Table 1
Sulfolane Content in Gasoline
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Product	Season	Sulfolane ppm
Data prior to 1992 is no longer available			
8/13/92	88 Octane	Summer grade	92
11/16/92	87 Octane	Winter grade	231
4/2/94	88 Octane	Winter grade	161
12/17/94	88 Octane	Winter grade	103
7/1/97	87 Octane	Summer grade	316
7/27/98	90 Octane	Summer grade	123
9/16/98	87 Octane	Summer grade	251
4/21/99	90 Octane	Winter grade	868
5/9/99	87 Octane	Summer grade	302
3/13/01	90 Octane	Winter grade	156
4/2/01	Sub grade	Winter grade	191
7/19/01	87 Octane	Summer grade	256
LIMS implemented 2002, maximum amount in an approved tank for each year:			
2002 Max	90 Octane	Winter grade	162
2002 Max	87 Octane	Summer grade	298
2003 Max	90 Octane	Summer grade	24
2003 Max	87 Octane	Winter grade	46
2004 Max	90 Octane	Summer grade	50
2004 Max	87 Octane	Summer grade	184
8/01/04 gasoline spec. for sulfolane was set at 48 ppm			
4/04/05 gasoline spec. for sulfolane was set at 56 ppm			
2005 Max	87 Octane	Winter Grade	52
2005 Max	90 Octane	Winter Grade	53
2006 Max	87 Octane	Winter Grade	53
2006 Max	90 Octane	Summer Grade	22
2007 Max	87 Octane		<2
2007 Max	90 Octane		<2
2008 Max	87 Octane	Summer Grade	55.5
2008 Max	90 Octane	Winter Grade	20
2009 Max	87 Octane		<2
2009 Max	90 Octane		<2

Table 2
Release Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
ND	19770731	Kerosene	100	North Pole Refinery
ND	19770807	Naphtha	150	North Pole Refinery
77-3	19770814	Gasoline	250	North Pole Refinery
77-4	19770902	Naphtha	120	Tank 502 dike
78-2|AL004424	19771001	Naphtha	200	Tank 502 dike
78-1|AL004425	19771226	Crude	150	Heat exchanger
78-3|AL004431	19771228	Naphtha	180	Control room|Crude tower|Utilities Building
78-4|AL004432	19780110	JP-4	50	JP-4 Filter|Loading Rack
78-5|AL004433	19780110	#1 fuel oil	1,000	Load Rack
78-6|AL004434	19780113	JP-4	10	Skid 6
78-9|AL004437	19780115	hago	3	Skid 5
78-11	19780117	JP-4	50	Loading Rack
78-15	19780119	Crude|Kerosene	10	Hot Oil Surge Tank
78-15	19780119	Crude	100	Crude charge pump skid
78-14	19780202	JP-4	12,000	Dike, sump & ditch at Tank 504
	19780203	Return oil	150	Adjacent to return oil pumps
	19780207	Return oil	100	Skid 4 return oil pumps
78-17A|AL004454	19780213	Lube oil	3	Skid 4 return oil pumps
78-18	19780213	JP-4	3	Salt tower
78-19	19780213	Reduced Crude	100	Skid at heat exchangers
78-20|AL004459	19780307	Crude oil	10	North Pole Metering Station
78-21|AL004458	19780317	waste oil	5	Fire water tank
	19780328	#2 Fuel Oil	20	Truck Loading Rack
78-23|AL004463	19780410	Return oil	200	Skid 4 return oil pumps
78-24	19780413	Kerosene	75	Truck Loading Rack
78-25|AL004467	19780805	JP-4	230	Inside Tank 502 dike
ND	19780907	Crude	5	Truck Loading Rack
ND	19781029	Propylene Glycol	1,150	Crude charge pump|Pipe rack|Skid #4
ND	19781031	JP-4	40	Tank 501
ND	19781204	JP-4	1,500	Tank
ND	19781221	JP-4	300	Tank
ND	19791214	#1 Fuel Oil	2,000	Within Tank 509 dike
ND	19800212	JP-4	5,600	Tank
ND	19800923	JP-4	60,000	Surplus DOD Tanks (old bolted tanks along Naphtha Avenue)
81-1|AL004485	19801120	JP-4	100	Tank
81-2|AL004488	19801220	Diesel	220	North Pole Refinery
81-3A|AL004493	19810110	JP-4	1,100	Tank
81-4|AL004496	19810507	Jet-A	200	Tank Car Loading Rack
81-5|AL004498	19810604	JP-4	100	Tank Car Loading Rack
81-6|AL004500	19810803	Jet A-1	50	Rail Loading Terminal
81-7	19810831	Jet A-1	200	Jet fuel tank farm
81-8|AL004504	19811101	Jet A-1	2,000	Tank 508|Tank 509
82-1|AL004511	19811103	#1 Heating|Diesel	150	Train Loading Rack
82-2|AL004513	19811118	#1 Heating	100	Rail Rack|Station 4
82-3	19811204	Jet-A|Kero	3,150	T-509
82-5|AL004526	19820105	Jet A	500	Rail Loading Station|Rail Rack
82-6|AL004528	19820223	Jet A	125	Rail Loading Terminal|Station 1
84-1|AL004536	19820722	Kerosene or Jet B|JP-4	1,000	Gathering sump|Process unit
84-10	19821104	Jet-B	300	Rail Loading Station|Rail Rack
85-1|AL004539	19821111	Jet-A	1,000	Load Rack|Rail Loading Terminal
ND	19840407	#4 Fuel Oil|hago	4,287	Rail Loading Station
ND	19840905	asphalt	200	Asphalt Unit
ND	19850123	Return oil	20	JP-4 Filter Skid
ND	19850125	Kerosene	100	Chemical addition
85-7 | AL004544	19850323	JP-4	17,000	Rail Loading Rack
85-8|AL004545	19850503	Kerosene	600	End of bottom loading rack
ND	19850505	Kerosene	1,000	Asphalt loading rack
86-1|AL004550	19850607	Crude	500	Block valve|North/South Pipe Rack
ND	19850913	asphalt	8,000	Truck Loading Area
86-3 | AL004556	19851002	Wastewater	100	Flow from lagoon west to gravel pit
	19860102	unleaded gas	8,400	Tank 617|Tank Farm
86-8 | AL004564	19860424	Unleaded gasoline	8,400	Tank 617 (near intersection of Williams Ave. and Gasoline Alley)
ND	19860429	hago	2,500	Tank Dike
87-2|AL004589	19861204	Jet-A	900	Jet A filter skid Tank 402 dike
87-5|AL004594	19861212	Oil	200	
87-4|AL004593	19870101	HAGO	20,000	Spread northerly from skids 5 & 6 under the pipe rack
87-6	19870325	Jet-A	15	T-508 Dike
87-7	19870408	Jet-A	15	Old bottoms loading rack
87-8|AL004599	19870408	#2 Diesel	100	Tank 401
87-9|AL004601	19870415	Crude	100	Charge skid
87-10	19870416	Crank case oil	10	Generator Building
87-11|AL004607	19870916	Effluent water	250	Waste water lagoon dike
88-2 | AL004612	19871008	Jet-A	5	Sump 922
88-4|AL004616	19871013	hago|Propylene Glycol	1	North/South Pipe Rack|Salt Dryers
88-5|AL004618	19871111	LAGO	10	Tank 404
88-6	19880115	JP-4|Kero	20	Tank Dike 404
88-7|AL004624	19880426	Jet-A	10	North/South Pipe Rack|Tank Farm

Table 2
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North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
	19880627	Mixed products	30	Old Truck Loading Rack
88-8 | AL004628	19880709	JP-4|Kero	20	Sump 05-7
88-9|AL004631	19880715	hago	250	crude unit #1
88-11|AL004635	19880722	hago	5	HAGO Filters
AL004643	19880723	Oil	5	Salt Dryers
	19880922	Oily water	200	Tank 508 dike
AL004647	19881123	Oily Water	140	Sump 05-7
89-4|AL004650	19890114	Jet-A	10	Rail Spur
89-5|AL004653	19890121	hago	100	Rail Loading Rack
90-1	19890204	hago	30	Boiler Building|HAGO Transfer Line to GVEA
90-2	19890512	#1 Diesel	10	Load Rack
90-3	19891227	#2 Diesel	40	Rail Rack Loading Area|Sump 902
90-4	19900115	Jet A	100	Rail Rack
90-6	19900126	hago	30	North/South Pipe Rack
91-1	19900402	Oily Water	120	Lagoon B
91-2	19900417	asphalt|Kerosene	15	Pipe rack
91-3	19900705	JP-4	2,400	Tank 501 Dike
91-4	19910129	Gasoline	100	Rail Loading Rack
91-5	19910404	Kerosene	8,000	Tank 302
91-6	19910619	Asphalt AC-5	200	Asphalt Truck rack
92-1	19910626	#2 Fuel Oil	50	Utility Building
ND	19910709	AC-5	100	Asphalt load rack
ND	19911024	hago	25	Effluent Building|Rail Spur
ND	19920114	Nalco 5376	5	Tank 191
ND	19920328	JP-4	400	Tank dike area around tanks
92-6	19920404	Naphtha	1,250	East end How Baker Unit
92-7	19920422	AC-5	118	Rail Rack Loading Area
92-8	19920517	Crude	5	crude unit #1
92-9	19920612	Av Fuel	4,000	North Pole Refinery
92-11	19920624	Diesel	50	Rail Rack
92-13	19920714	Hydraulic Oil	20	Rail Rack|Spur track
ND	19920805	Return crude	5	crude unit #1|Pipe rack
93-3	19920909	Premium unleaded gasoline	50	Rail Rack
93-4	19921124	Jet A	187	Rail Loading Rack
93-5	19930203	Kerosene	3,600	Rail rack
93-6	19930210	Oily Water	250	Effluent Building|Tank 192
93-8	19930401	Oil	1	Generator Building|Pipe rack
93-9	19930417	Kerosene	30	Rail Spur
93-10	19930423	hago	500	Truck rack
93-12	19930607	unleaded gas	10	Rail Rack Station 4
93-11	19930608	LAGO	5	Distribution Building
93-14	19930610	unleaded	304	Distribution Gas Loading Rack|Station 5
93-15	19930701	JP4	10	Military Skid|Piping manifold
93-16	19930721	waste oil	3	Maintenance Building
93-17	19930728	Kerosene	10	Sump 5103
ND	19930729	Hydrocarbon	30	S-908|Salt tower
93-19	19930825	Oil	51	Rail Loading Rack
ND	19930923	Oily Water	20	Salt tower skid
93-21	19931104	Jet A	1,255	Rail Rack
94-01	19931105	Lubrizol	3	Truck Loading Rack
94-02	19931111	Jet a	11,500	Truck Loading Rack
94-03	19931206	asphalt	5	Rail Tracks
94-04	19940102	asphalt|hago	0.5	Blower Building|Rail Car Steam Header
94-05	19940117	Oily Wastewater	400	Lagoon A
94-06	19940126	#4 Fuel Oil|hago	3	Track #4
94-08	19940130	Effluent water	500	C pond
ND	19940205	FSII	1	FSII Pump Box
94-10	19940315	Resid	1	Resid Pump
94-11	19940331	AC 2.5|ARC|LAGO	5	Truck rack
ND	19940420	Wastewater	400	North of Lagoon B
94-12	19940428	unleaded gas	3	Road by rail sump
94-13	19940430	Wastewater	1,000	Lagoon B
94-15	19940503	#1 Fuel oil	100	North Pole Refinery
94-16	19940517	Kerosene	20	Sump 04-3
94-17	19940607	AC-5	50	Lane 8|Truck Loading Facility
94-18	19940616	Jet A-1	9	Rail Rack Station 2
94-19	19940810	hago	5	Hago salt tower|North/South Pipe Rack
94-20	19940829	AC-5	10	Lane 8|Truck Loading Area
94-21	19940830	Gasoline	1,300	Rail station between tracks 3 & 4
ND	19941003	Resid	1.5	5180 Reject Pump
94-23	19941010	Resid	10	Injection pump 5180 & 397
95-3	19941109	Diesel	870	Rail Loading Rack
ND	19941113	Ethylene Glycol	165	VRU
95-05	19941215	JP-4|Kerosene	10	Pipe rack|Tank 401
95-06	19950413	unleaded gas	200	Rail Rack
092095IR.065|95-09	19950424	Diesel	100	Truck rack
95-11	19950614	FSII	15	FSII Injection Skid

Table 2
Release Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
ND	19950618	JP-4|unleaded gas	5	Tank 515
ND	19950920	#4 Fuel Oil|hago	10	Skid #5
110995IR.092	19951021	wastewater	30	CTX Box Skid
1116951IR.095	19951101	Additive	313	Additive enclosure and wastewater system
ND	19951109	Jet-A	100	Rail Rack|Station 4
120195IR.107	19951109	Jet-A	103	Rail Rack|Station 4
ND	19951114	HAGO	300	Truck rack paved area only
031796IR.010	19951116	Kerosene	10	CU2 Salt Tower skid
040996IR.016	19951201	Gasoline	100	Lane 1|Truck rack
050196IR.027	19960201	wastewater	10	Blower Building|Lagoon A
051096IR.023	19960315	Slop oil	2	Crude #1 charge pump|Pipe rack
062596IR.038	19960409	Naphtha	15	JP-4 Salt Tower
ND	19960501	Slop oil	300	Utilidor
ND	19960510	Slop oil | Sump Sludge	20	Distribution Rail Loading Sump|Sump 158
100796IR.063	19960625	Resid | Return oil	5	Return oil pipeline
110196IR.075	19960627	Crude	1,200	Crude Unit 1 Desalter
041497IR.028	19960812	Gasoline	94	Truck rack lane 6
ND	19961007	Mixture of Various Hydrocarbon Products		Sump 902
ND	19961101	aromatics|Gasoline	750	Tank 513|Tank Farm
060597IR.050	19970414	Kerosene	10	Crude #1|Slop manifold
	19970425	Gasoline	750	North Pole Refinery
060797IR.46	19970501	Propylene Glycol	7,400	North Pole Refinery
062397IR.056	19970605	Gasoline	1	Infiltration Gallery | Air Stripper Effluent Pond
070797IR.057	19970607	Gasoline	500	Rupture in off-site slop oil line during increase in pressure
ND	19970608	Slop oil	100	S-921 Discharge piping
ND	19970623	Wastewater	100	Sump 903 | Charge skid|crude unit #1
ND	19970707	#1 Diesel	40	Roadway|Truck rack fence line
072997IR.063	19970714	Diesel	200	Truck rack, lane 3
ND	19970718	Crude	500	North Pole Refinery
ND	19970722	Oily Water	100	Ground surrounding sump
ND	19970729	Kerosene	100	Lane 3|Truck Loading Rack
082297IR.078	19970822	Oily Water	100	Sump 908
082397IR.079	19970828	Sulfolane	9	Sulfolane Unit
090897IR.080	19970908	Oily Water	200	Tank 192|Utility Building
ND	19971012	Kerosene	400	New naphtha extraction skid
103107IR.098	19971031	Oily Water	200	Oily water line|Pipe rack
ND	19971107	Wastewater?	100	North Pole Refinery
ND	19971107	Wastewater?	500	North Pole Refinery
111297IR.100	19971112	Oily Water	50	Effluent Building|Sump 905
	19971218	Kerosene	150	Naphtha extractor skid on ground level
020998-IR-6	19980103	Kerosene	10	Auxiliary tank
010698IR.005|98021	19980106	glycol	150	C-Pond|Outlet piping
020998-IR-9	19980108	JP-4	5	Tank Farm
011298IR.004	19980112	Gasoline	0.5	Air Stripper Effluent Pond
980309-IR-28	19980309	glycol	50	JP-4 Filter Skid | Tank Farm
0980520-IR-89	19980520	wastewater	50	Drain line|Lab
980526-IR-96	19980524	Propylene Glycol	200	Asphalt loading pump|Tank Farm
980628-IR-130	19980627	Residual Crude	15	CU1|Pipeline|Piperack
980714-IR-150	19980714	glycol	2	Tank Farm
980827-IR-212	19980826	Propylene Glycol	40	Kero Loading filter|Piperack|Tank Farm
980109-IR-223	19980829	Nalco 5541	150	Crude #1
980921-IR-242	19980830	glycol	4,140	Crude #1 Heating Glycol System|Maintenance Building
980901-IR-222	19980901	unleaded gas	3	Check valve|Pipe rack|Truck rack
ND	19980901	Nalco 5541	150	Secondary containment
ND	19980929	Propylene Glycol	200	Crude Unit #1 Glycol Heater 5005, Secondary containment
981007-IR-262	19981002	Hydrocarbon	5	Gas Skid Sump|Tank Farm
981014-IR-269	19981014	Propylene Glycol	40	CU3|Glycol system
981102-IR-280	19981102	Hydrocarbon	10	Crude 1
ND	19981115	Residual Oil	280	Crude Unit #1 Secondary containment
ND	19981129	Kerosene	1,500	Tank Farm - Sump 922
ND	19990108	Benzene Overhead product	200	Crude Unit #2 BeRT Unit - secondary containment
ND	19990117	Kerosene	300	Truck rack - sump
ND	19990623	Asphalt AC-5	200	Trank Farm - Tank 822 loading skid
93-13	19990721	Oily Water	10	CU1 Resid Stripper
991130-IR-112	19991128	Propylene Glycol	300	Behind Lt. Kero product pumps near the BERT unit by CU2
ND	19991231	Kerosene	488	North Pole Refinery
000127-IR-9	20000126	Gasoline	10	Truck rack|VRU knock out drum
ND	20000216	Kerosene	200	Tank Farm - skid form filter vessel
ND	20000301	Naphtha	150	Rail rack - strainer housing
000511-IR-44	20000509	MEA	10	Crude 2
000522-IR-47	20000522	Oily Wastewater	40	Utility Building
ND	20000525	Diesel	500	North Pole Refinery
000604-IR-52	20000604	#2 LAGO	59	Truck rack
000622-IR-59	20000621	Propylene Glycol	40	Crude 2
000623-IR-61	20000623	glycol	92	crude unit #1
000710-IR-70	20000710	Oily Water	20	Boiler Building|CU1 I/O Building | Utility Building

Table 2
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North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
000718-IR-78	20000718	Kerosene	4	Truck rack
000808-IR-84	20000808	#2 Diesel	40	Drain cup|Tank Farm
000814-IR-87	20000813	Desalter water	5	Crude 3|Oily water line
ND	20000821	Propylene Glycol	144	Tank farm
000918-IR-99	20000918	glycol	45	crude unit #2
000920-IR-100	20000920	glycol	50	Crude 2|Hot glycol system
ND	20000920	glycol	800	
000929-IR-105	20000927	Gasoline	250	Tank Farm
001013-IR-115	20001013	Crude	20	Administration building|Crude #1 slop manifold
001014-IR-117	20001013	LAGO	50	Administration building | Tank 402 - NE Corner
ND	20001204	Groundwater	1,000	Tank Farm - Recovery well line
001208-IR-144	20001208	Oily Water	45	crude unit #2|Crude Unit #3
001219-IR-149	20001219	Kero Rich Solvent	30	Extraction Unit
010113-IR-3	20010113	Ground water	200	Tank Farm
010118-IR-9	20010118	Oily Water	5	Crude Unit #3|Oily water line
010122-IR-10	20010122	Kero	50	Rail Rack
010214-IR-17	20010213	glycol	30	Crude 2|East/West Pipe Rack|Glycol trace
010220-IR-23	20010218	Propylene Glycol	240	crude unit #2 | Tank Farm
010219-IR-22	20010219	water/brine	35	CU3 oily water line on CU2 side of Fin Fan Alley|Extraction Unit
010313-IR-30	20010313	Kerosene|Oily Water	20	Oily water line|Tank Farm
010326-IR-39	20010323	glycol	1	Tank Farm
010313-IR-38	20010323	hago	150	Tank Farm
010404-IR-45	20010402	hago	2	Tank Farm
010402-IR-42	20010402	Propylene Glycol	158	Crude 2
010404-IR-46	20010404	Kerosene	5	crude unit #2
010410-IR-52	20010410	Sodium Hydroxide	2	Maintenance Building
010418-IR-69	20010418	K050 wastewater	1	500-bbl tank rented by CEDA from R&K Industrial
010418-IR-68	20010418	K050 wastewater	10	Heat exchanger cleaning skid
010427-IR-91	20010426	Hydrocarbon sulfolane	40	Rail Rack
010501-IR-95	20010430	Kero	20	Rail Rack
010502-IR-96	20010502	hot ARC	1	Asphalt load arm, Station 8|Truck rack
010504-IR-98	20010504	Oily Water	0.5	Crude 1
010508-IR-101	20010507	K050 wastewater	40	Tank Farm
010531-IR-111	20010531	Kero	8	Truck rack
010614-IR-130	20010614	Gasoline	306	Rail Rack
010617-IR-137	20010616	wastewater	300	Benzene Strippers|Crude #1|Inlet line|Tank 198
ND	20010616	HAGO	1,500	Tank Farm HAGO Drier
010629-IR-148	20010629	Propylene Glycol	10	Tank Farm
010706-IR-156	20010706	wastewater	2	crude unit 3
010716-IR-160	20010713	Propylene Glycol	160	Flare Stack | Tank Farm
010726-IR-172	20010725	AC PG 52-28	2	Station 8|Truck rack
010801-IR-176	20010801	wastewater	20	Oily water line near tank 192|Utility Building
010822-IR-191	20010822	hago	5	Sump 904|Tank Farm
010914-IR-213	20010914	Sulfolane	5	Effluent Building|Utility Building
010918-IR-221	20010917	glycol/water mixture	725	Crude 2|Underground heat tracing near salt towers across from Fire Hall
010925-IR-230	20010925	Oily Water	20	Tank Farm
010927-IR-233	20010927	Propylene Glycol	200	Glycol trace|Tank Farm
011115-IR-390	20011115	ANS crude oil	3	Crude 3
ND	20011208	Propylene Glycol	165	Tank Farm
ND	20011211	Kerosene	5	Asphalt piping sample point
011212-IR-486	20011211	Kerosene	5	Tank Farm
020103-IR-5	20020103	Residual oil & kero	2,000	Crude 1
ND	20020209	Propylene Glycol	147	Crude Unit #2 coupler fitting
ND	20020221	Automatic transmission fluid	6	Track machine
020430-IR-585	20020429	Naphtha Wash Water	800	Crude 2
020430-IR-591	20020430	IRIS Inspection Water with very low percentage Kerosene	55	Off-site
020509-IR-723	20020509	Oily Water	5	Crude 2
ND	20020510	ARC	300	Crude Unit #1 Charge Skid Sump
020516-IR-784	20020515	glycol	10	Glycol header|Tank Farm
020516-IR-777	20020515	Sulfolane	75	Crude 1|Portable transfer pump
ND	20020524	Oily Water	1	Sump Drain
ND	20020602	asphalt	3	Asphalt loading arm
020626-IR-1024	20020626	Propylene Glycol	10	Heat trace for CTX stack exhaust|Utility Building
020711-IR-1090	20020711	antistrip	0.25	Truck rack
ND	20020715	Sulfolane	150	Crude Unit #1 Tank 194
020717-IR-1117	20020717	asphalt	20	Truck rack
020719-IR-1128	20020719	asphalt	9	Asphalt loading arm
020819-IR-1278	20020817	wastewater	10	Crude 1
020902-IR-1333	20020831	Kerosene	30	Rail Rack|Strainer screen
020908-IR-1365	20020908	Avgas LL100	5	Truck rack
020914-IR-1395	20020912	Hydraulic Oil	4	Distribution|Track mover
021024-IR-1599	20021021	Propylene Glycol	140	Crude #2
ND	20021031	Kerosene	225	Truck Rack Lane 2 Load Arm
021102-IR-1648	20021102	Hydaulic fluid (oil)	4	Loading Rack
021102-IR-1649	20021102	Propylene Glycol	20	Crude Unit #3|Glycol heat trace
021121-IR-1727	20021121	glycol	280	CU#1|Glycol line|Portable air compressor

Table 2
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North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
021123-IR-1736	20021123	ethelene glycol	7	Distribution
021127-IR-1750	20021126	glycol	15	Crude 1
021213-IR-1809	20021213	Propylene Glycol	86	crude unit #2|Heat trace|Tank Farm
030311-IR-303	20030311	Jet A	3	Distribution
030407-IR-406	20030406	Kero	2	Distribution
030514-IR-614	20030513	ARC	15	crude unit #1
030515IR.675	20030516	Oily Water	200	railtrack|Sump 5118
030517-IR-698	20030517	AFFF Foam	0.25	Contractor Parking area
030531-IR-835	20030531	antistrip|Pave Bond	2	Anti-strip tank|Truck Loading Rack
030610-IR-890	20030610	hago	30	GVEA Metering Building
ND	20030711	Jet A	7	
030817-IR-1274	20030817	hago	1	crude unit #2|Hago salt tower|Tank Farm
ND	20030903	Propylene Glycol	50	Propylene Glycol heat tracing
030918-IR-1522	20030918	Mineral Oil	50	Gasket|Transformer ET-2101B
031008-IR-1642	20030929	glycol	15	Gravel pad|Tank Farm
031008-IR-1642	20030929	Propylene Glycol	15	Tank Farm
030930-IR-1588	20030930	Oil	3	Tank Farm
031020-IR-1707	20031017	AC 5|ARC	3	Lane 7|Truck rack
031017-IR-1692	20031017	Propylene Glycol	45	NPR Tank Farm
031202-IR-1934	20031202	Crude oil	200	NPR Boiler House (107)
040413-IR-391	20040412	Kerosene	25	Rail Rack
040419-IR-410	20040419	Mineral Oil	5	Crude Unit #3
040422-IR-423	20040422	JP-8|Kerosene	3	Military Skid|Tank Farm
040512-IR-452	20040512	heating oil #2	2	Warehouse Complex
040528-IR-488	20040528	Kero	1	Warehouse Complex
040606-IR-497	20040605	LAGO|Water	5	Tank Farm; Tank 402
ND	20040608	LAGO	4	Lago loading line drain
040608-IR-500	20040608	LAGO	9	Skid 6|Tank Farm
040615-IR-506	20040614	Chromium		Tank Farm
040617-IR-508	20040617	Hydraulic Oil		Rail Loading Rack
040623-IR-518	20040623	Demulsifier; EC2043A	0.5	P-5535
ND	20040623	EC2043A	0.5	
040628-IR-524	20040628	Jet Fuel	250	Rail Rack|Station 1
040630-IR-526	20040629	asphalt	40	Asphalt Truck rack|Lane 7
ND	20040711	LAGO	154	Rail Rack
040722-IR-569	20040722	asphalt	8	Tank Farm
ND	20040731	Kerosene	1,071	Crude Unit #2
ND	20040927	water/oil	5	FHR terminal|SW corner of asphalt scale
ND	20040930	glycol	21	Hot glycol heat trace|North of the terminal building
ND	20040930	glycol	21	Glycol line tracer
ND	20041023	Propylene Glycol	178	East West Pipe Rack
Lynx 5432	20041025	glycol	52	CU#3 Chemical Building|Glycol tracer
ND	20041028	Oily Wastewater	390	Sump 5002
5468	20041108	glycol	15	CU1|Portable air compressor
5501	20041202	ASA Stadis 450	0.001	ASA injection system|Truck Loading Rack
5541	20041227	hydraulic fluid	1	Blend Building|CU#3
ND	20050102	Propylene Glycol	5	CU2 Glycol pipe rack north of Extraction Unit
ND	20050125	Liquid Gas|Water		Sulfatreat
ND	20050405	Propylene Glycol	250	CU3
ND	20050405	glycol	250	Crude Unit #3|Hot glycol system
6951	20050429	Kerosene	5	Tank 302 Foam Chamber Piping
6758	20050529	JP-4	1	Tank 511
7030	20050603	Process water / oily water	8	crude unit 3|Oily water piping
ND	20050624	Sulfolane	0.008	Tank 194 solvent tanks|Tank 194 transfer line
7241	20050910	Asphalt	75	Truck Loading Rack
ND	20051031	Propylene Glycol	20	Fitting|Glycol line|Piperack|Slop manifold
ND	20060116	Nalco 2043	0.016	2043 Bulk Tank|Bulk Tank Dike|Check valve
9795	20060126	Ferric Chloride	110	C pond
ND	20060213	Hitec 6560 Fuel Additive	0.004	Truck rack
10886	20060414	Jet A	100	Rail Rack|Station 2
ND	20060512	Oily Water	600	Exchanger Wash Skid
ND	20060519	Jet Fuel	2	Flange connection|Nap line tie in
ND	20060704	FeCl, Propylene Glycol	162	Ferric Chloride Pump
12331	20060725	Oily water	200	ASIG Pit sump
ND	20060725	glycol	329	crude unit #2; Glycol System
ND	20060917	Kero	3	Fuel terminal
ND	20061216	Jet A	108	Rail Rack
15963	20070426	Jet Fuel	50	Anchorage Railrack
16552	20070606	Pave Bond	0.25	Anchorage Asphalt Yard
17662	20070822	Hydaulic oil	0.13	Maintenance Building
21838|5429	20080422	Fuel oil	1	Maintenance Building parking area
23417	20080709	Oily Water	25	crude unit #2|Hago salt tower|Pipe rack
23587	20080723	Rectifier Vapor/Water	0.125	crude unit #2
6344	20080904	OVHD Desalter Water	50	CU2
25059|6381	20080913	LAGO|Oily Water	15	Sump 908
25060	20080915	waste thinner	0.125	Bucket|Field of Dreams|Gravel field north of CU2
27525	20081212	Propylene Glycol	75	Asphalt Dike|Heat tracing on gasoline load line to rail rack

Table 2
Release Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Facility Tracking Number	Date	Material	Volume Spilled (gallons)	Location
27931	20090110	Hydaulic fluid	2	North Tank dike
27932	20090112	oily water	8	Utilities Tank 196 | Wastewater piping
81858	20090728	Treated waste water	25	CPS Overflow Sump
31942	20090731	Futurathane 5040 part A	0.008	APC Trailer
33695	20091013	Hydaulic fluid	5	Hydraulic hose|Rail Rack|Track 3|Track machine
34714	20091128	Recovery Well Water	84	Recovery Well #35|Recovery Well #39|Recovery Well Line
34841	20091203	Recovery Well Water	0.125	Discharge valve|Recovery Well #39

Table 3
Well Construction Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Monitoring	MW-101	Apr 1987	494.44	3.30	491.1	61.0	430.1	—	2.0	56.0	435.1	61.0	430.1	5.0	0.020	ss	ss?	3927588.78	1428199.67
	MW-101A	Apr 1987	495.93	4.64	491.3	23.0	468.3	—	2.0	17.8	473.5	22.8	468.5	5.0	0.020	ss	ss?	3927590.29	1428209.63
	MW-102	Apr 1987	495.94	3.40	492.5	71.5	421.0	—	2.5	61.5	431.0	71.5	421.0	10.0	0.010	PVC	PVC?	3927955.12	1429113.91
	MW-104	Apr 1987	496.01	3.05	493.0	67.0	426.0	—	2.5	63.0	430.0	67.0	426.0	4.0	0.020	PVC	PVC?	3927958.82	1429747.75
	MW-105	Apr 1987	497.64	2.44	495.2	63.0	432.2	—	2.0	58.0	437.2	63.0	432.2	5.0	0.020	ss	ss?	3924918.95	1430402.38
	MW-105A	Apr 1987	499.19	3.41	495.8	23.0	472.8	—	2.0	18.0	477.8	23.0	472.8	5.0	0.020	ss	ss?	3924910.02	1430404.24
	MW-106	Nov 1987	499.21	1.41	497.8	23.0	474.8	—	2.0	18.5	479.3	23.0	474.8	4.5	0.020	PVC	PVC?	3926112.10	1428065.05
	MW-109	Aug 1988	495.17	0.34	494.8	14.0	480.8	—	2.0	9.5	485.3	14.0	480.8	4.5	0.020	PVC	PVC?	3925855.20	1428674.99
	MW-110	Aug 1988	496.64	3.34	493.3	18.0	475.3	—	2.0	13.5	479.8	18.0	475.3	4.5	0.020	PVC	PVC?	3925975.36	1428873.06
	MW-111	Sep 88 / Jun 97	493.53	2.12	491.4	19.5	471.9	—	2.0	14.5	476.9	19.5	471.9	5.0	0.020	PVC	PVC?	3926568.20	1428698.07
	MW-113	Sep 1988	494.38	2.97	491.4	16.0	475.4	—	2.0	11.5	479.9	16.0	475.4	4.5	0.020	PVC	PVC?	3926957.71	1428777.98
	MW-115	Sep 1988	495.88	2.61	493.3	17.0	476.3	—	2.0	12.5	480.8	17.0	476.3	4.5	0.020	ss	ss?	3925758.76	1429540.81
	MW-116	Sep 1988	496.19	2.93	493.3	17.0	476.3	—	2.0	12.0	481.3	17.0	476.3	5.0	0.020	ss	ss?	3925670.10	1429332.64
	MW-118	Mar 1990	496.90	3.97	492.9	43.0	449.9	—	2.0	38.5	454.4	43.0	449.9	4.5	0.020	ss	PVC	3927467.01	1429638.43
	MW-124	Jun 1990	497.12	2.92	494.2	24.5	469.7	—	2.0	20.0	474.2	24.5	469.7	4.5	0.020	PVC	PVC?	3927015.09	1429816.83
	MW-125	Jun 1990	497.15	4.07	493.1	24.0	469.1	—	2.0	19.5	473.6	24.0	469.1	4.5	0.020	PVC	PVC	3927032.49	1429569.75
	MW-126	Jun 1991	495.55	3.75	491.8	24.5	467.3	—	2.0	20.0	471.8	24.5	467.3	4.5	0.020	PVC	PVC	3927426.37	1429419.17
	MW-127	Jun 1991	496.36	3.46	492.9	24.5	468.4	—	2.0	20.0	472.9	24.5	468.4	4.5	0.020	PVC	PVC	3927476.29	1429065.47
	MW-129	Oct 1996	496.06	3.26	492.8	41.5	451.3	—	2.0	37.0	455.8	41.5	451.3	4.5	0.020	PVC	PVC	3927205.45	1429720.22
	MW-130	Apr 1997	496.87	2.76	494.1	23.0	471.1	—	2.0	19.0	475.1	23.0	471.1	4.0	0.020	PVC	PVC	3926825.66	1429354.64
	MW-131	Jul 1998	495.69	1.79	493.9	24.5	469.4	—	2.0	20.0	473.9	24.5	469.4	4.5	0.020	PVC	PVC	3927936.24	1429024.82
	MW-132	Sep 1999	499.44	2.24	497.2	22.0	475.2	—	2.0	17.5	479.7	22.0	475.2	4.5	0.020	PVC	PVC	3926600.34	1429997.01
	MW-133	Sep 1999	498.36	2.06	496.3	22.0	474.3	—	2.0	17.5	478.8	22.0	474.3	4.5	0.020	PVC	PVC	3926597.42	1430160.18
	MW-134	Sep 1999	497.79	2.55	495.2	21.5	473.7	—	2.0	17.0	478.2	21.5	473.7	4.5	0.020	PVC	PVC	3926000.91	1430170.26
	MW-135	Mar 2001	496.93	3.45	493.5	19.5	474.0	—	2.0	10.6	482.9	19.5	474.0	8.9	0.020	PVC	PVC	3927024.53	1429730.91
	MW-136	Mar 2001	496.93	2.91	494.0	19.1	474.9	—	2.0	10.1	483.9	19.1	474.9	9.0	0.020	PVC	PVC	3927024.41	1429778.02
	MW-137	Mar 2001	497.45	3.65	493.8	19.3	474.5	—	2.0	10.4	483.4	19.3	474.5	8.9	0.020	PVC	PVC	3927083.81	1429737.46
	MW-138	Apr 2001	496.34	3.09	493.3	18.1	475.2	—	2.0	3.9	489.4	18.1	475.2	14.2	0.020	PVC	PVC	3925738.32	1429686.77
	MW-139	May 2001	497.18	1.89	495.3	25.0	470.3	—	2.0	5.7	489.6	25.0	470.3	19.3	0.020	PVC	PVC	3927427.97	1428848.56
	MW-140	May 2001	494.85	2.69	492.2	23.5	468.7	—	2.0	4.2	488.0	23.5	468.7	19.3	0.020	PVC	PVC	3927683.10	1429244.57
	MW-141	Oct 2001	492.39	2.12	490.3	22.4	467.9	—	2.0	7.9	482.4	22.4	467.9	14.5	0.020	PVC	PVC	3927598.03	1427540.67
	MW-142	Aug 2001	496.08	3.10	493.0	19.4	473.6	—	2.0	5.4	487.6	19.4	473.6	14.0	0.020	PVC	PVC	3927602.87	1428813.48
	MW-143	Aug 2005	495.23	3.35	491.9	19.5	472.4	—	2.0	4.7	487.2	19.5	472.4	14.8	0.020	PVC	PVC	3927688.65	1428487.50
	MW-144A	Sep 2005	495.25	1.69	493.6	24.7	468.9	—	2.0	5.7	487.9	24.7	468.9	19.0	0.020	PVC	PVC	3927485.68	1429623.04
	MW-144BR	9/21/11	494.99	2.67	492.3	90.5	401.8	—	2.0	85.4	406.9	89.9	402.4	4.5	0.010	PVC	PVC	3927483.20	1429632.06
	MW-145	Aug 2005	495.61	2.91	492.7	19.0	473.7	—	2.0	4.7	488.0	19.0	473.7	14.3	0.020	PVC	PVC	3927212.61	1429712.57
	MW-146A	Sep 2008	495.07	2.74	492.3	16.0	476.3	—	2.0	6.0	486.3	16.0	476.3	10.0	0.020	PVC	PVC	3927201.05	1427049.42
	MW-146B	Sep 2008	494.95	2.40	492.6	28.0	464.6	—	2.0	22.0	470.6	27.0	465.6	5.0	0.020	PVC	PVC	3927193.28	1427048.17
	MW-147A	Oct 2008	491.90	2.32	489.6	13.0	476.6	—	2.0	3.0	486.6	13.0	476.6	10.0	0.020	PVC	PVC	3927723.21	1427288.46
	MW-147B	Sep 2008	492.57	2.82	489.8	26.0	463.8	—	2.0	20.5	469.3	25.5	464.3	5.0	0.020	PVC	PVC	3927729.22	1427290.37
	MW-148A	Oct 2008	492.99	2.08	490.9	15.0	475.9	—	2.0	5.0	485.9	15.0	475.9	10.0	0.020	PVC	PVC	3928675.03	1428153.49
	MW-148B	Oct 2008	493.25	2.96	490.3	29.0	461.3	—	2.0	22.0	468.3	27.0	463.3	5.0	0.020	PVC	PVC	3928677.21	1428158.65
	MW-148C	9/27/11	493.05	2.64	490.4	55.7	434.7	—	2.0	50.7	439.7	55.2	435.3	4.4	0.010	PVC	PVC	3928670.73	1428140.18
	MW-148D	9/26/11	493.32	2.98	490.3	151.0	339.4	151.5	2.0	145.9	344.4	150.4	340.0	4.4	0.010	PVC	PVC	3928673.10	1428146.93
	MW-149A	Oct 2008	493.65	3.10	490.6	14.0	476.6	—	2.0	4.0	486.6	14.0	476.6	10.0	0.020	PVC	PVC	3928676.81	1428953.13

Table 3
Well Construction Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Monitoring	MW-149B	Oct 2008	493.34	2.64	490.7	21.0	469.7	—	2.0	14.0	476.7	19.0	471.7	5.0	0.020	PVC	PVC	3928677.69	1428959.56
	MW-150A	10/2/09	487.03	-0.54	487.6	11.6	476.0	—	2.0	6.7	480.9	11.1	476.5	4.4	0.010	PVC	PVC	3930163.44	1426522.55
	MW-150B	10/2/09	487.20	-0.32	487.5	24.6	462.9	—	2.0	20.6	466.9	24.5	463.0	3.9	0.010	PVC	PVC	3930162.06	1426527.97
	MW-151A	10/7/09	487.09	-0.53	487.6	15.5	472.1	—	2.0	10.0	477.6	15.0	472.6	5.0	0.010	PVC	PVC	3930152.81	1427042.16
	MW-151B	10/2/09	487.07	-0.64	487.7	23.6	464.1	—	2.0	18.5	469.2	23.1	464.6	4.6	0.010	PVC	PVC	3930154.30	1427034.87
	MW-151C	2/18/10	491.02	3.21	487.8	57.7	430.1	65.0	2.0	52.6	435.3	57.2	430.7	4.6	0.010	PVC	PVC	3930151.93	1427038.65
	MW-152A	10/7/09	488.40	-0.24	488.6	16.0	472.6	—	2.0	10.6	478.0	15.0	473.6	4.4	0.010	PVC	PVC	3930112.63	1427987.59
	MW-152B	10/7/09	488.00	-0.51	488.5	25.4	463.1	—	2.0	19.9	468.6	24.4	464.1	4.5	0.010	PVC	PVC	3930112.89	1427983.05
	MW-152C	9/28/11	488.10	-0.68	488.8	65.2	423.6	67.5	2.0	60.1	428.7	64.6	424.2	4.4	0.010	PVC	PVC	3930113.17	1427992.07
	MW-153A	10/7/09	490.17	-0.35	490.5	16.0	474.5	—	2.0	10.6	479.9	14.5	476.0	3.9	0.010	PVC	PVC	3928749.86	1427720.55
	MW-153B	4/20/10	489.73	-0.58	490.3	56.7	433.7	59.0	2.0	51.6	438.7	56.1	434.2	4.5	0.010	PVC	PVC	3928741.21	1427721.08
	MW-154A	10/5/09	497.99	2.82	495.2	75.5	419.7	—	2.0	71.0	424.2	75.0	420.2	4.0	0.010	PVC	PVC	3927391.51	1428835.89
	MW-154B	2/20/10	497.68	2.61	495.1	95.0	400.1	102.0	2.0	90.2	404.9	94.8	400.3	4.6	0.010	PVC	PVC	3927410.23	1428845.45
	MW-155A	11/11/09	488.16	-0.52	488.7	15.5	473.2	—	2.0	5.4	483.3	15.1	473.6	9.7	0.010	PVC	PVC	3930320.08	1425509.58
	MW-155B	9/11/10	488.21	-0.50	488.7	65.8	422.9	67.0	2.0	60.8	427.9	65.2	423.5	4.4	0.020	PVC	PVC	3930314.75	1425510.07
	MW-156A	11/12/09	485.83	-0.33	486.2	15.5	470.7	—	2.0	5.4	480.8	15.1	471.1	9.7	0.010	PVC	PVC	3931955.04	1425536.52
	MW-156B	2/17/10	489.29	2.99	486.3	50.4	435.9	51.5	2.0	45.2	441.1	50.0	436.3	4.8	0.010	PVC	PVC	3931949.92	1425537.02
	MW-157A	11/13/09	485.00	-0.55	485.6	15.5	470.1	—	2.0	5.4	480.2	15.1	470.5	9.7	0.010	PVC	PVC	3932561.84	1426870.93
	MW-157B	9/30/11	484.72	-0.68	485.4	30.7	454.7	40.0	2.0	25.7	459.7	30.1	455.3	4.4	0.010	PVC	PVC	3932567.15	1426874.11
	MW-158A	11/13/09	487.83	-0.46	488.3	15.6	472.7	—	2.0	5.5	482.8	15.2	473.1	9.7	0.020	PVC	PVC	3931120.65	1426869.14
	MW-158B	9/23/10	487.38	-0.65	488.0	60.6	427.4	65.0	2.0	55.6	432.4	60.1	427.9	4.5	0.020	PVC	PVC	3931119.26	1426874.85
	MW-159A	11/13/09	488.42	-0.56	489.0	15.6	473.4	—	2.0	5.5	483.5	15.2	473.8	9.7	0.020	PVC	PVC	3931101.34	1427690.57
	MW-159B	10/12/11	488.20	-0.87	489.1	46.2	442.9	—	2.0	41.2	447.9	45.6	443.5	4.4	0.010	PVC	PVC	3931101.12	1427679.28
	MW-159C	9/29/11	488.63	-0.50	489.1	72.3	416.8	72.5	2.0	67.1	422.0	71.8	417.3	4.7	0.010	PVC	PVC	3931100.83	1427684.86
	MW-160A	11/13/09	485.48	-0.34	485.8	15.5	470.3	—	2.0	5.4	480.5	15.1	470.7	9.7	0.010	PVC	PVC	3932566.91	1427463.18
	MW-160B	2/19/10	485.53	-0.21	485.7	90.7	395.0	91.0	2.0	85.6	400.2	90.2	395.6	4.6	0.010	PVC	PVC	3932566.90	1427459.68
	MW-161A	12/9/09	479.42	-0.40	479.8	15.6	464.2	—	2.0	5.5	474.3	15.2	464.6	9.7	0.020	PVC	PVC	3935554.06	1421680.78
	MW-161B	9/10/10	479.58	-0.24	479.8	50.4	429.4	—	2.0	46.0	433.8	50.4	429.4	4.4	0.020	PVC	PVC	3935553.83	1421678.29
	B-161	8/18/11	Boring installed to a depth of 54 feet NO WELL					54.0											
	MW-162A	11/25/09	483.94	-0.60	484.5	15.6	468.9	—	2.0	5.5	479.0	15.2	469.3	9.7	0.020	PVC	PVC	3934831.10	1425571.90
	MW-162B	2/21/10	484.12	-0.29	484.4	65.4	419.0	67.5	2.0	60.2	424.2	64.7	419.7	4.6	0.010	PVC	PVC	3934825.07	1425574.08
	MW-163A	12/9/09	485.05	-1.00	485.2	15.6	469.6	—	2.0	5.5	479.7	15.2	470.0	9.7	0.020	PVC	PVC	3935430.75	1426901.11
	MW-163B	9/13/10	485.16	-0.45	485.4	39.6	445.8	40.0	2.0	34.5	450.9	39.0	446.4	4.4	0.020	PVC	PVC	3935430.72	1426906.78
	MW-164A	12/10/09	480.01	-1.00	480.3	15.6	464.7	—	2.0	5.5	474.8	15.2	465.1	9.7	0.020	PVC	PVC	3938026.16	1425651.07
	MW-164B	9/9/10	479.35	-0.45	480.3	50.7	429.6	—	2.0	45.6	434.7	50.1	430.2	4.4	0.020	PVC	PVC	3938027.01	1425654.08
	MW-164C	8/17/11	479.50	-0.50	480.3	62.4	417.9	63.0	2.0	57.3	423.0	62.0	418.3	4.7	0.010	PVC	PVC	3938023.06	1425652.19
	MW-165A	1/18/10	475.07	-0.40	475.5	15.4	460.1	—	2.0	5.2	470.3	14.9	460.6	9.7	0.010	PVC	PVC	3938692.18	1416849.70
	MW-165B	9/28/10	474.78	-0.70	475.6	50.9	424.7	—	2.0	45.9	429.7	50.4	425.3	4.5	0.020	PVC	PVC	3938690.33	1416854.17
	MW-166A	1/8/10	474.92	2.70	472.2	15.6	456.6	—	2.0	5.4	466.8	15.2	457.1	9.7	0.010	PVC	PVC	3940972.27	1419512.27
	MW-166B	3/15/10	475.11	3.00	472.2	32.1	440.1	33.0	2.0	27.2	445.1	31.4	440.9	4.2	0.010	PVC	PVC	3940967.37	1419509.53
	MW-167A	1/7/10	475.68	-0.36	476.0	15.8	460.2	—	2.0	5.7	470.4	15.4	460.7	9.7	0.010	PVC	PVC	3942809.92	1423092.52
	MW-167B	3/23/10	475.82	-0.25	476.0	33.3	442.7	33.5	2.0	28.2	447.8	33.2	442.9	5.0	0.010	PVC	PVC	3942813.73	1423092.51
	MW-168A	1/8/10	478.27	-0.15	478.7	15.5	463.2	—	2.0	5.4	473.4	15.1	463.7	9.7	0.010	PVC	PVC	3941284.64	1425723.88
	MW-168B	10/1/11	478.34	-0.50	478.7	51.5	427.3	55.0	2.0	46.3	432.4	51.0	427.7	4.7	0.010	PVC	PVC	3941289.40	1425724.13
	MW-169A	2/25/10	486.13	3.01	483.1	15.2	468.0	—	2.0	5.3	477.9	15.1	468.1	9.8	0.010	PVC	PVC	3931955.69	1423035.08

Table 3
Well Construction Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Monitoring	MW-169B	10/21/10	485.95	3.00	483.1	49.2	433.9	—	2.0	44.1	439.0	48.7	434.4	4.6	0.020	PVC	PVC	3931960.39	1423037.49
	MW-169C	9/1/11	482.57	-0.70	483.2	59.9	423.2	69.0	2.0	54.8	428.4	59.5	423.7	4.7	0.020	PVC	PVC	3931966.50	1423042.84
	MW-170A	2/24/10	490.82	-0.31	491.1	14.9	476.2	—	2.0	4.6	486.5	14.4	476.7	9.8	0.010	PVC	PVC	3930005.65	1429184.98
	MW-170B	3/6/10	490.72	-0.25	491.0	74.8	416.3	—	4.0	69.7	421.3	74.1	417.0	4.4	0.010	PVC	PVC	3930000.43	1429187.53
	MW-170C	3/4/10	490.85	-0.31	491.2	130.9	360.3	135.0	2.0	125.9	365.3	130.2	361.0	4.3	0.010	PVC	PVC	3929995.96	1429188.84
	MW-170D	10/13/10	490.39	-0.40	490.9	50.6	440.3	—	2.0	45.5	445.4	50.1	440.8	4.6	0.020	PVC	PVC	3929991.96	1429189.27
	MW-171A	2/25/10	484.68	-0.62	485.3	15.2	470.1	—	2.0	5.0	480.3	14.8	470.5	9.8	0.010	PVC	PVC	3935401.97	1428945.84
	MW-171B	3/16/10	484.69	-0.25	485.3	40.3	445.1	42.0	2.0	35.3	450.1	39.7	445.6	4.4	0.010	PVC	PVC	3935402.47	1428941.37
	MW-172A	3/24/10	475.72	-0.40	476.1	15.5	460.7	—	2.0	5.3	470.8	15.0	461.1	9.7	0.010	PVC	PVC	3942632.06	1427431.58
	MW-172B	3/27/10	476.05	-0.22	476.3	150.4	325.9	150.5	2.0	145.4	330.9	149.8	326.5	4.4	0.010	PVC	PVC	3942631.33	1427425.63
	MW-173A	3/31/10	496.16	3.16	493.0	14.6	478.4	—	2.0	4.5	488.5	14.2	478.8	9.7	0.010	PVC	PVC	3927534.58	1430223.98
	MW-173B	3/30/10	496.40	3.17	493.2	150.8	342.4	—	2.0	145.8	347.4	150.2	343.0	4.4	0.010	PVC	PVC	3927527.38	1430222.41
	MW-174A	9/16/10	494.16	2.77	491.4	50.2	441.2	—	2.0	45.0	446.4	49.7	441.7	4.7	0.020	PVC	PVC	3926454.50	1428665.44
	MW-174B	9/15/10	493.28	1.97	491.3	90.4	400.9	—	2.0	85.2	406.2	89.9	401.4	4.7	0.020	PVC	PVC	3926461.30	1428664.22
	MW-175	9/30/10	496.80	2.85	494.0	90.8	403.1	—	2.0	85.8	408.1	90.3	403.7	4.5	0.020	PVC	PVC	3926774.40	1429593.36
	MW-176A	10/4/10	496.99	3.08	493.9	14.8	479.1	—	2.0	4.7	489.2	14.4	479.5	9.8	0.020	PVC	PVC	3926055.80	1429416.30
	MW-176B	10/4/10	496.92	3.06	493.9	50.6	443.3	—	2.0	45.6	448.3	50.1	443.8	4.5	0.020	PVC	PVC	3926056.30	1429412.03
	MW-176C	10/1/10	496.84	3.10	493.7	90.5	403.3	—	2.0	85.4	408.3	89.9	403.8	4.5	0.020	PVC	PVC	3926056.80	1429407.76
	MW-177	9/22/10	497.90	2.92	495.0	89.7	405.3	—	2.0	84.7	410.3	89.2	405.8	4.5	0.020	PVC	PVC	3925072.46	1430037.88
	MW-178A	9/18/10	496.48	2.32	494.2	16.1	478.1	—	2.0	5.9	488.3	15.6	478.5	9.7	0.020	PVC	PVC	3926117.29	1429586.63
	MW-178B	9/18/10	496.09	1.96	494.1	51.2	443.0	—	2.0	46.0	448.1	50.7	443.4	4.7	0.020	PVC	PVC	3926117.08	1429579.97
	MW-178C	9/17/10	497.26	3.10	494.2	90.2	404.0	—	2.0	85.2	409.0	89.9	404.2	4.8	0.020	PVC	PVC	3926117.30	1429573.58
	MW-179A	9/21/10	496.94	2.96	494.0	15.6	478.4	—	2.0	5.6	488.4	15.2	478.8	9.6	0.020	PVC	PVC	3926050.54	1429676.64
	MW-179B	9/21/10	496.74	2.72	494.0	50.8	443.2	—	2.0	45.8	448.2	50.3	443.7	4.5	0.020	PVC	PVC	3926047.16	1429680.75
	MW-179C	9/20/10	497.25	3.22	494.0	90.4	403.6	—	2.0	85.4	408.6	89.9	404.1	4.5	0.020	PVC	PVC	3926045.58	1429674.43
	MW-179D	8/12/11	497.05	3.52	494.0	134.1	360.0	140.5	2.0	129.0	365.1	133.7	360.4	4.7	0.020	PVC	PVC	3926048.88	1429668.63
	MW-180A	9/27/10	497.40	3.06	494.3	15.4	479.0	—	2.0	5.3	489.1	15.0	479.4	9.7	0.020	PVC	PVC	3925874.85	1429928.62
	MW-180B	9/27/10	496.86	2.68	494.2	50.7	443.5	—	2.0	45.7	448.5	50.2	444.0	4.5	0.020	PVC	PVC	3925879.52	1429922.58
	MW-180C	9/25/10	497.05	2.82	494.2	90.4	403.8	—	2.0	85.3	408.9	89.9	404.4	4.5	0.020	PVC	PVC	3925873.80	1429924.19
	MW-181A	10/6/10	475.91	-0.52	476.4	15.2	461.3	—	2.0	5.1	471.4	14.8	461.7	9.7	0.020	PVC	PVC	3944095.46	1425755.04
	MW-181B	10/6/10	476.02	-0.41	476.4	50.8	425.7	—	2.0	45.8	430.7	50.3	426.1	4.5	0.020	PVC	PVC	3944099.95	1425752.10
	MW-181C	10/3/11	475.96	-0.48	476.4	150.5	326.0	—	2.0	145.4	331.0	149.9	326.5	4.4	0.010	PVC	PVC	3944089.21	1425759.17
	MW-182A	10/8/10	475.38	-0.45	475.9	15.8	460.0	—	2.0	5.7	470.2	15.4	460.5	9.7	0.020	PVC	PVC	3941132.12	1423038.13
	MW-182B	8/22/11	475.32	-0.40	475.9	44.7	431.2	46.0	2.0	39.6	436.3	44.3	431.6	4.7	0.020	PVC	PVC	3941136.42	1423037.29
	MW-183A	10/8/10	478.06	-0.55	478.6	15.9	462.7	—	2.0	5.8	472.8	15.5	463.1	9.7	0.020	PVC	PVC	3937529.71	1420159.70
	MW-183B	8/29/11	478.05	-0.62	478.6	59.7	418.9	59.0	2.0	54.6	424.0	59.3	419.3	4.7	0.020	PVC	PVC	3937532.14	1420157.14
	MW-184	10/11/10	486.44	-0.50	486.9	45.2	441.7	45.0	2.0	40.1	446.8	44.8	442.2	4.6	0.020	PVC	PVC	3932560.61	1428756.36
	MW-185A	10/12/10	478.09	-0.60	478.7	15.6	463.1	—	2.0	5.5	473.2	15.1	463.6	9.6	0.020	PVC	PVC	3940802.50	1428251.19
	MW-185B	10/12/10	478.09	-0.60	478.7	51.4	427.3	—	2.0	46.3	432.4	50.9	427.8	4.6	0.020	PVC	PVC	3940797.61	1428251.05
	MW-185C	10/4/11	478.47	-0.50	478.8	121.0	357.8	121.0	2.0	116.0	362.9	120.4	358.4	4.4	0.010	PVC	PVC	3940806.68	1428250.19
	MW-186A	10/19/10	495.95	3.24	492.7	15.2	477.5	—	2.0	5.1	487.6	14.8	477.9	9.7	0.020	PVC	PVC	3927025.87	1429092.83
	MW-186B	10/16/10	495.77	3.09	492.7	60.8	431.9	—	2.0	50.7	442.0	60.4	432.3	9.7	0.020	PVC	PVC	3927021.15	1429092.67
	MW-186C	10/15/10	495.72	3.00	492.7	100.8	391.9	—	2.0	90.7	402.0	100.3	392.4	9.6	0.020	PVC	PVC	3927017.05	1429092.45
	MW-186D	12/4/11	495.13	2.29	492.8	135.0	357.8	—	2.0	129.8	363.0	134.6	358.2	4.8	0.010	PVC	PVC	3927010.35	1429093.23
	MW-187	10/21/10	485.48	3.01	482.5	17.4	465.1	—	2.0	7.3	475.2	16.9	465.6	9.6	0.020	PVC	PVC	3934464.24	1420335.62

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North Pole Refinery
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Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Monitoring	MW-188	11/24/10	461.39	-0.62	462.0	40.9	421.1	45.5	2.0	35.4	426.6	40.4	421.6	5.0	0.020	PVC	PVC	3951521.76	1410365.52
	MW-189A	8/19/11	470.20	-0.74	470.9	16.5	454.4	—	2.0	6.5	464.5	16.2	454.8	9.7	0.010	PVC	PVC	3945399.36	1424696.44
	MW-189B	8/19/11	470.24	-0.70	470.9	60.5	410.4	—	2.0	55.4	415.5	60.1	410.9	4.7	0.010	PVC	PVC	3945396.24	1424692.19
	MW-190A	8/23/11	481.49	-0.43	481.9	15.6	466.3	—	2.0	5.5	476.4	15.2	466.7	9.7	0.010	PVC	PVC	3938370.06	1429592.42
	MW-190B	8/23/11	481.30	-0.62	481.9	60.7	421.2	—	2.0	55.6	426.3	60.3	421.6	4.7	0.010	PVC	PVC	3938370.16	1429596.16
	MW-191A	8/24/11	475.61	-0.78	476.4	15.3	461.1	—	2.0	5.2	471.2	14.9	461.5	9.7	0.010	PVC	PVC	3937781.57	1417713.87
	MW-191B	8/24/11	475.50	-0.89	476.4	60.3	416.1	—	2.0	55.2	421.2	59.8	416.6	4.6	0.010	PVC	PVC	3937777.89	1417714.18
	MW-192A	8/25/11	495.86	2.42	493.4	14.6	478.8	—	2.0	4.5	488.9	14.2	479.2	9.7	0.020	PVC	PVC	3924992.22	1428889.36
	MW-192B	8/25/11	495.42	2.34	493.1	55.5	437.6	—	2.0	50.4	442.7	55.1	438.0	4.7	0.020	PVC	PVC	3924992.57	1428887.11
	MW-193A	8/30/11	487.61	-0.36	488.0	15.7	472.3	—	2.0	5.0	483.0	15.5	472.5	10.5	0.020	PVC	PVC	3930483.21	1424590.71
	MW-193B	8/30/11	487.31	-0.66	488.0	59.9	428.1	61.0	2.0	54.7	433.3	59.4	428.6	4.7	0.020	PVC	PVC	3930481.25	1424593.75
	MW-194A	8/31/11	475.49	-0.74	476.2	15.8	460.5	—	2.0	6.0	470.2	15.4	460.9	9.4	0.020	PVC	PVC	3939634.55	1418923.90
	MW-194B	8/31/11	475.72	-0.51	476.2	39.5	436.8	39.0	2.0	34.4	441.9	39.0	437.3	4.6	0.020	PVC	PVC	3939630.80	1418924.87
	MW-195A	10/11/11	495.98	2.57	493.4	15.4	478.1	—	2.0	5.2	488.3	15.0	478.5	9.8	0.010	PVC	PVC	3926110.91	1428572.63
	MW-195B	12/5/11	496.09	2.63	493.5	149.9	343.6	—	2.0	144.8	348.7	149.5	344.0	4.7	0.010	PVC	PVC	3926110.92	1428566.32
	MW-196	10/11/11	497.20	3.01	494.2	15.2	479.0	—	2.0	5.0	489.2	14.7	479.5	9.7	0.010	PVC	PVC	3925033.44	1429646.49
	MW-197B	10/16/11	495.27	2.91	492.8	149.7	343.2	—	2.0	144.6	348.2	149.1	343.8	4.5	0.010	PVC	PVC	3926950.83	1429491.74
	MW-198	12/10/11	493.31	-0.29	493.6	149.8	343.8	—	2.0	144.7	348.9	149.4	344.2	4.7	0.010	PVC	PVC	3925820.02	1429027.70
	MW-199	12/2/11	495.89	2.54	493.3	149.8	343.5	—	2.0	144.7	348.7	149.4	343.9	4.8	0.010	PVC	PVC	3926959.18	1428830.82
	MW-300	12/6/11	495.98	1.88	494.0	150.3	343.7	—	2.0	145.0	349.0	149.7	344.3	4.7	0.010	PVC	PVC	3926139.62	1429895.14
	MW-301-CMT-10	10/26/11	492.83	3.37	489.5	10.0	479.5	—	2.0	9.9	479.6	10.1	479.3	0.3	CMT	PVC	PVC	3927444.46	1427850.40
	MW-301-CMT-20	10/26/11	492.83	3.37	489.5	20.0	469.5	—	2.0	19.9	469.6	20.1	469.3	0.3	CMT	PVC	PVC	3927444.46	1427850.40
	MW-301-CMT-30	10/26/11	492.83	3.37	489.5	30.0	459.5	—	2.0	29.9	459.6	30.1	459.3	0.3	CMT	PVC	PVC	3927444.46	1427850.40
	MW-301-CMT-40	10/26/11	492.83	3.37	489.5	40.0	449.5	—	2.0	39.9	449.6	40.1	449.3	0.3	CMT	PVC	PVC	3927444.46	1427850.40
	MW-301CMT-50	10/26/11	492.83	3.37	489.5	50.0	439.5	—	2.0	49.9	439.6	50.1	439.3	0.3	CMT	PVC	PVC	3927444.46	1427850.40
	MW-301-60	10/26/11	492.76	3.12	489.6	60.9	428.8	—	2.0	55.6	434.0	60.3	429.4	4.7	0.010	PVC	PVC	3927435.06	1427867.56
	MW-301-70	10/9/11	492.37	2.72	489.7	70.8	418.9	71.5	2.0	65.7	424.0	70.1	419.5	4.4	0.010	PVC	PVC	3927422.66	1427894.40
	MW-302-CMT-10	10/25/11	494.14	3.41	490.7	10.0	480.7	—	2.0	9.9	480.9	10.1	480.6	0.3	CMT	PVC	PVC	3927605.74	1428194.16
	MW-302-CMT-20	10/25/11	494.14	3.41	490.7	20.0	470.7	—	2.0	19.9	470.9	20.1	470.6	0.3	CMT	PVC	PVC	3927605.74	1428194.16
	MW-302-CMT-30	10/25/11	494.14	3.41	490.7	30.0	460.7	—	2.0	29.9	460.9	30.1	460.6	0.3	CMT	PVC	PVC	3927605.74	1428194.16
	MW-302-CMT-40	10/25/11	494.14	3.41	490.7	40.0	450.7	—	2.0	39.9	450.9	40.1	450.6	0.3	CMT	PVC	PVC	3927605.74	1428194.16
	MW-302-CMT-50	10/25/11	494.14	3.41	490.7	50.0	440.7	—	2.0	49.9	440.9	50.1	440.6	0.3	CMT	PVC	PVC	3927605.74	1428194.16
	MW-302-70	11/5/11	493.13	2.63	490.5	70.9	419.6	—	2.0	65.8	424.8	70.4	420.1	4.7	0.010	PVC	PVC	3927612.39	1428219.37
	MW-302-80	11/3/11	493.34	2.88	490.5	81.5	409.0	—	2.0	76.3	414.1	81.0	409.5	4.7	0.010	PVC	PVC	3927614.39	1428208.27
	MW-302-110	10/17/11	493.48	2.90	490.6	110.2	380.4	110.0	2.0	105.1	385.5	109.6	381.0	4.5	0.010	PVC	PVC	3927616.89	1428196.81
	MW-303-CMT-9	10/20/11	495.88	3.47	492.4	9.0	483.4	—	2.0	8.9	483.5	9.1	483.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-CMT-19	10/20/11	495.88	3.47	492.4	19.0	473.4	—	2.0	18.9	473.5	19.1	473.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-CMT-29	10/20/11	495.88	3.47	492.4	29.0	463.4	—	2.0	28.9	463.5	29.1	463.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-CMT-39	10/20/11	495.88	3.47	492.4	39.0	453.4	—	2.0	38.9	453.5	39.1	453.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-CMT-49	10/20/11	495.88	3.47	492.4	49.0	443.4	—	2.0	48.9	443.5	49.1	443.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-CMT-59	10/20/11	495.88	3.47	492.4	59.0	433.4	—	2.0	58.9	433.5	59.1	433.3	0.3	CMT	PVC	PVC	3927675.95	1428481.84
	MW-303-70	11/1/11	495.03	2.65	492.4	70.4	421.9	—	2.0	65.2	427.1	70.0	422.3	4.8	0.010	PVC	PVC	3927668.05	1428484.37
	MW-303-80	11/2/11	495.09	2.72	492.4	80.7	411.6	—	2.0	75.5	416.8	80.3	412.0	4.8	0.010	PVC	PVC	3927660.37	1428485.11
	MW-303-130	10/18/11	495.12	2.94	492.2	130.7	361.5	130.0	2.0	125.6	366.6	130.2	362.0	4.6	0.010	PVC	PVC	3927682.57	1428479.64
	MW-304-CMT-10	10/18/11	497.59	3.42	494.2	10.0	484.2	—	2.0	9.9	484.3	10.1	484.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58

Table 3
Well Construction Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Monitoring	MW-304-CMT-20	10/18/11	497.59	3.42	494.2	20.0	474.2	—	2.0	19.9	474.3	20.1	474.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58
	MW-304-CMT-30	10/18/11	497.59	3.42	494.2	30.0	464.2	—	2.0	29.9	464.3	30.1	464.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58
	MW-304-CMT-40	10/18/11	497.59	3.42	494.2	40.0	454.2	—	2.0	39.9	454.3	40.1	454.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58
	MW-304-CMT-50	10/18/11	497.59	3.42	494.2	50.0	444.2	—	2.0	49.9	444.3	50.1	444.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58
	MW-304-CMT-60	10/18/11	497.59	3.42	494.2	60.0	434.2	—	2.0	59.9	434.3	60.1	434.0	0.3	CMT	PVC	PVC	3927758.31	1428860.58
	MW-304-70	10/20/11	496.94	2.72	494.2	70.7	423.6	—	2.0	65.5	428.7	70.2	424.0	4.7	0.010	PVC	PVC	3927751.83	1428854.08
	MW-304-80	10/31/11	496.69	2.67	494.0	81.1	412.9	—	2.0	76.0	418.0	80.7	413.4	4.7	0.010	PVC	PVC	3927740.60	1428843.75
	MW-304-125	10/14/11	497.09	3.30	493.8	125.9	367.9	—	2.0	120.9	372.9	125.3	368.5	4.4	0.010	PVC	PVC	3927730.33	1428833.79
	MW-304-150	12/12/11	Not surveyed	2.86	Not surveyed	150.7	Not surveyed	—	2.0	145.5	Not surveyed	150.2	Not surveyed	4.7	0.010	PVC	PVC	Not surveyed	Not surveyed
	MW-305-CMT-8	10/24/11	496.33	3.20	493.1	7.5	485.6	—	2.0	7.4	485.8	7.6	485.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-CMT-18	10/24/11	496.33	3.20	493.1	17.5	475.6	—	2.0	17.4	475.8	17.6	475.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-CMT-28	10/24/11	496.33	3.20	493.1	27.5	465.6	—	2.0	27.4	465.8	27.6	465.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-CMT-38	10/24/11	496.33	3.20	493.1	37.5	455.6	—	2.0	37.4	455.8	37.6	455.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-CMT-48	10/24/11	496.33	3.20	493.1	47.5	445.6	—	2.0	47.4	445.8	47.6	445.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-CMT-58	10/24/11	496.33	3.20	493.1	57.5	435.6	—	2.0	57.4	435.8	57.6	435.5	0.3	CMT	PVC	PVC	3927940.69	1429048.97
	MW-305-70	10/22/11	495.58	2.76	492.8	70.4	422.5	—	2.0	65.0	427.8	69.9	422.9	4.9	0.010	PVC	PVC	3927953.08	1429040.73
	MW-305-80	10/30/11	495.35	2.66	492.7	81.2	411.5	—	2.0	76.1	416.6	80.8	411.9	4.7	0.010	PVC	PVC	3927959.70	1429046.56
	MW-305-100	10/8/11	495.67	2.68	493.0	99.9	393.1	110.0	2.0	94.9	398.1	99.3	393.7	4.4	0.010	PVC	PVC	3927946.36	1429034.54
	MW-306-CMT-10	10/27/11	496.92	3.36	493.6	10.0	483.6	—	2.0	9.9	483.7	10.1	483.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-CMT-20	10/27/11	496.92	3.36	493.6	20.0	473.6	—	2.0	19.9	473.7	20.1	473.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-CMT-30	10/27/11	496.92	3.36	493.6	30.0	463.6	—	2.0	29.9	463.7	30.1	463.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-CMT-40	10/27/11	496.92	3.36	493.6	40.0	453.6	—	2.0	39.9	453.7	40.1	453.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-CMT-50	10/27/11	496.92	3.36	493.6	50.0	443.6	—	2.0	49.9	443.7	50.1	443.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-CMT-60	10/27/11	496.92	3.36	493.6	60.0	433.6	—	2.0	59.9	433.7	60.1	433.4	0.3	CMT	PVC	PVC	3928108.33	1429306.73
	MW-306-70	11/6/11	496.68	3.32	493.4	70.7	422.7	—	2.0	65.5	427.9	70.3	423.1	4.8	0.010	PVC	PVC	3928115.77	1429309.12
	MW-306-80	11/7/11	496.50	3.02	493.5	80.5	413.0	—	2.0	75.3	418.2	80.1	413.4	4.8	0.010	PVC	PVC	3928108.87	1429292.74
	MW-306-100	10/13/11	495.51	2.32	493.2	100.6	392.6	—	2.0	95.4	397.8	100.2	393.0	4.8	0.010	PVC	PVC	3928121.97	1429302.41
	MW-306-150	10/7/11	496.00	2.79	493.2	150.1	343.2	—	2.0	144.9	348.4	149.6	343.6	4.8	0.010	PVC	PVC	3928118.47	1429293.75
	MW-307	12/3/11	495.48	2.52	492.9	149.9	343.0	—	2.0	144.8	348.2	149.6	343.4	4.8	0.010	PVC	PVC	3926951.83	1429734.66
Observation	O-1	9/23/10	497.15	2.54	494.6	15.1	479.5	—	2.0	4.9	489.7	14.7	479.9	9.7	0.020	PVC	PVC	3925973.83	1429619.47
	O-2	9/23/10	496.84	2.99	493.9	15.0	478.8	—	2.0	4.9	489.0	14.6	479.2	9.7	0.020	PVC	PVC	3927114.04	1429130.05
	O-3	9/23/10	497.67	3.23	494.4	14.6	479.9	—	2.0	4.4	490.0	14.2	480.3	9.7	0.020	PVC	PVC	3927090.75	1429551.50
	O-4	9/16/10	496.47	2.63	493.8	15.1	478.7	—	2.0	5.0	488.9	14.6	479.2	9.7	0.020	PVC	PVC	3927159.11	1428795.47
	O-5	9/13/11	496.05	2.55	493.5	15.1	478.4	—	2.0	5.0	488.5	14.7	478.8	9.7	0.010	PVC	PVC	3926951.41	1428829.08
	O-6	9/14/11	494.52	2.22	492.3	15.6	476.7	—	2.0	5.5	486.8	15.2	477.1	9.7	0.010	PVC	PVC	3926744.06	1428769.81
	O-7	9/14/11	495.95	2.28	493.7	15.3	478.3	—	2.0	5.2	488.5	14.9	478.8	9.7	0.010	PVC	PVC	3926757.84	1429941.88
	O-8	9/15/11	496.71	2.66	494.1	15.9	478.2	—	2.0	5.8	488.3	15.5	478.6	9.7	0.010	PVC	PVC	3926131.00	1429895.90
	O-9	9/15/11	496.89	3.09	493.8	15.1	478.7	—	2.0	5.0	488.8	14.7	479.1	9.7	0.010	PVC	PVC	3926505.32	1429912.51
	O-10	9/16/11	496.21	2.59	493.6	16.4	477.3	—	4.0	6.4	487.2	16.0	477.6	9.7	0.010	PVC	PVC	3926386.30	1429760.78
	O-11	9/20/11	497.86	2.83	495.0	16.4	478.6	—	2.0	6.4	488.6	15.9	479.1	9.5	0.010	PVC	PVC	3927247.94	1429025.71
	O-12	9/21/11	496.12	2.99	493.1	17.0	476.1	—	2.0	6.8	486.3	16.6	476.5	9.8	0.010	PVC	PVC	3927268.21	1429161.41
	O-13	9/21/11	495.35	2.88	492.5	15.9	476.6	—	2.0	5.7	486.8	15.5	477.0	9.8	0.010	PVC	PVC	3927268.35	1429254.10
	O-14	10/1/11	494.89	-0.37	495.3	15.3	480.0	—	2.0	5.1	490.1	14.9	480.4	9.8	0.010	PVC	PVC	3925995.33	1430224.22
	O-15	10/6/11	498.62	2.98	495.6	15.4	480.3	—	2.0	5.2	490.5	15.0	480.7	9.8	0.010	PVC	PVC	3925553.75	1430177.50
	O-16	10/7/11	Not surveyed	-0.50	Not surveyed	14.6	Not surveyed	—	2.0	4.4	Not surveyed	14.2	Not surveyed	9.8	0.010	PVC	PVC	Not surveyed	Not surveyed

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North Pole Refinery
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Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Observation	O-17	10/13/11	493.23	-0.44	493.7	15.0	478.6	—	2.0	4.9	488.8	14.6	479.1	9.7	0.010	PVC	PVC	3926546.15	1429036.74
	O-18	10/12/11	492.66	-0.46	493.1	15.3	477.8	—	2.0	5.2	488.0	14.9	478.3	9.7	0.010	PVC	PVC	3926309.43	1429007.34
	O-19	10/15/11	496.44	3.06	493.4	15.3	478.0	—	2.0	5.2	488.2	14.9	478.5	9.7	0.010	PVC	PVC	3926814.98	1429229.93
	O-20	10/13/11	497.42	3.12	494.3	15.8	478.5	—	2.0	5.6	488.7	15.4	478.9	9.8	0.010	PVC	PVC	3925863.81	1429729.04
	O-21	10/14/11	493.12	-0.46	493.6	15.7	477.9	—	2.0	5.5	488.1	15.3	478.3	9.8	0.010	PVC	PVC	3925656.97	1429631.77
	O-22	11/14/11	496.73	1.90	494.8	18.6	476.2	—	2.0	8.3	486.5	18.1	476.8	9.8	0.010	PVC	PVC	3926789.25	1430139.00
	O-23	12/5/11	495.83	2.23	493.6	16.3	477.3	—	2.0	6.0	487.6	15.8	477.8	9.8	0.010	PVC	PVC	3927110.81	1429926.50
	O-24	11/10/11	496.86	2.39	494.5	15.2	479.2	—	2.0	5.0	489.5	14.7	479.8	9.8	0.010	PVC	PVC	3927281.16	1429428.42
	O-25	11/10/11	497.74	2.44	495.3	16.4	478.9	—	2.0	6.1	489.2	15.9	479.4	9.8	0.010	PVC	PVC	3927402.44	1429242.45
	O-26	11/9/11	496.79	2.79	494.0	15.0	479.0	—	2.0	4.7	489.3	14.4	479.6	9.8	0.010	PVC	PVC	3927363.19	1429037.48
	O-27	11/10/11	496.84	1.91	494.9	17.4	477.6	—	2.0	7.1	487.9	16.8	478.1	9.8	0.010	PVC	PVC	3927278.05	1428804.68
	O-28	11/14/11	494.62	2.06	492.6	14.8	477.7	—	2.0	4.6	488.0	14.3	478.3	9.8	0.010	PVC	PVC	3925637.58	1428886.20
	O-29	11/12/11	498.59	2.35	496.2	18.2	478.1	—	2.0	7.9	488.4	17.6	478.6	9.8	0.010	PVC	PVC	3926600.52	1430083.48
	S-9	Aug 2001	495.11	2.80	492.3	19.8	?		2.0	4.9	487.4	18.9	473.4	14.0	0.010	PVC	PVC	3927494.32	1429112.46
	S-20†	May 1987	498.00	1.80	496.2	12.1	?		2.0	2.7	493.5	12.5	483.8	9.8	0.020	PVC	PVC		
	S-21	May 1987	497.16	2.40	494.8	13.4	?		2.0	2.9	491.8	12.7	482.1	9.8	0.020	PVC	PVC	3926670.65	1429597.64
	S-22	May 1987	496.70	1.90	494.8	14.7	?		2.0	4.5	490.3	14.2	480.6	9.7	0.020	PVC	PVC	3926430.46	1429717.90
	S-23†	Sep 1986	498.25	4.02	494.2	13.6	?		2.0	3.5	490.7	12.9	481.4	9.3	0.020	PVC	PVC		
	S-32	Nov 1987	495.69	2.60	493.1	11.3	?		4.0	1.3	491.8	11.3	481.8	10.0	0.020	ABS	ABS	3926946.66	1429732.57
	S-34	Dec 1989	?	?	?	13.0	?		?	7.9	?	12.9	?	5.0	?	?	?		
	S-37†	Dec 1989	500.59	7.30	493.3	12.0	?		?	6.8	486.5	11.8	481.5	5.0	?	?	?	3926645.38	1429730.56
	S-38†	Dec 1989	499.30	5.80	493.5	13.0	?		?	7.9	485.6	12.9	480.6	5.0	?	?	?	3926817.13	1429386.00
	S-39	Dec 1989	497.11	4.01	493.1	13.0	?		?	7.5	485.6	12.5	480.6	5.0	?	?	?	3927009.82	1429395.60
	S-40†	Dec 1989	493.62	0.01	493.6	13.0	?		?	7.8	485.9	12.8	480.9	5.0	?	?	?	3927031.64	1429617.37
	S-41†	May 1990	497.83	1.93	495.9	17.0	?		?	12.1	483.8	16.5	479.4	4.5	?	?	?		
	S-43	June 1991	496.13	1.98	494.2	13.0	?		?	3.4	490.8	12.7	481.5	9.3	?	?	?	3926779.68	1429530.33
	S-44	June 1991	495.69	2.61	493.1	13.0	?		?	3.2	489.9	12.6	480.4	9.5	?	?	?	3926922.12	1429493.51
	S-50	July 1997	496.67	3.24	493.4	15.0	?		4.0	3.9	489.6	13.6	479.9	9.7	0.020	PVC	PVC	3926779.29	1429065.48
	S-51	June 1997	495.90	2.64	493.3	15.0	?		2.0	4.8	488.5	14.4	478.8	9.7	0.020	PVC	PVC	3926824.07	1429045.61
	S-52†	July 1997	?	?	?	15.0	?		4.0	4.5	?	14.1	?	9.7	0.020	PVC	PVC		
	S-54	July 1998	496.98	3.07	493.9	15.0	?		2.0	10.0	483.9	15.0	478.9	5.0	0.020	PVC	PVC	3928055.37	1429680.65
Recovery	R-1	June 1986	497.64	?	496.8	9.3	?		50.0	?	?	?	?	?	NA	culvert		3926818.91	1429340.13
	R-3	Nov 1987	493.98	0.40	493.6	6.9	?		38.0	?	?	?	?	?	NA	culvert		3925550.08	1429397.48
	R-4	Nov 1987	494.93	0.77	494.2	8.6	?		50.0	?	?	?	?	?	NA	culvert		3925501.58	1429377.63
	R-5	June 1986	495.29	1.86	493.4	7.2	?		38.0	?	?	?	?	?	NA	culvert		3925824.93	1429309.40
	R-14	June 1986	493.99	1.36	492.6	6.1	?		20.0	?	?	?	?	?	NA	culvert		3927108.36	1429010.00
	R-14A	1987	494.12	1.40	492.7	10.7	?		4.0	4.0	488.7	10.7	482.0	6.7	?	ABS	ABS	3927100.21	1429016.07
	R-18	June 1987	499.67	3.71	496.0	32.8	?		10.0	7.7	488.3	32.8	463.2	25.1	?	steel	steel	3926667.15	1429608.07
	R-20R	February 2011	498.77	3.86	494.9				6.0	3.8	491.1	19.7	475.2	15.9	0.025	ss	ss	3926382.77	1429577.80
	R-21	October 1987	495.53	2.82	492.7	24.2	?		12.0	4.2	488.5	24.2	468.5	20.0	?	steel	steel	3926960.05	1429035.68
	R-22	October 1987	495.57	?	493.1	24.7	?		12.0	4.7	?	24.7	?	20.0	?	steel	steel	3927061.93	1429008.20
	R-31	Nov 1987	?	?	?	11.0	?		24.0	?	?	?	?	?	NA	culvert			
	R-32	Nov 1987	494.28	0.37	493.9	11.0	?		24.0	?	?	?	?	?	NA	culvert		3926473.43	1429438.03
	R-33	August 1988	495.77	2.53	493.2	24.6	?		12.0	7.4	485.8	24.6	468.6	17.2	?	steel	steel	3925827.95	1429332.73
	R-34	August 1988	495.15	1.82	493.3	20.8	?		12.0	0.5	492.8	20.8	472.5	20.3	?	ss	steel	3926500.01	1429393.41

Table 3
Well Construction Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Type	Well	Install Date	Riser Elevation (feet MSL)	Riser Stickup (feet)	Ground Surface Elevation (feet MSL)	Well Depth (feet BGS)	Well Bottom Elevation (feet MSL)	Depth to Top of Permafrost (feet BGS)	Well Diameter (inches)	Well Screen: Depth to Top (feet BGS)	Well Screen: Top Elevation (feet MSL)	Well Screen: Depth to Bottom (feet BGS)	Well Screen: Bottom Elevation (feet MSL)	Well Screen: Length (feet)	Well Screen: Screen Slot Size (inches)	Well Screen: Material	Riser Material	ALASKA STATE PLANE NAD83, ZONE 3: NORTHING	ALASKA STATE PLANE NAD83, ZONE 3: EASTING
Recovery	R-35R	February 2011	494.74	2.01	492.7				8.0	4.0	488.7	39.0	453.7	35.0	0.008	ss	steel	3926840.14	1429455.05
	R-38	August 1988	498.65	2.74	495.9	9.8	?		24.0	?	?	?	?	?	NA	culvert		3925496.45	1429474.75
	R-39	August 1988	495.27	1.89	493.4	25.5	?		10.0	6.3	487.1	25.5	467.9	19.3	?	steel	steel	3927030.22	1429648.72
	R-40	1989	494.53	1.81	492.7	25.2	?		10.0	6.0	486.7	25.2	467.6	19.2	?	steel	steel	3927004.81	1429396.89
	R-41	July 1997	?	?	?	24.5	?		5.0	19.5	?	24.5	?	5.0	?	ss	steel		
	R-42		493.30	1.4	491.9				8.0	15.0	476.9	35.0	456.9	20.0	0.040	ss	steel	3926974.24	1428686.38

S-52† Well to be decommissioned in 2012
ss stainless steel

Table 4
Representative Areas for Soil Borings
North Pole Refinery
Flint Hills Resources Alaska, LLC

Soil Boring	Standard/COPC Boring	Representative Area	Associated Spills/Targeted Source Areas[1]
SB-101	COPC	Northern Downgradient Property Boundary	Downgradient boring, no associated spills or targeted source area
SB-102	COPC	Northern Downgradient Property Boundary	Downgradient boring, no associated spills or targeted source area
SB-103	COPC	Northern Downgradient Property Boundary	Downgradient boring, no associated spills or targeted source area
SB-104	COPC	Northern Downgradient Property Boundary	Downgradient boring, no associated spills or targeted source area
SB-105	COPC	Rail Spur	Downgradient boring, no associated spills or targeted source area
SB-106	Standard	Truck Loading Rack	11,500 gallons of Jet A released on 11/11/93, 500 gallons of heavy atmospheric gasoline oil released on 4/23/93, 300 gallons of kerosene released on 1/17/90, 225 gallons of kerosene on 10/31/02, additional smaller releases of other fuels
SB-107	Standard	Asphalt Loading Rack	1,000 gallons of kerosene released on 5/5/85, 200 gallons of asphalt released on 6/19/91, 200 gallons of propylene glycol released on 5/24/98, additional smaller releases of asphalt
SB-108	COPC	Truck Loading Rack	11,500 gallons of Jet A released on 11/11/93, 500 gallons of heavy atmospheric gasoline oil released on 4/23/93, 300 gallons of kerosene released on 1/17/90, 225 gallons of kerosene on 10/31/02, additional smaller releases of other fuels
SB-109	Standard	Truck Loading Rack/LNAPL Core Location	11,500 gallons of Jet A released on 11/11/93, 500 gallons of heavy atmospheric gasoline oil released on 4/23/93, 300 gallons of kerosene released on 1/17/90, 225 gallons of kerosene on 10/31/02, additional smaller releases of other fuels
SB-110	Standard	Truck Loading Rack	11,500 gallons of Jet A released on 11/11/93, 500 gallons of heavy atmospheric gasoline oil released on 4/23/93, 300 gallons of kerosene released on 1/17/90, 225 gallons of kerosene on 10/31/02, additional smaller releases of other fuels
SB-111	Standard	Truck Loading Rack	11,500 gallons of Jet A released on 11/11/93, 500 gallons of heavy atmospheric gasoline oil released on 4/23/93, 300 gallons of kerosene released on 1/17/90, 225 gallons of kerosene on 10/31/02, additional smaller releases of other fuels
SB-112	Standard	Williams Avenue	At the Rail Rack: 1,300 gallons of gasoline released on 8/30/94, 870 gallons of diesel released on 11/9/94, 500 gallons of Jet-A on 1/5/82, 1,000 gallons of Jet-A released on 11/11/82, 4,287 gallons of #4 fuel oil on 4/7/84, 17,000 gallons of JP-4 released on 3/23/85, additional smaller releases
SB-113	Standard	Williams Avenue	At the Rail Rack: 1,300 gallons of gasoline released on 8/30/94, 870 gallons of diesel released on 11/9/94, 500 gallons of Jet-A on 1/5/82, 1,000 gallons of Jet-A released on 11/11/82, 4,287 gallons of #4 fuel oil on 4/7/84, 17,000 gallons of JP-4 released on 3/23/85, additional smaller releases
SB-114	Standard	Rail Rack	1,300 gallons of gasoline released on 8/30/94, 870 gallons of diesel released on 11/9/94, 500 gallons of Jet-A on 1/5/82, 1,000 gallons of Jet-A released on 11/11/82, 4,287 gallons of #4 fuel oil on 4/7/84, 17,000 gallons of JP-4 released on 3/23/85, additional smaller releases
SB-115	Standard	LNAPL Core Location	750 gallons of aromatics/gasoline released on 11/01/96 (Tank 513/Tank Farm), additional smaller releases
SB-116	Standard	Railcar Loading Area	1,300 gallons of gasoline released on 8/30/94, 870 gallons of diesel released on 11/9/94, 500 gallons of Jet-A on 1/5/82, 1,000 gallons of Jet-A released on 11/11/82, 4,287 gallons of #4 fuel oil on 4/7/84, 17,000 gallons of JP-4 released on 3/23/85, additional smaller releases
SB-117	Standard	Former Truck Loading Rack	1,000 gallons of #1 fuel oil on 01/10/78, additional smaller releases of other fuels
SB-118	COPC	Historic Storage Yard	No associated spills or targeted source area
SB-119	Standard	Rail Spur	Downgradient boring of the rail and former truck loading racks, additional smaller releases of other fuels
SB-120	COPC	Southeast Corner of CA4	900 gallons of Jet A released on 12/4/86 to the "filter skid Tank 402 dike", additional smaller releases
SB-121	COPC	Distribution Street	2,400 gallons of JP-4 at Tank 501 dike on 7/5/90, additional smaller releases of other fuels
SB-122	Standard	Former Truck Loading Rack	1,000 gallons of #1 fuel oil on 01/10/78, additional smaller releases of other fuels
SB-123	COPC	Rail Rack Sumps/LNAPL Core Location	1,300 gallons of gasoline released on 8/30/94, 870 gallons of diesel released on 11/9/94, 500 gallons of Jet-A on 1/5/82, 1,000 gallons of Jet-A released on 11/11/82, 4,287 gallons of #4 fuel oil on 4/7/84, 17,000 gallons of JP-4 released on 3/23/85, additional smaller releases
SB-124	Standard	Railcar Loading Area	Downgradient boring of the rail and former truck loading racks
SB-125	COPC	Access Road North of Facility	Downgradient boring, no associated spills or targeted source area
SB-126	Standard	Williams Avenue	750 gallons of aromatics/gasoline on 11/01/96 (Tank 513/Tank Farm), 8,400 gallons of unleaded gasoline on 01/02/86 (Tank 617/Tank Farm)
SB-127	Standard	Williams Avenue	8,400 gallons of unleaded gasoline on 01/02/86 (Tank 617/Tank Farm)
SB-128	COPC	Gasoline Alley	Downgradient of 60,000 gallons of JP-4 from the DoD surplus bolted tanks along Naphtha Avenue on 9/23/80, known impacts in the area
SB-129	COPC	Southeast Corner of CA7	No associated spills or targeted source area, known impacts in the area
SB-130	Standard	East Diesel/LNAPL Core Location	Downgradient of 60,000 gallons of JP-4 from the DoD surplus bolted tanks along Naphtha Avenue on 9/23/80, known impacts in the area
SB-131	Standard	Exchanger Wash Skid	No known releases in this area, boring intended to assess condition of potential source area.
SB-132	COPC	Waste Storage Area	No known releases in this area, boring intended to assess condition of potential source area.
SB-133	Standard	Downgradient of Lagoons	Downgradient of lagoon area, multiple releases of oily water or wastewater reported in lagoon area
SB-134	Standard	Tank Farm Road	60,000 gallons of JP-4 from the DoD surplus bolted tanks along Naphtha Avenue on 9/23/80
SB-135	Standard	S. Gravel Pit/Fire Training Area	Releases reported at/near Lagoon B: 120 gallons of oily water released on 4/2/90, 1,000 gallons of wastewater on 4/30/94, 400 gallons of wastewater released north of Lagoon B on 1/17/94, additional smaller releases in lagoon area
SB-136	Standard	Lagoon B	120 gallons of oily water released on 4/2/90, 1,000 gallons of wastewater on 4/30/94, 400 gallons of wastewater released north of Lagoon B on 1/17/94, additional smaller releases in lagoon area
SB-137	Standard	Lagoon B	120 gallons of oily water released on 4/2/90, 1,000 gallons of wastewater on 4/30/94, 400 gallons of wastewater released north of Lagoon B on 1/17/94, additional smaller releases in lagoon area
SB-138	COPC	Lagoon B	120 gallons of oily water released on 4/2/90, 1,000 gallons of wastewater on 4/30/94, additional smaller releases in lagoon area
SB-139	Standard	Lagoon C	500 gallons of "effluent water" released on 1/30/94
SB-140	COPC	Lagoon C	500 gallons of "effluent water" released on 1/30/94
SB-141	Standard	Lagoon C	500 gallons of "effluent water" released on 1/30/94
SB-142	Standard	Lagoon C	500 gallons of "effluent water" released on 1/30/94
SB-143	Standard	Fire Training Facility	No known releases in this area, boring intended to assess condition of potential source area.
SB-144	Standard	Lagoon C	500 gallons of "effluent water" released on 1/30/94
SB-145	Standard	Lagoon B	120 gallons of oily water released on 4/2/90, 1,000 gallons of wastewater on 4/30/94, 400 gallons of wastewater released north of Lagoon B on 1/17/94, additional smaller releases in lagoon area

Table 4
Representative Areas for Soil Borings
North Pole Refinery
Flint Hills Resources Alaska, LLC

Soil Boring	Standard/COPC Boring	Representative Area	Associated Spills/Targeted Source Areas[1]
SB-146	Standard	Crude Unit #1	150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-147	Standard	Lagoon A	400 gallons of oily water on 1/17/94
SB-148	Standard	Distribution Street	150 gallons of sulfolane released on 7/15/02, reported from Tank 194 of Crude Unit #1
SB-149	Standard	Distribution Street	150 gallons of sulfolane released on 7/15/02, reported from Tank 194 of Crude Unit #1
SB-150	Standard	Crude Unit #1	150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-151	COPC	Crude Unit #1	150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-152	Standard	South Gravel Pit	Upgradient delineation boring, no associated spills or targeted source area
SB-153	Standard	Energy Boulevard	150 gallons of sulfolane released on 7/15/02, reported from Tank 194 of Crude Unit #1
SB-154	Standard	Energy Boulevard	Upgradient of Crude Unit #1: 150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-155	Standard	Energy Boulevard	Upgradient of Crude Unit #1: 150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-156	Standard	Energy Boulevard	Upgradient of Crude Unit #1: 150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-157	COPC	East Edge of CA9	Eastern delineation boring, no associated spills or targeted source area
SB-158	Standard	South Edge of CA5	60,000 gallons of JP-4 from the DoD surplus bolted tanks along Naphtha Avenue on 9/23/80
SB-159	Standard	CA9	Eastern delineation boring, no associated spills or targeted source area
SB-160	COPC	Tank Farm Road	60,000 gallons of JP-4 from the DoD surplus bolted tanks along Naphtha Avenue on 9/23/80
SB-161	Standard	Crude Unit #3	Minor releases of oily water, glycol and mineral oil
SB-162	COPC	Crude Unit #3	Minor releases of oily water, glycol and mineral oil
SB-163	Standard	Crude Unit #3	Minor releases of oily water, glycol and mineral oil
SB-164	COPC	Tank Farm Road	Downgradient of Crude Unit #1: 150 gallons of sulfolane released on 7/15/02, 250 gallons of heavy atmospheric gas oil released on 7/15/88, 200 gallons of glycol released on 9/29/98, 280 gallons of residual oil released on 11/15/98, 300 gallons of "ARC" released on 5/10/20, additional smaller releases of wastewater, glycol and ARC
SB-165	Standard	Crude Unit #2/LNAPL Core Location	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-166	Standard	Crude Unit #2	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene
SB-167	COPC	Sulfolane Extraction Unit	9 gallons of sulfolane released on 8/28/97, additional smaller releases of other materials in area
SB-168	Standard	Sulfolane Extraction Unit	9 gallons of sulfolane released on 8/28/97, additional smaller releases of other materials in area
SB-169	Standard	Crude Unit #3	Minor releases of oily water, glycol and mineral oil
SB-170	Standard	Crude Unit #3	Minor releases of oily water, glycol and mineral oil
SB-171	Standard	Crude Unit #2	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-172	COPC	Crude Unit #2	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-173	Standard	Crude Unit #2	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-174	Standard	Sulfolane Extraction Unit	9 gallons of sulfolane released on 8/28/97, additional smaller releases of other materials in area
SB-175	COPC	Sulfolane Extraction Unit	9 gallons of sulfolane released on 8/28/97, additional smaller releases of other materials in area
SB-176	COPC	Crude Unit #3	Upgradient of Crude Unit #3: Minor releases of oily water, glycol and mineral oil
SB-177	Standard	Energy Boulevard	Upgradient of Crude Unit #2: 1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene
SB-178	Standard	Crude Unit #2	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-179	Standard	"Field of Dreams"	Downgradient of 9 gallons of sulfolane released on 8/28/97, additional smaller releases of other materials upgradient
SB-180	Standard	Crude Unit #2/LNAPL Core Location	1,071 gallons of kerosene released on 7/31/04, 200 gallons of "benzene overhead product" released on 1/8/90, 240 gallons of propylene glycol released on 2/18/01, additional smaller releases of glycol, oily water, kerosene,
SB-181	COPC	Lagoon A	Upgradient boring, no associated spills or targeted source area
SB-182	Standard	Lagoon A	Upgradient boring, no associated spills or targeted source area
SB-183	COPC	Administration Building	Upgradient boring, no associated spills or targeted source area

Notes:
COPC = constituent of potential concern
LNAPL = Light nonaqueous phase liquid
DoD = Department of Defense
[1]: The consolidated spill list of recorded releases is included as Table 2

Table 5
Well Decommissioning Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well ID	Casing Type	Approximate Depth (ft.)	Well Decommissioning Notes
R-9	Culvert	8	Well decommissioned: Excavated approximately 2 feet below ground surface, cut culvert at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
R-12	4-inch ABS	7.6	Decommissioning postponed due to onset of winter conditions.
R-13	Culvert	9.7	Well decommissioned: Excavated approximately 2 feet below ground surface, cut culvert at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
R-28	Culvert	6.7	Well decommissioned: Excavated approximately 2 feet below ground surface, cut culvert at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
R-29	Culvert	7.3	Well decommissioned: Excavated approximately 2 feet below ground surface, cut culvert at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
R-30	Culvert	7	Well decommissioned: Excavated approximately 2 feet below ground surface, cut culvert at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
R-35	12-inch steel	7	Well decommissioned: Excavated approximately 2 feet below ground surface, cut well at that depth, filled well with gravel, poured concrete cap at top of cut casing, backfilled excavation to ground surface.
S-19	4-inch PVC	11.7	Well decommissioned: Hand-dug around casing to approximately 2 feet below ground surface. Cut casing at that depth and filled remaining casing with bentonite. Hydrated bentonite with potable water, covered the top of casing with a layer of pea gravel, backfilled hole using excavated material.
S-20	2-inch PVC	12.1	Decommissioning postponed due to onset of winter conditions.
S-23	2-inch PVC	13.6	Decommissioning postponed due to onset of winter conditions.
S-37	2-inch PVC	12	Decommissioning postponed due to onset of winter conditions.
S-38	2-inch PVC	13	Decommissioning postponed due to onset of winter conditions.
S-40	2-inch PVC	13	Decommissioning postponed due to onset of winter conditions.
S-41	2-inch PVC	17	Decommissioning postponed due to onset of winter conditions.
S-52	2-inch PVC	15	Decommissioning postponed due to onset of winter conditions.
S-55	2-inch PVC	15	Well decommissioned: Hand-dug around casing to approximately 2.5 feet below ground surface. Cut casing at that depth and filled remaining casing with bentonite. Hydrated bentonite with potable water, covered the top of casing with a layer of pea gravel, backfilled hole using excavated material.
MW-144B	2-inch PVC	45	Well decommissioned: 90-foot well, casing damaged at 45 feet. Removed protective monument. Excavated 2-foot square hole to approximately 2 feet below ground surface, cut PVC casing at that depth. Used tremie pipe to pump grout slurry from 45 feet to top of well. Used bentonite chips to seal top of cut casing, covered with pea gravel, and backfilled hole using excavated material.
MW-169B	2-inch PVC	49	Decommissioning postponed due to onset of winter conditions.

Table 6
Well Repair and Redevelopment Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well ID	Repair needed	Repair Notes
S-32	Add monument	Repair postponed due to onset of winter conditions
S-39	Add monument	Repair postponed due to onset of winter conditions
S-51	Add monument	Repair postponed due to onset of winter conditions
S-54	Add monument	New monument installed
R-32	24-inch culvert well with slots nearly to ground surface. Need to seal slots near surface to reduce potential for surface water to flow into well.	Excavated approximately 2 feet below grade, wrapped well casing with petroleum-resistant fabric, then poured concrete around exposed portion of well to ground surface
S-21	2-inch well frost-jacked above monument.	Cut well casing to below level of protective monument (cut 1.38 feet)
S-22	2-inch well frost-jacked above monument.	Cut well casing to below level of protective monument (cut 1.85 feet)
S-43	4-inch well frost-jacked above monument.	Cut well casing to below level of protective monument (cut 1.31 feet)
MW-102	Needs conversion to new-style monument (remove 12-inch PVC cover).	Excavated approximately 2 feet below ground surface, welded steel casing monument extension to existing base, cut 0.14 feet from PVC well casing
MW-104	Needs conversion to new-style monument (remove 12-inch PVC cover).	Excavated approximately 2 feet below ground surface, welded steel casing monument extension to existing base, cut 0.14 feet from PVC well casing
MW-106	Needs monument repair (cannot be locked, casing jacked).	Repair postponed due to onset of winter conditions
MW-109	Lagoon B berm collapsing on monument; dig out and replace monument.	Repair postponed due to onset of winter conditions
MW-125	Repair monument (well has frost-jacked); redevelop	Redevelopment completed, repair postponed due to onset of winter conditions
MW-101	Redevelop	Redeveloped
MW-101A	Redevelop	Redeveloped
MW-105	Redevelop	Redeveloped
MW-105A	Redevelop	Redeveloped
MW-113	Redevelop	Redeveloped
MW-116	Redevelop	Redeveloped
MW-126	Redevelop	Redeveloped
MW-127	Redevelop	Redeveloped
MW-137	Redevelop	Redeveloped
MW-139	Redevelop	Redeveloped
MW-141	Redevelop	Redeveloped
MW-144A	Redevelop	Redeveloped
MW-148B	Redevelop	Redeveloped
MW-149B	Redevelop	Redeveloped
MW-169C	Replace flush monument with stickup	Repair postponed due to onset of winter conditions
R-21	Cleaning	Cleaned and redeveloped; inserted 8-inch slotted screen within 12-inch casing following discovery of breach in original screen.
R-39	Cleaning	Cleaned and redeveloped
R-40	Cleaning	Cleaned and redeveloped

Table 7
Sampled Private Wells with Depth Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)
1977	315460	Yes	45		
1998	348571	Yes	60		
1998	348554	Yes	40	1	8
1998	348589	Yes	34		
1985	315290	Yes	122	5	110
1981	333891	Yes	140	3	120
1977	315320	Yes	127	4	117
2000	318043	Yes	40		
1999	317918	Yes	40		
1999	372943	Yes	51		
1988	406333	Yes	353	30	230
1972	328383	Yes	40		
2006	348481	Yes	32		
1984	391565	Yes	120	36	105
1984	391557	Yes	150	40	150
1984	391531	Yes	205	24	205
2006	565822	Yes	40		
2005	565831	Yes	40		
1998	484067	Yes	40		
1999	348520	Yes	55	5	12
1984	375721	Yes	42		
1985	383899	Yes	50		
2001	317217	Yes	40		
2006	565521	Yes	50		
2002	519359	Yes	40		
1998	348546	Yes	33		
1975	296945	Yes	40		
1985	296937	Yes	220	20	210
1984	316679	Yes	80		
1984	316687	Yes	40		
2006	318191	Yes	40		
1984	408697	Yes	193	22	176
2006	565717	Yes	50		
1979	294501	Yes	36		
1998	348716	No	40		
2006	565636	Yes	40		
1984	391361	Yes	133	19	133
1984	391344	Yes	202	7	202
1987	391336	Yes	320	5	195
2006	565709	Yes	40		
1996	315192	Yes	89	22	70
1984	395340	Yes	218	65	215
2000	297046	Yes	40		
1985	303917	Yes	223	11	217
2003	317497	Yes	40		
2005	317969	Yes	40		
1984	379883	No	33		
1984	395099	No	74		
1985	406384	Yes	33		

Table 7
Sampled Private Wells with Depth Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)
1984	381039	Yes	42		
1981	333883	Yes	196	12	180
2006	565695	Yes	40		
1983	347531	No	35		
1984	395218	Yes	70	32	70
2005	304034	Yes	54		
1964	535885	Yes	40		
2001	499897	Yes	40		
2001	333778	Yes	236	8	230
1982	333905	Yes	60		
1977	296449	Yes	200		
1980	290670	Yes	40		
1987	297135	Yes	40		
2005	318205	Yes	40		
2006	565512	Yes	50		
1984	391409	Yes	255	19	146
1985	429929	Yes	305	8	228
1985	333794	Yes	40	27	40
1985	333786	Yes	42	23	38
1984	399248	Yes	65		
0	445657	Yes	215	5	205
2006	565849	Yes	40		
2004	429911.1	Yes	40		
2006	565652	Yes	60		
2005	565661	Yes	40		
2003	317926	Yes	40		
1967	406309	Yes	21		
2002	460800	Yes	40		
2003	317713	Yes	40		
1984	375730	Yes	42		
1983	375748	Yes	50		
1999	348538	Yes	55	8	13
1984	302082	Yes	105	20	103
1984	395200	Yes	236	55	230
1984	395196	Yes	295	3	245
1998	348856	Yes	55		
0	395251	Yes	38	12	27
1998	348864	Yes	40		
1999	507075	Yes	40		
1984	391492	Yes	100		
1987	348619	Yes	42		
2006	519286	Yes	40		
1994	348503	Yes	60		
2005	565725	Yes	40		
2005	565733	Yes	50		
2005	565741	Yes	40		
2007	579581	Yes	220	12	200
1987	315249	Yes	40		
1998	429881.2	Yes	40		

Table 7
Sampled Private Wells with Depth Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)
0	290190	Yes	238	6	215
1983	297062	Yes	40		
2006	581593	Yes	40		
2006	581666	Yes	40		
1998	429881.1	Yes	75	8	65
2004	429911.2	Yes	40		
2004	429911.3	Yes	115	10	92
1983	375586	Yes	76.0		
1983	375594	Yes	53.0		
1972	513431	No	26.5		
2000	315206	Yes	98.0	25	90
1982	373834	No	20.0		
1985	296775	No	160.0		
1982	296783	Yes	186.0		
1976	296635	No	49.0		
1980	278912	No	30.0		
1985	296813	Yes	40.0	34	40
1982	296830	Yes	205.0		
1983	348473	No	35.6		
1983	375608	Yes	42.0		
1982	296805	Yes	200.0		
1983	375578	Yes	63.0		
1979	296759	No	63.0		
1979	296767	No	63.0		
1976	296724	No	40.0		
1982	296589	No	220.0		
1993	130427	No	32.0		
1985	296732	Yes	41.0		
1983	348465	Yes	40.0		
1986	427063	No	220.0		
1997	296856	Yes	218.0		
1996	348902	Yes	40.0		
1986	296571	No	48.0		
1979	115525	No	40.0		
1978	278963	No	35.0		
2002	303836	No	30.0		
1998	513423	No	45.0		
1977	296741	Yes	230.0		
1984	375551	Yes	48.0		
1983	375543	Yes	53.0		
1997	401871	No	30.0		
1981	113964	No	30.0		
1985	383881	No	45.0		
1984	348155	Yes	40.0		
1986	383830	Yes	62.0		
1983	375560	Yes	42.0		
1972	403971	No	35.0		
1978	279111	No	30.5		
1984	277045	Yes	60.0	N/A	

Table 7
Sampled Private Wells with Depth Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)
1986	383848	Yes	40.0		
1984	295884	No	35.0		
1976	296643	No	45.0		
1979	113921	No	30.0		
2004	348724	Yes	40.0		
1976	296163	Yes	40.0		
1997	401951	No	35.0		
1976	288845	No	30.0		
1972	424391	Yes	51.0	3	20
2004	348651	Yes	40.0		
1983	375641	Yes	42.0		
1983	375632	Yes	42.0		
1984	383856	No	40.0		
1984	375624	Yes	40.0		
1983	347400	No	33.0		
1984	375659	Yes	65.0		
1983	375667	No	42.0		
1983	375675	Yes	40.0		
1984	383864	No	40.0		
1983	375683	Yes	42.0		
1985	383872	No	34.0		
1983	348449	No	40.0		
1984	383759	Yes	51.0		
1976	296716	No	40.0		
2000	348732	Yes	40.0		
1984	346110	No	32.0		
1980	296627	No	57.0		
1982	296601	No	158.0		
1984	296597	No	170.0		

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
MW-101		x	quarterly	Monitor groundwater elevation	
MW-101A		x	annually	Monitor groundwater elevation	
MW-102		x	quarterly	Monitor groundwater elevation	
MW-104		x	semi-annually	Monitor groundwater elevation	
MW-105		x	annually	Monitor groundwater elevation	
MW-105A		x	annually	Monitor groundwater elevation	
MW-106		x	quarterly	Monitor groundwater elevation	
MW-109		x	quarterly	Monitor groundwater elevation	
MW-110		x	quarterly	Monitor groundwater elevation	
MW-111		x	quarterly	Monitor groundwater elevation	
MW-113		x	quarterly	Monitor groundwater elevation	
MW-115		x	semi-annually	Monitor groundwater elevation	
MW-116		x	semi-annually	Monitor groundwater elevation	
MW-124		x	semi-annually	Monitor groundwater elevation	
MW-125		x	semi-annually	Monitor groundwater elevation	
MW-126		x	semi-annually	Monitor groundwater elevation	
MW-127		x	quarterly	Monitor groundwater elevation	
MW-129		x	semi-annually	Monitor groundwater elevation	
MW-130		x	quarterly	Monitor groundwater elevation	
MW-131		x	quarterly	Monitor groundwater elevation	
MW-132			semi-annually	Monitor groundwater elevation	
MW-133		x	semi-annually	Monitor groundwater elevation	
MW-135		x	semi-annually	Monitor groundwater elevation	
MW-136		x	semi-annually	Monitor groundwater elevation	
MW-137		x	semi-annually	Monitor groundwater elevation	
MW-138	x		monthly	Monitor fluctuation in product thickness	pumping well
MW-139	x		monthly	Monitor NW product boundary	-
MW-140	x		quarterly	Monitor product boundary	-
MW-141		x		Monitor groundwater elevation	
MW-142	x		quarterly	Monitor product boundary	-
MW-143		x	quarterly	Monitor groundwater elevation	
MW-144A	x		quarterly	Monitor product boundary	-
MW-144BR		x		Monitor groundwater elevation	
MW-145	x		monthly	Monitor NE product boundary	-
MW-146A		x	quarterly	Monitor groundwater elevation	

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
MW-146B		x	quarterly	Monitor groundwater elevation	
MW-147B		x	quarterly	Monitor groundwater elevation	
MW-148A		x	quarterly	Monitor groundwater elevation	
MW-148B		x	quarterly	Monitor groundwater elevation	
MW-148C		x	quarterly	Monitor groundwater elevation	
MW-148D		x	quarterly	Monitor groundwater elevation	
MW-149A		x	quarterly	Monitor groundwater elevation	
MW-149B		x	quarterly	Monitor groundwater elevation	
MW-150A		x	quarterly	Monitor groundwater elevation	
MW-150B		x	quarterly	Monitor groundwater elevation	
MW-151A		x	quarterly	Monitor groundwater elevation	
MW-151B		x	quarterly	Monitor groundwater elevation	
MW-151C		x	quarterly	Monitor groundwater elevation	
MW-152A		x	quarterly	Monitor groundwater elevation	
MW-152B		x	quarterly	Monitor groundwater elevation	
MW-152C		x	quarterly	Monitor groundwater elevation	
MW-153A		x	quarterly	Monitor groundwater elevation	
MW-153B		x	quarterly	Monitor groundwater elevation	
MW-154A		x	quarterly	Monitor groundwater elevation	
MW-154B		x	quarterly	Monitor groundwater elevation	
MW-155A		x	quarterly	Monitor groundwater elevation	
MW-155B		x	quarterly	Monitor groundwater elevation	
MW-156A		x	quarterly	Monitor groundwater elevation	
MW-156B		x	quarterly	Monitor groundwater elevation	
MW-157A		x	quarterly	Monitor groundwater elevation	
MW-157B		x	quarterly	Monitor groundwater elevation	
MW-158A		x	quarterly	Monitor groundwater elevation	
MW-158B		x	quarterly	Monitor groundwater elevation	
MW-159A		x	quarterly	Monitor groundwater elevation	
MW-159B		x	quarterly	Monitor groundwater elevation	
MW-159C		x	quarterly	Monitor groundwater elevation	
~~MW-160A~~	Well destroyed.				
MW-160B		x	quarterly	Monitor groundwater elevation	
MW-161A		x	quarterly	Monitor groundwater elevation	
MW-161B		x	quarterly	Monitor groundwater elevation	

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
MW-162A		x	quarterly	Monitor groundwater elevation	
MW-162B		x	quarterly	Monitor groundwater elevation	
MW-163A		x	quarterly	Monitor groundwater elevation	
MW-163B		x	quarterly	Monitor groundwater elevation	
MW-164A		x	quarterly	Monitor groundwater elevation	
MW-164B		x	quarterly	Monitor groundwater elevation	
MW-164C		x	quarterly	Monitor groundwater elevation	
MW-165A		x	quarterly	Monitor groundwater elevation	
MW-165B		x	quarterly	Monitor groundwater elevation	
MW-166A		x	quarterly	Monitor groundwater elevation	
MW-166B		x	quarterly	Monitor groundwater elevation	
MW-167A		x	quarterly	Monitor groundwater elevation	
MW-167B		x	quarterly	Monitor groundwater elevation	
MW-168A		x	quarterly	Monitor groundwater elevation	
MW-168B		x	quarterly	Monitor groundwater elevation	
MW-169A		x	quarterly	Monitor groundwater elevation	
MW-169B		x	quarterly	Monitor groundwater elevation	
MW-169C		x	quarterly	Monitor groundwater elevation	
MW-170A		x	quarterly	Monitor groundwater elevation	
MW-170B		x	quarterly	Monitor groundwater elevation	
MW-170C		x	quarterly	Monitor groundwater elevation	
MW-170D		x	quarterly	Monitor groundwater elevation	
MW-171A		x	quarterly	Monitor groundwater elevation	
MW-171B		x	quarterly	Monitor groundwater elevation	
MW-172A		x	quarterly	Monitor groundwater elevation	
MW-172B		x	quarterly	Monitor groundwater elevation	
MW-173A		x	quarterly	Monitor groundwater elevation	
MW-173B		x	quarterly	Monitor groundwater elevation	
MW-174A		x	quarterly	Monitor groundwater elevation	
MW-174B		x	quarterly	Monitor groundwater elevation	
MW-175		x	quarterly	Monitor groundwater elevation	
MW-176A	x		quarterly	Monitor fluctuation in product thickness	-
MW-176B		x	quarterly	Monitor groundwater elevation	
MW-176C		x	quarterly	Monitor groundwater elevation	
MW-177		x	quarterly	Monitor groundwater elevation	

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
MW-178A	x		quarterly	Monitor product boundary	-
MW-178B		x	quarterly	Monitor groundwater elevation	
MW-178C		x	quarterly	Monitor groundwater elevation	
MW-179A	x		quarterly	Monitor product boundary	-
MW-179B		x	quarterly	Monitor groundwater elevation	
MW-179C		x	quarterly	Monitor groundwater elevation	
MW-179D		x	quarterly	Monitor groundwater elevation	
MW-180A	x		quarterly	Monitor product boundary	-
MW-180B		x	quarterly	Monitor groundwater elevation	
MW-180C		x	quarterly	Monitor groundwater elevation	
MW-181A		x	quarterly	Monitor groundwater elevation	
MW-181B		x	quarterly	Monitor groundwater elevation	
MW-181C		x	quarterly	Monitor groundwater elevation	
MW-182A		x	quarterly	Monitor groundwater elevation	
MW-182B		x	quarterly	Monitor groundwater elevation	
MW-183A		x	quarterly	Monitor groundwater elevation	
MW-183B		x	quarterly	Monitor groundwater elevation	
MW-184		x	quarterly	Monitor groundwater elevation	
MW-185A		x	quarterly	Monitor groundwater elevation	
MW-185B		x	quarterly	Monitor groundwater elevation	
MW-185C		x	quarterly	Monitor groundwater elevation	
MW-186A	x		monthly	Monitor fluctuation in product thickness	-
MW-186B		x	quarterly	Monitor groundwater elevation	
MW-186D		x	quarterly	Monitor groundwater elevation	
MW-187		x	quarterly	Monitor groundwater elevation	
MW-188		x	quarterly	Monitor groundwater elevation	
MW-189A		x	quarterly	Monitor groundwater elevation	
MW-189B		x	quarterly	Monitor groundwater elevation	
MW-190A		x	quarterly	Monitor groundwater elevation	
MW-190B		x	quarterly	Monitor groundwater elevation	
MW-191A		x	quarterly	Monitor groundwater elevation	
MW-191B		x	quarterly	Monitor groundwater elevation	
MW-192A		x	quarterly	Monitor groundwater elevation	
MW-192B		x	quarterly	Monitor groundwater elevation	
MW-193A		x	quarterly	Monitor groundwater elevation	

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
MW-193B		x	quarterly	Monitor groundwater elevation	
MW-194A		x	quarterly	Monitor groundwater elevation	
MW-194B		x	quarterly	Monitor groundwater elevation	
MW-195A	x		quarterly	Monitor product boundary	installed 2011 Q4
MW-195B		x	quarterly	Monitor groundwater elevation	
MW-196	x		quarterly	Monitor product boundary	installed 2011 Q4
MW-198		x	quarterly	Monitor groundwater elevation	
MW-199		x	quarterly	Monitor groundwater elevation	
MW-300		x	quarterly	Monitor groundwater elevation	
MW-301-70		x	quarterly	Monitor groundwater elevation	
MW-301-CMT		x	quarterly	Monitor groundwater elevation	
MW-302-110		x	quarterly	Monitor groundwater elevation	
MW-302-CMT		x	quarterly	Monitor groundwater elevation	
MW-303-CMT		x	quarterly	Monitor groundwater elevation	
MW-304-125		x	quarterly	Monitor groundwater elevation	
MW-304-70		x	quarterly	Monitor groundwater elevation	
MW-304-CMT		x	quarterly	Monitor groundwater elevation	
MW-305-CMT		x	quarterly	Monitor groundwater elevation	
MW-306-150		x	quarterly	Monitor groundwater elevation	
MW-306-CMT		x	quarterly	Monitor groundwater elevation	
MW-307		x	quarterly	Monitor groundwater elevation	
S-9	x		monthly	Monitor product boundary	down gradient of known LNAPL, nearby wells ND for contaminants.
~~S-19~~	Well damaged; decommission.				
~~S-20~~	Well damaged; decommission.				
S-21	x		monthly	Monitor fluctuation in product thickness	-
S-22	x		monthly	Monitor fluctuation in product thickness	-
~~S-23~~	Well damaged; decommission.				
S-32	x		monthly	Monitor fluctuation in product thickness	-
~~S-33~~	Well destroyed.				
~~S-35~~	Well destroyed.				
~~S-37~~	Well damaged; decommission.				
~~S-38~~	Well damaged; decommission.				
S-39	x		monthly	Monitor fluctuation in product thickness	-
~~S-40~~	Well damaged; decommission.				

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
~~S-41~~	Well damaged; decommission.				
S-43	x		monthly	Monitor fluctuation in product thickness	-
S-44	x		monthly	Monitor fluctuation in product thickness	-
S-50	x		monthly	Monitor fluctuation in product thickness	pumping well
S-51	x		monthly	Monitor fluctuation in product thickness	-
~~S-52~~	Well damaged; decommission.				
S-54		x		Monitor groundwater elevation	
~~S-55~~	Well damaged; decommission.				
O-1	x		monthly	Monitor product boundary	-
O-2	x		monthly	Monitor fluctuation in product thickness	pumping well
O-3	x		monthly	Monitor product boundary	-
O-4	x		monthly	Monitor product boundary	-
O-5	x		monthly	Monitor product boundary	installed 2011 Q3
O-6	x		monthly	Monitor product boundary	installed 2011 Q3
O-7	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q3
O-8	x		monthly	Monitor product boundary	installed 2011 Q3
O-9	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q3
O-10	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q4
O-11	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q3
O-12	x		monthly	Monitor product boundary	installed 2011 Q3
O-13	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q3
O-14	x		monthly	Monitor product boundary	installed 2011 Q4
O-15	x		monthly	Monitor product boundary	installed 2011 Q4
O-16	x		monthly	Monitor product boundary	installed 2011 Q4
O-17	x		monthly	Monitor product boundary	installed 2011 Q4
O-18	x		monthly	Monitor product boundary	installed 2011 Q4
O-19	x		monthly	Monitor fluctuation in product thickness	installed 2011 Q4
O-20	x		monthly	Monitor product boundary	installed 2011 Q4
O-21	x		monthly	Monitor product boundary	installed 2011 Q4
O-22	x		monthly	Monitor product boundary	installed 2011 Q4
O-23	x		monthly	Monitor product boundary	installed 2011 Q4
O-24	x		monthly	Monitor product boundary	installed 2011 Q4
O-25	x		monthly	Monitor product boundary	installed 2011 Q4
O-26	x		monthly	Monitor product boundary	installed 2011 Q4
O-27	x		monthly	Monitor product boundary	installed 2011 Q4

Table 8
Current Groundwater Elevation and LNAPL Monitoring Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Measurement Type		Frequency	Rationale	Notes
	LNAPL & GW Elev	GW Elev			
O-28	x		monthly	Monitor product boundary	installed 2011 Q4
O-29	x		monthly	Monitor product boundary	installed 2011 Q4
R-3	x		quarterly	Monitor product boundary	Suitablity as observation well should be assessed; well dry for several quarters
R-5	x		quarterly	Monitor fluctuation in product thickness	Suitability as observation well should be assessed; well dry for several quarters
~~R-6~~	Well destroyed.				
~~R-9~~	Well damaged; decommission.				
~~R-12~~	Well damaged; decommission.				
~~R-13~~	Well damaged; decommission.				
~~R-14~~	x		monthly	Monitor fluctuation in product thickness	Suitablity as observation well should be assessed; well dry for several quarters; colocated with R-14A
R-14A	x		monthly	Monitor fluctuation in product thickness	-
R-18	x		quarterly	Monitor fluctuation in product thickness	-
~~R-19~~	Well destroyed.				
R-20R	x		monthly	Monitor fluctuation in product thickness	pumping well
R-21	x		monthly	Monitor fluctuation in product thickness	pumping well
~~R-28~~	Well damaged; decommission.				
~~R-29~~	Well damaged; decommission.				
~~R-30~~	Well damaged; decommission.				
R-32	x		monthly	Monitor fluctuation in product thickness	pumping well
R-33	x		monthly	Monitor fluctuation in product thickness	pumping well
R-34	x		quarterly	Monitor fluctuation in product thickness	-
R-35R	x		monthly	Monitor fluctuation in product thickness	pumping well
R-38	x		quarterly	Monitor product boundary	Suitablity as observation well should be assessed
R-39	x		monthly	Monitor fluctuation in product thickness	pumping well
R-40	x		monthly	Monitor fluctuation in product thickness	pumping well
R-42	x		monthly	Monitor product boundary	pumping well

Table 9
Monitoring Wells with Pressure Transducers and Data Loggers
North Pole Refinery
Flint Hills Resources Alaska, LLC

Monitoring Well	Well Nest	Well Depth (feet BGS)	WL-16 Installation Date
MW-150A	MW-150	11.6	3/11/11
MW-150B		24.6	12/15/10
MW-151A	MW-151	15.5	12/4/10
MW-151B		26.5	12/4/10
MW-151C		57.7	12/21/10
MW-156A		15.5	12/15/10
MW-158A		16.5	3/11/11
MW-161A		16.5	3/11/11
MW-162A	MW-162	16.5	2/18/11
MW-162B		65.4	2/18/11
MW-170A	MW-170	15	12/21/10
MW-170C		130.2	12/21/10
MW-111		19.5	12/21/10
MW-113		16	12/21/10
MW-186A	MW-186	15.2	12/21/10
MW-186B		60.8	12/21/10
MW-186C		100.8	12/21/10

Table 10
Summary of Analytical Soil Samples from the Laboratory Drain Investigation
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft BGS)	Sample ID	Sample Date	Parameter	GRO	DRO	RRO	VOCs	SVOCs	RCRA Metals	Total Solids	Sulfolane
				Method	AK101	AK102	AK103	SW8260B	SW8270D	SW6020	SM20 2540G	
SBLAB-1	3-3.2	SBLAB-1-3-3.2	3/29/2011		x	x	x	x	x	x	x	x
	5.2-5.4	SBLAB-1-5.2-5.4	3/29/2011		x	x	x	x	x	x	x	x
SBLAB-2	3-3.2	SBLAB-2-3-3.2	3/29/2011		x	x	x	x	x	x	x	x
	5.8-5.9	SBLAB-2-5.8-5.9	3/29/2011		x	x	x	x	x	x	x	x
SBLAB-3	2.5-2.7	SBLAB-3-2.5-2.7	3/29/2011		x	x	x	x	x	x	x	x
	4.4-4.6	SBLAB-3-4.4-4.6	3/29/2011		x	x	x	x	x	x	x	x
SBLAB-4	1.6-1.8	SBLAB-4-1.6-1.8	3/29/2011		x	x	x	x	x	x	x	x
	1.6-1.8[D]	DUP-1	3/29/2011		x	x	x	x	x	x	x	x
	3.8-4.0	SBLAB-4-3.8-4.0	3/29/2011		x	x	x	x	x	x	x	x
SBLAB-5	2.5-2.7	SBLAB-5-2.5-2.7	3/29/2011		x	x	x	x	x	x	x	x
	6.9-7.0	SBLAB-5-6.9-7.0	3/29/2011		x	x	x	x	x	x	x	x

ft BGS feet below ground surface
GRO Gasoline Range Organics
DRO Diesel Range Organics
RRO Residual Range Organics
[D] Duplicate Sample

Table 11
Summary of Analytical Soil Samples from Site Characterization (2010)
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Method	SW8270D	AK101	AK102	SW8021B	SW8260B	SW8270D
				Parameter	Sulfolane	GRO	DRO	BTEX	VOCs	SVOCs
MW-144B	90-91.5	*MW-144B(90-91.5)*	9/24/10		x	x	x	x	x	x
MW-151C	15-16.5	*1489-021810-1511*	2/18/10		x	—	—	—	—	—
MW-151C	25-26.5	*1489-021810-1512*	2/18/10		x	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-1513*	2/18/10		x	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-2513**	2/18/10		x	—	—	—	—	—
MW-154B	90-91.5	*1489-022010-1542*	2/20/10		x	—	—	—	—	—
MW-156B	20-21.5	*1489-021710-1561*	2/17/10		x	—	—	—	—	—
MW-156B	35-36.5	*1489-021710-1562*	2/17/10		x	—	—	—	—	—
MW-160B	90-91.5	*1489-021910-1605*	2/19/10		x	—	—	—	—	—
MW-162B	10-11.5	*1489-021610-1621*	2/16/10		x	—	—	—	—	—
MW-162B	30-31.5	*1489-021610-1622*	2/16/10		x	—	—	—	—	—
MW-162B	55-56.5	*1489-021610-1623*	2/16/10		x	—	—	—	—	—
MW-162B	65-66.5	*1489-021610-1624*	2/16/10		x	—	—	—	—	—
MW-174A	50-51.5	*MW-174A (50-51.5)*	9/16/10		x	x	x	x	x	x
MW-174B	90-91.5	*MW-174B(90-91.5)*	9/15/10		x	x	x	x	x	x
MW-175	7.5-9	*MW-175(7.5-9)*	9/29/10		x	x	x	x	x	x
MW-175	7.5-9	*MW-175D**	9/29/10		x	x	x	x	x	x
MW-175	90-91.5	*MW-175(90-91.5)*	9/29/10		x	x	x	x	x	x
MW-176A	15-16.5	*MW-176A(15-16.5)*	10/4/10		x	x	x	x	x	x
MW-176B	30-32	*MW-176B(30-32)*	10/4/10		x	x	x	x	x	x
MW-176B	50-51.5	*MW-176B(50-51.5)*	10/4/10		x	x	x	x	x	x
MW-176C	5-6.5	*MW-176C(5-6.5)*	10/1/10		x	x	x	x	x	x
MW-176C	5-6.5	*MW-176D**	10/1/10		x	x	x	x	x	x
MW-176C	90-91.5	*MW-176C(90-91.5)*	10/1/10		x	x	x	x	x	x
MW-177	90-91.5	*MW-177(90-91.5)*	9/22/10		x	x	x	x	x	x
MW-178A	15-16.5	*MW-178A (15-16.5)*	9/18/10		x	x	x	x	x	x
MW-178B	50-51.5	*MW-178B (50-51.5)*	9/18/10		x	x	x	x	x	x
MW-178C	10-12	*MW-178C (10-12)*	9/17/10		x	x	x	x	x	x
MW-178C	90-91.5	*MW-178C (90-91.5)*	9/17/10		x	x	x	x	x	x
MW-179A	15-16.5	*MW-179A(15-16.5)*	9/21/10		x	x	x	x	x	x
MW-179B	50-51.5	*MW-179B(50-51.5)*	9/21/10		x	x	x	x	x	x
MW-179C	90-91.5	*MW-179C(90-91.5)*	9/20/10		x	x	x	x	x	x
MW-180A	15-16.5	*MW-180A(15-16.5)*	9/27/10		x	x	x	x	x	x
MW-180B	50-51.5	*MW-180B(50-51.5)*	9/27/10		x	x	x	x	x	x
MW-180C	7.5-9	*MW-180C(7.5-9)*	9/25/10		x	x	x	x	x	x

Table 11
Summary of Analytical Soil Samples from Site Characterization (2010)
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Method	SW8270D	AK101	AK102	SW8021B	SW8260B	SW8270D
				Parameter	Sulfolane	GRO	DRO	BTEX	VOCs	SVOCs
MW-180C	90-91.5	*MW-180C(90-91.5)*	9/25/10		x	x	x	x	x	x
MW-186A	15-16.5	*MW-186A (15-16.5)*	10/19/10		x	—	—	—	x	x
MW-186C	7.5-9	*MW-186C (7.5-9)*	10/15/10		x	—	—	—	x	x
MW-186C	7.5-9	*MW-186D**	10/15/10		x	—	—	—	x	x
MW-186C	100-101.5	*MW-186C (100-101.5)*	10/15/10		x	—	—	—	x	x
O-1	2.5-4	*0-1 (2.5-4)*	10/19/10		x	—	—	—	x	x
O-1	5-6.5	*0-1 (5-6.5)*	10/19/10		x	—	—	—	x	x
O-1	10-11.5	*0-1 (10-11.5)*	10/19/10		x	—	—	—	x	x
O-1	12.5-14	*0-1 (12.5-14)*	10/19/10		x	—	—	—	x	x
O-1	15-16.5	*0-1(15-16.5)*	9/23/10		x	x	x	x	x	x
O-2	2.5-4	*0-2 (2.5-4)*	10/20/10		x	—	—	—	x	x
O-2	5-6.5	*0-2 (5-6.5)*	10/20/10		x	—	—	—	x	x
O-2	5-6.5	*0-2 D**	10/20/10		x	—	—	—	x	x
O-2	7.5-9	*0-2(7.5-9)*	9/23/10		x	x	x	x	x	x
O-2	10-11.5	*0-2 (10-11.5)*	10/20/10		x	—	—	—	x	x
O-2	10-11.5	*0-2 DD**	10/20/10		x	—	—	—	x	x
O-2	12.5-14	*0-2 (12.5-14)*	10/20/10		x	—	—	—	x	x
O-2	15-16.5	*0-2(15-16.5)*	9/23/10		x	x	x	x	x	x
O-3	2.5-4	*0-3 (2.5-4)*	10/20/10		x	—	—	—	x	x
O-3	5-6.5	*0-3 (5-6.5)*	10/20/10		x	—	—	—	x	x
O-3	10-11.5	*0-3 (10-11.5)*	10/20/10		x	—	—	—	x	x
O-3	12.5-14	*0-3 (12.5-14)*	10/20/10		x	—	—	—	x	x
O-3	15-16.5	*0-3(15-16.5)*	9/23/10		x	x	x	x	x	x
O-4	2.5-4	*0-4 (2.5-4)*	10/20/10		x	—	—	—	x	x
O-4	5-6.5	*0-4 (5-6.5)*	10/20/10		x	—	—	—	x	x
O-4	10-11.5	*0-4 (10-11.5)*	10/20/10		x	—	—	—	x	x
O-4	12.5-14	*0-4 (12.5-14)*	10/20/10		x	—	—	—	x	x
O-4	15-16.5	*0-4(15-16.5)*	9/16/10		x	x	x	x	x	x

GRO Gasoline Range Organics
DRO Diesel Range Organics
— Analysis not performed
* Duplicate of previous sample

Table 12
Groundwater Characterization Full COPC List for Sampling
North Pole Refinery
Flint Hills Resources Alaska, LLC

Compound/Suite of Compounds	Analytical Method
GRO	AK101
DRO	AK102
RRO	AK103
Cyanide	SM20 4500-CN C
Sulfolane	USEPA 1625 Isotope Dilution
Antimony	USEPA SW 6020
Barium	USEPA SW 6020
Cadmium	USEPA SW 6020
Chromium, Total	USEPA SW 6020
Iron	USEPA SW 6020
Lead	USEPA SW 6020
Selenium	USEPA SW 6020
Propylene glycol (1,2,-Propanediol)	USEPA 8015 Modified
Isopropanol (propanol)	USEPA 8015 Modified
1,1-Dichloroethene	USEPA SW-846 8260B
1,2,4-Trimethylbenzene	USEPA SW-846 8260B
1,3,5-Trimethylbenzene	USEPA SW-846 8260B
4-Isopropyltoluene (p-cymene)	USEPA SW-846 8260B
Benzene	USEPA SW-846 8260B
Cyclohexane	USEPA SW-846 8260B
Ethylbenzene	USEPA SW-846 8260B
Methyl tert-butyl ether	USEPA SW-846 8260B
Methylene chloride	USEPA SW-846 8260B
n-Hexane	USEPA SW-846 8260B
n-Propylbenzene	USEPA SW-846 8260B
Toluene	USEPA SW-846 8260B
Xylenes	USEPA SW-846 8260B
1-Methylnaphthalene	USEPA 8270C PAH SIM
2-Methylnaphthalene	USEPA 8270C PAH SIM
Benzo (a) anthracene	USEPA 8270C PAH SIM
Benzo (a) pyrene	USEPA 8270C PAH SIM
Benzo (b) fluoranthene	USEPA 8270C PAH SIM
Benzo (k) fluoranthene	USEPA 8270C PAH SIM
Dibenzo (a,h) anthracene	USEPA 8270C PAH SIM
Indeno (1,2,3-cd) pyrene	USEPA 8270C PAH SIM
Naphthalene	USEPA 8270C PAH SIM
Dibenzofuran	USEPA 8270D
Alkanol amines	No Available Method
Alkylamines	No Available Method
Alkylene amines	No Available Method
Dinonylnaphthylsulfonic acid	No Available Method
Fluoroalkyl surfactant	No Available Method
Iron oxides	No Available Method
2-Methoxymethylethoxy propanol	No Available Method
Monoethanolamine	No Available Method
Montmorillonite, calcined	No Available Method

Table 12
Groundwater Characterization Full COPC List for Sampling
North Pole Refinery
Flint Hills Resources Alaska, LLC

Notes:
1: Subject to further evaluation

USEPA = United States Environmental Protection Agency
AK = Alaska
ADEC = Alaska Department of Environmental Conservation
Addendum = Site Characterization Work Plan Addendum
COPC = chemical of potential concern
PAH = Polyaromatic Hydrocarbon
SIM = Selective Ion Monitoring

All analyses confirmed with SGS Laboratories of Anchorage, Alaska.
This list is currently under review by ADEC and may be subject to change independent of the Addendum

Table 13
Monitored Natural Attenuation Evaluation Sampling Locations and Parameters
North Pole Refinery
Flint Hills Resources Alaska, LLC

Wells for Shallow MNA Sampling (within 10 feet of water table)	
Well ID	**Rationale**
MW-170A, MW-171A	Sidegradient well, baseline for MNA capacity of aquifer
MW-142, MW-143, MW-148A	Upgradient well in plume
MW-151A, MW-152A, MW-158, MW-159	Downgradient about ½ mile in plume
MW-156A, MW-157, MW-160A	Downgradient about ¾ mile in plume
MW-161, MW-162A, MW-163, MW-164	Downgradient about 1.5 miles in plume
MW-165, MW-166A, MW-167A, MW-168	Downgradient, outside of plume
Wells for Deep MNA Sampling (15 to 55 feet from water table)	
Well ID	**Rationale**
MW-171B	Sidegradient well, baseline for MNA capacity of aquifer
MW-127, MW-131	Within plume, near edge
MW-152B, MW-151B, MW-148B	Upgradient well in plume
MW-156B, MW-162B, MW-166B	In plume, downgradient
MW-167B	Out of plume, downgradient

MNA Parameters	
Field-based Measurements	**Laboratory Analyses (Method)**
Dissolved oxygen, conductivity, temperature, pH	Sulfolane (EPA Method 8270D)
Total and ferrous iron	Total organic carbon (SM20 5310B)
Total and reduced manganese	Total phosphorus (SM20 4500P-B,E)
Sulfide	Total Kjeldahl nitrogen (SM20 4500-N D)
	Alkalinity (SM20 2320B)
	Total hardness (SM20 2340B)
	Sulfate (EPA Method 300.0)
	Nitrate/nitrite (SM20 4500NO3-F)

Table 14
Suprapermafrost and Subpermafrost Geochemistry Sampling Locations
North Pole Refinery
Flint Hills Resources Alaska, LLC

Location	Screen Bottom Depth (feet bgs)	Permafrost Depth at Time of Well Installation (feet bgs)	Notes
Area 1			
A1-1	>215	Frozen 6 feet to 215 feet	Sulfolane detected in well sample. Permafrost thickness obtained from well-installation log.
MW-162A	15.2	Frozen at 67.5 feet	Sulfolane detected in well samples; well is upgradient from residence.
MW-162B	64.7		Sulfolane detected in well samples; well is upgradient from residence.
Area 2			
A2-1	>100	unknown	Sulfolane detected in well sample. No well log available; resident states well is greater than 100 feet deep.
A2-4	<40	approximately 40	Sulfolane not detected in well sample. No well log available.
A2-5	<40	approximately 40	Sulfolane not detected in well sample. No well log available.
MW-163A	15.2	Frozen at 40 feet	Sulfolane detected in well samples.
MW-163B	39.9		Sulfolane detected in well samples.
MW-171A	14.8	Frozen at 42 feet	Sulfolane not detected in well samples.
MW-171B	39.7		Sulfolane not detected in well samples.
Area 3			
A3-3	>120	3 - 120	Sulfolane detected in well sample. Permafrost thickness obtained from well-installation log.
A3-2	>230	8 - 230	Sulfolane not detected in well sample. Permafrost thickness obtained from well-installation log.
MW-164A	15.2	not encountered	Sulfolane detected in well samples.
MW-164B	50.1		Sulfolane detected in well samples.
Additional Wells to Assess Suprapermafrost Geochemistry			
MW-158A	15.2	frozen at 65 feet	Sulfolane detected in well samples.
MW-158B	60.1		Sulfolane detected in well samples.
MW-167A	15.4	frozen at 33.5 feet	Sulfolane not detected in well samples.
MW-167B	33.2		Sulfolane not detected in well samples.

Table 15
Contaminated Site Summary Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
Address: Richardson Hwy and 5th Avenue ADEC Summary: Leaking Underground Storage Tank (LUST) Site. LUST release confirmed 10/87. Release investigation. Tanks removed. Off-site contamination confirmed; free product found on site 1992. 1993: 365 tons of highly contaminated soils removed and thermally treated at OIT. Excavation went down to ground water. 12 MWs were sampled. Ground water gradient determined to be westerly. Ground water heavily contaminated as far as 600 feet downgradient. 1995: Air Sparging/Soil Vapor Extraction (AS/SVE) system on line for plume on property. 2001: ADEC requiring additional monitoring. Concern over contamination beneath adjacent properties, but no water receptors and concentrations too low to yield indoor air concern. 2003: Benzene was detected at 48.5 parts per billion (ppb) (G-3) and 16.7 ppb (MW-6). 2005: The only elevated levels were G-3 had a benzene level of 17 ppb, MW-4 had a benzene level of 18.3 ppb, and MW-6 had a GRO level of 3.99 parts per million (ppm). ADEC reviewed and approved a decommissioning work plan for the AS/SVE system at Stage Stop. All wells and piping will be decommissioned except for MW-4, MW-6, and G-3 that will be used for long-term monitoring every third year.			
24203	Telephone Utilities of Northland	100.26.019	Cleanup Complete
Address: 3120 Badger Road ADEC Summary: 1990: Letter from contractor, Arctic Slope Consulting Group, reported the closure of gasoline and diesel tanks, both 2,000 gallons. 2 out of 5 samples were above 100 Total Petroleum Hydrocarbons (TPH) using Environmental Protection Agency (EPA) Method 418.1 (111 and 115 ppm). Groundwater was encountered 9 feet below surface during excavation. LUST cleanup initiated. Responsible Party (RP) tested on-site well for benzene, toluene, ethylbenzene, and xylenes (BTEX) and results were below detection levels. Long-term monitoring established. 3 groundwater samples analyzed for BTEX using EPA method 8020. Six soil samples analyzed for Total Volatile Petroleum Hydrocarbons (TVPH) and Total Recoverable Petroleum Hydrocarbons (TRPH) depending on location to tanks. No BTEX or gasoline product contamination was found above cleanup levels, but 2 samples tested above 100 ppm TPH for non gasoline product. LUST corrective action underway. ADEC requested additional sampling down-gradient of tanks for BTEX. BTEX was not detected. 1992: Site closure approved. Long-term monitoring complete.			
24234	Tundra Tours Bus Barn	100.26.024	Active
Address: 3009 Badger Road (FKA: 3220 Badger Road); 10 Mile Badger Road ADEC Summary: In May and June 1998, two 10,000-gallon underground fuel tanks (diesel and gas) and a 5000-gallon heating oil tank were removed from the site. There was soil contamination that was excavated and subsequent investigations identified a groundwater contaminant plume (benzene) extending north of the former gas and diesel tanks. For information the heating oil tank, see file no. 100.38.129 and separate entry in Contaminated Sites Database.			
24263	Sourdough Fuel Beaverbrook Mall	100.26.031	Active
Address: 3330 Badger Road; southeast corner of Badger and Hurst ADEC Summary: Hydrocarbons were first detected in groundwater beneath the site in 1991. The underground storage tank (UST) system was upgraded in 1992. An AS/SVE system was installed at the site in 1996, and operated until 1999. Free product was detected in several on-site wells, though long term monitoring suggests that the amount of free product has declined, and is currently detected irregularly in only one monitoring well near the pumps. The AS/SVE system was successful in reducing volatile contaminants, and the site was nearing a No Further Remedial Action Planned (NFRAP) status. However, contamination above cleanup levels has been detected again in 2005 and 2006 putting the no further action decision on hold. Sulfolane was not detected during recent 2010 sampling.			
24299	FNSB - Wescott Pool	100.26.038	Cleanup Complete - Institutional Controls
Address: 30 East 8th Avenue ADEC Summary: Subsurface petroleum contamination discovered in 1991 at the removal site of two 500 gallon underground storage tanks. One tank contained gasoline, the adjacent diesel tank was discovered to have a leaky return line. The diesel tank was removed and replaced. A monitoring well was established in 1992. A water well search was initiated in 1992. Groundwater impacted, 1995 sample showed 0.02 mg/L benzene, above ADEC cleanup level of 0.005 mg/L. Two local wells and a city fire well were tested as part of an off-site well search and showed no contaminant levels above ADEC cleanup levels including sulfolane. 130 cubic yards of soil were removed and thermally treated in 1993. Excavation was limited by concern for the integrity of the building foundation.			
24323	Green Alaska Construction, Inc.	100.26.042	Cleanup Complete
Address: MP 9 mile Richardson Highway ADEC Summary: Excavated (2) 3,000-gallon diesel and gasoline UST systems plus 1,000-gallon waste oil UST 6/91. Submitted interim corrective action Plan (CAP) 6/22/92 for thermal treatment of approximately 50 cubic yards contaminated soil. Submitted signed legal documents on NOTICE OF CONDITION AFFECTING PROPERTY 5/14/93 re- installation of impermeable liner on east side of bldg. for containment of contaminated soil beneath bldg. and groundwater monitoring twice/year for '93 and '94, then once/year for '95, '96 and '97. Name of company is Green International. 1993: Groundwater sampling done by new owner, Snail Corp. Resubmitted 10-19-93 letter w/attached lab result of analysis to comply w/legal document, "Notice of Condition Affecting Property". Result of analysis was 0.6 ppm TPH. RP will need to employ firm/person with ADEC-approved quality assurance program plan (QAPP) to conduct all future sampling of groundwater, all analysis will be for BTEX using method 602, resample before end 1/94, resample 4/94 & 7/94 and contact DEC each December for sampling desired times for yrs. '95, '96, & '97. 1995, 1996: Groundwater monitoring reports show sample taken in 1995 less than MDL w/Method 602. 1999: No Further Action completed following review of file.			
24344	Cork's Pitstop	100.26.059	Cleanup Complete
Address: 12 Mile Richardson Highway ADEC Summary: 1992: LUST release confirmed. 1993: 8,000-gallon unleaded regular gasoline, a 2,000-gallon unleaded premium gasoline, a 6,000-gallon leaded gasoline, and a 1,000-gallon diesel USTs removed. Approximately 50 cubic yards of contaminated soil was removed and thermally treated. 1994: ADEC requests site assessment report and post-closure form. 1995: ADEC rejected site assessment based on inadequate, questionable data gathering and QAPP violations. 1999: ADEC completed review of information and obtained appropriate documentation. NFA letter written and site closed.			
24341	North Pole Police Department	100.26.061	Cleanup Complete
Address: Second & Carey Streets (Lot 1A, Block 2, City of NP Phase II) ADEC Summary: 1992: LUST release confirmed. 25 cubic yards soil to be incinerated. Site closure approved.			

Table 15
Contaminated Site Summary Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
23415	FNSB - NORTH POLE MIDDLE SCHOOL	100.26.080	Cleanup Complete
Address: 306 East 8th Avenue ADEC Summary: 1992 LUST release confirmed, cleanup initiated. 1998: Site closure approved.			
24975	FNSB - NORTH POLE HIGH SCHOOL	100.26.081	Cleanup Complete
Address: 601 West 8th Avenue ADEC Summary: 1992: LUST cleanup initiated. Below cleanup levels. 1998: Site closure approved.			
24476	Tesoro - Northstore #112	100.26.159	Active
Address: 3392 Badger Road ADEC Summary: 1996: Three USTs, associated piping, and dispensers were removed and the site assessed. An adjacent property was assessed prior to installing a new UST system. Petroleum hydrocarbon contamination was encountered in the soils and groundwater at the former UST system. Contaminants of concern include BTEX, gasoline range organics (GRO) and diesel range organics (DRO). This site is currently an operating convenience store and retail fuel sales facility. 1998: Corrective action and groundwater monitoring underway. 2004: Groundwater contaminant trends consistent with previous monitoring events. Monitor well MW-1 continues to exceed groundwater cleanup levels for benzene and is just below the cleanup level for diesel range organics. The soil vapor extraction (SVE) remediation system was evaluated and continues to operate. March 2007: AS/SVE soil and groundwater treatment systems remain in operation at this site, combined with continued groundwater quality monitoring. High groundwater concentrations remain, however groundwater quality is slowly improving. December 2007: Groundwater quality has improved since the prior monitoring event and improved greatly since beginning soil and groundwater treatment with the AS/SVE treatment system. MW-2 and MW-3 still exceed ADEC groundwater cleanup levels. 2008: Site conditions remain stable, and the contamination continues to remain around the underground storage tanks. Overall the hydrocarbon concentrations are decreasing. 2009: The groundwater concentrations have continued to show an increasing trend over the past few monitoring events, along with increased groundwater elevations. The groundwater concentrations have remained lower since the remediation project has begun, and the contamination continues to remain around the existing underground storage tanks. The groundwater monitoring wells down gradient, towards Beaver Springs Creek continues to remain undetected. 2010: Since the May 2009 groundwater sampling event, GRO concentrations have increased in the two groundwater monitoring wells closest to the existing underground storage tanks at the facility. The monitoring well tested further downgradient, towards Beaver Springs Creek continues to remain undetected. The AS/SVE system was shut off for repairs, and the repair work will be performed through a subcontractor. Once the repair work is completed the remediation systems will be operational in order to address the soil and groundwater impacts at the site. Reviewed the results for an additional sampling event for sulfolane, conducted on June 15th and 16th, 2010 from MW-3 located on the site. Sample results are non-detect for Sulfolane from MW-3. Reviewed and approved the July 14, 2010 Supplemental Work Plan for Chemical Oxidation Treatment, Tesoro 2 Go Mart #112, from MWH for the injection of potassium permanganate into the groundwater via multiple existing wells. June 2010 Monitoring Event Report, dated October 2010, from MWH: During the June 15, 2010 groundwater sampling event, of the six monitoring wells sampled only one well remains above the groundwater cleanup levels, three wells were undetected for all analytes tested for, and two showed detections but were below the groundwater cleanup levels. The AS/SVE systems are operating 24 hours a day with the AS system operating in a concentrated area around the area of the former underground storage tanks. The data collected during the June sampling event shows that the elevated hydrocarbon concentrations remains near the former underground storage tanks, and the downgradient wells toward Beaver Springs Creek continues to remain undetected. 2011: October 2010 Monitoring Event Report, dated November 2010, from MWH: During the October 14, 2010 groundwater sampling event, three monitoring wells were sampled. MW-10, located just down-gradient of the source area showed high concentrations of GRO at 126 milligrams per liter (mg/L). The furthest most down-gradient monitoring well located next to Beaver Springs Creek, however, continues to test un-detect for all analytes tested, indicating that the plume remains centrally located on the west side of the Tesoro station building (former underground storage tank area) and the current dispenser area. The AS/SVE systems continue to operate 24 hours a day. Sulfolane was not detected during recent sampling.			
24821	Pacific Telecom North Pole	100.26.170	Cleanup Complete
Address: 4TH & Santa Claus Lane ADEC Summary: 1997 Site Assessment conducted on 425-gallon diesel emergency generator UST. 1/30/98: Notice of Violation issued to the RP for using olfactory senses to screen soils and for not using field QC. 1/30/98: ADEC letter to RPCON requests submit amendment to Site Assessment report which lacked pertinent information. 8/10/98: Closure letter requested by RP due to sale. 9/3/98: Closure letter issued by ADEC, Comments: Lab analysis for DRO using olfactory senses to select 2 soil samples indicated 24.5 and 25.7 ppm DRO with absence of BTEX. Operator of Site: Telephone Utilities of the North Land, Inc. Appears change of ownership took place after UST removal to Century Telephone Enterprises, Inc. As of 8/10/98 ADEC notified, Century selling to ALEC Acquisition Corporation.			
24999	ARRC - North Pole Section	100.26.173	Cleanup Complete
ADEC Summary: Release is associated with a heating oil tank and not a UST. One former 10,000-gallon UST on site was removed in 1987. As such, no additional SA is required. Samples from the vicinity of this tank were ND. 1999: AKRR submitted report indicating that the problem at the site consists of heating oil tank issues. As such, the UST portion of this project is closed out. LUST release confirmed – petroleum. LUST Site created in CSP for source area ID 77431. Cleanup initiated.			
22918	Hector's Welding	100.26.182	Cleanup Complete
Address: 701 Finell Drive ADEC Summary: Diesel UST removed in 1998, no contamination detected at limits of excavation. 15 cy of impacted soil stockpiled on site. Stockpile approved for land spreading and site closed in 2006.			
24966	Petro Star North Pole Refinery	100.26.188	Cleanup Complete
Address: 1200 H&H Lane ADEC Summary: 1998: UST removal by PSI and AGRA E&E. 1999: Site Assessment. Release confirmed. Cleanup initiated, 2000: Site closure approved.			
24826	Bradley Sky Ranch	100.26.190	Cleanup Complete
Address: 2751 Old Richardson Highway ADEC Summary: 1995: UST closure. Minimal impacts detected. UST Site Assessment completed. 1999: Site closure approved.			

Table 15
Contaminated Site Summary Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
1621	Million Subdivision, Lot 4	100.38.049	Cleanup Complete
Address: 2944 Saint Nicholas Drive ADEC Summary: Soil and groundwater sampling by FPE/Roen on 5/14/91 indicates surface and subsurface hydrocarbon contamination. Floor drain leach field samples indicate chlorinated solvents. FDIC is interested buyer and had a site assessment performed (John Heim). 1992: Closure pending remediation of contaminated soil stockpile. 1994: Submitted NFA letter after documentation submitted from Mr. Heim which shows that the 20 cubic yard pile of contaminated soil was thermally remediated by ESI last year			
1636	AHFC Properties - Perimeter Road	100.38.072	Cleanup Complete
Address: 2742 Perimeter Road ADEC Summary: 1992: Old waste-oil disposal area cleanup underway at home. 1993: ESI soil remediation sample analysis received. Soil and water samples clean. Site closure approved.			
2309	Cardin Property	100.38.087	Cleanup Complete
Address: 124, 132, & 140 4th Avenue ADEC Summary: Heating oil tank serving 3 apartment buildings with total 24 units. Impacted groundwater. Soil borings indicate soil contamination also. Lots 4, 5 and 6, Block 31 Davis Subdivision. 1997: AGRA submits request for site closure for Lot 6. During winter time excavation (February 1997), 950 cubic yards of soil removed and thermally treated. Free product was removed daily before start of excavation. Excavation was backfilled and confirmation samples were taken by drilling through back fill to base of excavation. Former lateral extent of free product was confirmed by drilling around perimeter of excavation. There is the possibility that a small amount of free product and resulting smear zone extends beneath the northeast corner of the apartment complex on lot 6. A hole was drilled through the apartment floor to the groundwater interface and DRO and BTEX were non-detectable. There is the possibility of that some free product and smear zone remains adjacent to or beneath the foundation at the corner of the building. AGRA performed a RBCA Tier 1 (ASTM ES38-94) analysis showing a risk based screening level of 81.2 micrograms per liter (µg/L) for groundwater. Using Groundwater Services, Inc. RBCA spreadsheet, a site-specific target level for benzene of 23 µg/L in groundwater was calculated. The March 1997 average benzene concentration was 20 µg/L and the August average benzene concentration was 3.2 µg/L. January 1998, Fairbanks North Star Borough bought property, apartments will be removed Summer 1998, parking lot developed. AGRA submits August 1998 sampling results: MW-3 benzene 2.08 µg/L and DRO 0.44 mg/L; MW-4 benzene ND and DRO ND; MW-5 benzene ND and DRO 0.38; MW-6 benzene 3.01 and DRO 1.1; and MW-8 benzene ND and DRO ND.			
535	Petro Star Refinery	100.38.102	Active
Address: H & H Lane ADEC Summary: Unknown quantity of petroleum product leaked to the soil and groundwater over a period of time in the mid-1980s. Drinking water supply impacted. Extent of contamination and health impact unknown. Cross reference files 100.07.259 and 100.02.067. Sampling of wells at Petro Star detected up to 180 ppb benzene in 2/12/88 sample from shop. Contaminants also detected in samples from meter building (unit well?) and fire well. Letter from W. Gore indicating that monitoring wells would be installed, what would be done with contaminated gravel, and that the water well would be tested. Connected to North Pole water. 2005: site added to ADEC's Brownfield Inventory. 2010: Staff received a work plan from PERP to investigate a release of approximately 1400 gallons of ultra-low-sulfur diesel near the "FSSI" building. An estimated 500 gallons overflowed from the secondary containment. Excavation occurred to the extent practicable, but it was in a tight spot near the building and piping infrastructure. 14 soil samples will be collected at the limits of excavation and analyzed for GRO, DRO, BTEX and PAHs. Three monitoring wells will be installed downgradient and sampled for the same contaminants. Flint Hills North Pole Refinery is immediately downgradient of the Petro Star facility.			
2640	Christine Drive Fuel Spill	100.38.108	Cleanup Complete
Address: 1751 Christine Drive (Lot 5, Block A, Pine Stream Subdivision) ADEC Summary: On 7/15/96, ADEC was informed that a sizeable spill of heating oil at resulted from a furnace line. Excavation of soils was halted to maintain the structural integrity of the house. Potential for groundwater contamination with water table 18 feet below ground surface. Groundwater monitoring for TPH conducted during the fall of 1997 verified DRO concentrations not found above detection levels. Site closed. Placement of downgradient MW based on USGS flownet data. Estimated quantity of spill is 20 gallons.			
2913	ARRC Former North Pole Section House	100.38.126	Cleanup Complete - Institutional Controls
Address: ARR Milepost G 15.9 ADEC Summary: A 1,000-gallon unregulated UST was removed in 1988. Recently soil samples were done which determined some DRO 531 contamination at 7.5 feet. No contamination of groundwater (groundwater at 10 feet). Cross reference file 100.26.173. January 1998 CH2M Hill report documents sampling in locations of prior heating oil and diesel USTs. Heating oil UST shows DRO at 137, 531, and 289 milligrams/kilogram (mg/kg), below Tier 2 calculated value. Other analytes for both tanks are non-detectable. 2006: The cleanup actions conducted at the North Pole Section House were effective in removing the majority of impacted soil associated with the former USTs. There is a minor amount of contamination remaining above established cleanup levels but ADEC determined there is no unacceptable risk to human health or the environment and this site will be conditionally closed.			
4530	Tundra Tours Bus Barn	100.38.129	Cleanup Complete - Institutional Controls
Address: 3009 Badger Road; about 10 mile Badger Road ADEC Summary: Tundra Tours bus barn (warehouse/shop) was located on site. A 5,000-gallon heating oil tank was removed in May 1998. Contaminated soil was encountered and approximately 260 cubic yards were removed. It was determined contaminated soil remained on site and groundwater was impacted. There were also two regulated gas and diesel tanks located on site (see file no. 100.26.024, LUST Event ID 966, UST Fac ID 1675). The heating oil tank was located on the west side of the warehouse building and removed in May 1998. There was contaminated soil identified at the time and removed. Also, groundwater (8 feet bgs) was impacted at 2.4 mg/L but decreased over time and no longer exceeded the groundwater cleanup levels. 2000: AMEC report indicating 5 soil borings (converted into monitor wells) were installed. the one boring (MW 4) in the former heating oil tank location detected low levels of DRO in soil (140 mg/kg) and groundwater had 2.4 mg/L. There were elevated levels of contamination in the gas and diesel tank area on the northern portion of the property. 2003: Travis Peterson report providing information that 14 wells were decommissioned - including MW 3 and 4. These wells had monitored the groundwater in the vicinity of the heating oil tank and monitor data reflected groundwater quality conditions did not exceed cleanup levels. This action serves to close out the heating oil tank location as an area of concern and requires no further action. Refer to file # 100.26.004 for the other site related information. The monitor date from MW 3 and 4 (August 2000 - April 2003) indicated that the DRO contamination from the heating oil tank decreased over time from 2.4 to 0.9 mg/L. ADEC determined that the heating oil tank site no longer exceeds established cleanup levels and requires no further remedial action. However, the property still has an area of concern where the former gas and diesel tanks were located and continues to be monitored under file # 100.26.024. Conditional closure approved.			

Table 15
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Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
3220	Residence - Circle Loop Road HHOT	100.38.136	Active

Address: 2954 Circle Loop Road
ADEC Summary: Soil and groundwater contamination resulting from heating oil LUST. Spill Number 99309903801, PERP file number 100.02.211, Spill Date 2/7/1999.

Shannon & Wilson Project 31-1-11209 additional information: During February 1999, abnormally high fuel consumption at the subject property prompted an investigation into the integrity of the heating-oil tank. On February 13, 1999, Inland Petroservice (IPS) of Fairbanks, Alaska, removed the 300-gallon tank and observed floating product on the water table. Sorbent pads and a vacuum truck were used to recover the floating product. In late March 1999, a ground-thawing system was used to soften the ground on the east side of the building. Approximately 90 cubic yards of contaminated soil were removed from the area around the tank and treated by OIT. Continued use of sorbent pads and the vacuum truck resulted in the recovery of approximately 310 gallons of diesel fuel from the groundwater surface.

In April 1999, Shannon & Wilson collected soil samples at the limits of the excavation. Four of ten samples exceeded soil cleanup levels. Soil exceeding the cleanup levels could not be removed without compromising the building's foundation. IPS installed collection galleries along the east and north sides of the building prior to backfilling the excavation. Three monitoring wells were installed in 1999; groundwater concentrations did not exceed cleanup levels. Later that year, samples from the wells did not contain detectable DRO or BTEX. Approximately 15 gallons of product were recovered from the collection galleries. Groundwater samples in 2000 and 2001 were non-detect or less than cleanup levels. Less than a ½ gallon of product was recovered from the collection galleries during the summer 2000, and less than one-quarter of a gallon of product was recovered in 2001.

SWI collected groundwater samples from the three monitoring wells and the on-site well in 2004. Samples did not contain concentrations of DRO or BTEX above the laboratory practical quantitation limit. We recommended no further action at the site. ADEC can issue a "no

3229	North Pole Elementary School LUST	100.38.137	Cleanup Complete - Institutional Controls

Address: 250 Snowman Lane
ADEC Summary: Heating-oil LUST, free-product on water table. 2000: "UST Closure and Release Investigation". Removal of two USTs. UST#2 was removed with no visible site or groundwater contamination. During the removal of UST#1 free phase hydrocarbons (red dyed) were encountered in the excavation and on the water table. Following removal of the UST, a 24 inches of free product recovery well was installed in the excavation. Approximately 110-120 gallons of product were recovered. Subsequent release investigation included installation of six soil borings and two monitoring wells. Soil borings to groundwater reported DRO conc. as high as 2,330 mg/kg with approximate plume dimensions exceeding 1100 mg/kg DRO on the order of 160-180' NE/SW by 50-60' NW/SE. Two groundwater monitoring events confirmed a Northwest gradient and a dissolved benzene plume exceeding 5 µg/L, similar in size and location to the DRO plume, in the NE/SW direction with a 140-150' downgradient NW elongation. 2001: "Soil Boring and Monitoring Well Installation" report. The data confirmed that the soil and groundwater contamination is not moving offsite towards the North Pole Municipal Water Plant or the residential property west of the site. Recovery efforts removed an additional 50 gallons of free product. All groundwater samples from the five monitoring wells on the property were below ADEC Cleanup Levels. Soil Boring and Monitoring Well Installation report (Nortech). All groundwater samples from the five monitoring wells on the property were below ADEC Cleanup Levels. The groundwater gradient appears to still be towards the northwest and contamination is not moving offsite. Free product monitoring during late winter, breakup and early spring did not detect recoverable quantities of free product. The product recovery well was removed during surface improvements and a new free product monitoring well is recommended at that location. 2001: "Emergency Generator 500-gallon diesel UST Closure Report". An emergency generator 500-gallon diesel underground storage tank located east of the North Pole Elementary gymnasium was removed. Rockwell Engineering performed the Site Assessment after the tank was removed. DRO results from the two samples beneath the tank indicated a spill or leak (273 and 473 mg/kg). BTEX results for both samples were non-detect. DRO results from the test pit sample taken in the vadose zone suggest that petroleum may have migrated to groundwater (1,230 mg/kg DRO). Benzene and toluene were non-detect. Low levels of ethylbenzene and xylenes were detected in the sample. Approximately 148 cubic yards of contaminated soil was thermally remediated at OIT, Inc. 2002: "October 2001 Groundwater Sampling". All groundwater samples from the three remaining monitoring wells on the property were below ADEC Cleanup Levels. The data continue to indicate that the groundwater gradient is towards the northwest and contamination is not moving offsite towards the North Pole Municipal Water Plant or the residential property west of the site.

3240	ADNR Hollowell Road Salvage Yard	100.38.139	Cleanup Complete - Institutional Controls

Address: Hollowell Road
ADEC Summary: 2000: Site added to Contaminated Sites Database. Former auto shop and salvage yard. 200 square feet of stained soil, full and partial drums of petroleum products and waste oils, containers of mixed hazards such as paint, grease, and possibly solvents, as well as batteries and tires. Removal action in 2000 under PERP left only stained soils. Stained soil must be screened for metals and solvents and reduced to petroleum as main contaminant. 2004: Following a site visit, an RFP was prepared for further site assessment and characterization to address residual soil staining, remaining drums, and at least one probable UST. 2005: Received final Limited Site Investigation and UST Closure report. 2006: Request for Proposal was solicited from Shannon & Wilson to address oily waste water from UST and contaminated soil (approximately 12 cubic yards from tanks site and 7 cubic yards from test pits). A Notice to Proceed was issued to remove; treat and/or dispose of contaminated soil and water from site. Shannon & Wilson report (June 30, 2006) summarized the cleanup actions conducted on June 8, 2006. Soil was excavated at the former UST (15 cubic yards) and from 2 test pits (14 cubic yards) and transported off site for thermal treatment. Soil samples from the excavated areas did not exceed cleanup levels. A temporary groundwater well in the UST excavation detected DRO at 2.3 mg/L which is above the 1.5 mg/L cleanup level. Based on this information, ADEC issued a conditional closure decision that requires groundwater sampling prior to use.

Table 15
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Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
3670	Residence - Super Cub Lane HHOT	100.38.145	Cleanup Complete - Institutional Controls

Address: 3032 Super Cub Lane
ADEC Summary: A 500-gallon UST leaked an estimated 900 gallons of heating oil from a break in a weld found on the bottom edge of the tank. Contaminated soil was detected in the immediate area of the UST and the foundation of the house is saturated. Groundwater is impacted. 10 dump truck loads were excavated from around the HOT and disposed of appropriately. The owner has also removed over 50 gallons of free product from the excavation at the groundwater table. The drinking water well on-site is 47 feet deep approximately 130 feet away from the spill area. Site transferred from PERP. Spill number 00309917202, PERP file number 100.02.155, Spill date 6/20/2000. 2001: Release Investigation, Cleanup and Corrective Action Report submitted by Oil Spill Technology, Inc. According to the report, approximately 108 tons of contaminated soil was excavated and transported to a thermal treatment facility. Confirmation samples collected from the soil remaining in the ground detected diesel range organics as high as 14,500 ppm. Approximately 500 gallons of oil/water mixture have been collected to date from the recovery well onsite. Two monitoring wells were installed to the north/northwest of the house in the assumed downgradient groundwater direction. MW2 is located approximately 90 to 100 feet from the recovery well and MW1 is approximately 70 feet to the west of MW2. Both of the wells were installed in October 2000 and they encountered GW approximately 5 to 6 feet below ground surface. Analytical data from GW sample from MW1 were below table C for BTEX and DRO. Analytical data from GW sample from MW2 showed below table C for DRO but 8.96 ppb for benzene. Onsite drinking water well was sampled in July and October 2000 and results for DRO and BTEX were below table C. 2003: Continued Cleanup and Corrective Action: Follow Up Report submitted by Oil Spill Technology. Elevated groundwater levels found in MW-2 were 0.123 ppm GRO and 0.00267 ppm benzene. The drinking water well was sampled in Oct. 2002 and all constituents were non-detectable. Oil Spill Technology submitted a letter report with results of the sample collected from MW-2 in August 2003. GRO and DRO were non-detectable and benzene was 0.000712 ppm. 2003: Institutional control record established. Conditional closure approved. 2004: Two monitoring wells on-site were decommissioned by Oil Spill Technology, Inc.

3674	North Pole Otter Drive HOT	100.38.149	Cleanup Complete

Address: 3199 Snowshoe Avenue. Formerly 2110 Otter Drive
ADEC Summary: 2000: A 300-gallon heating oil tank (HOT) was removed from this site. Field screening of the soil beneath the tank indicated petroleum-contaminated soil. Further excavation of the soil down to the groundwater showed petroleum-contaminated soil in the saturated zone. Fuel sheen was noticed on the groundwater at approximately 7 feet below ground surface. It is not apparent that the contamination is coming from the HOT, however there are no other obvious potential sources. It appears that the release is historic in nature. The extent of the contamination has not been determined yet and the volume released is unknown. Landowner currently building 4 houses upgradient of the contamination on this 5-acre parcel. A 60 feet below ground surface DW well is planned for each dwelling. DW well from original dwelling will be used as a monitoring well. 2001: Site Assessment Report received by ADEC. 600 tons of impacted soil was excavated and thermally remediated. Three monitoring wells are on site (two downgradient and one upgradient). DRO and BTEX were sampled in the MWs and no contamination was found above ADEC cleanup levels. Groundwater sampling conducted July 2002; all samples below DRO and BTEX cleanup standards. 2004: Site closure approved. remaining 442 mg/kg DRO in sidewall sample determined to be de minimis, posing no threat. This site was reevaluated after multiple inquires from realtors and prospective buyers revealed confusion over the actual address of this site. With help from the FNSB Land Management office, it was determined that the current address of the property that was contaminated is actually 3199 Snowshoe Avenue. This discrepancy arose after the original 2110 Otter Drive property was subdivided.

3222	Santa Claus House Spill	100.38.158	Cleanup Complete - Institutional Controls

Address: 518 Santa Claus Lane
ADEC Summary: 2001: A 300-gallon heating oil UST removal project found 103 cubic yards of soil contaminated by petroleum. A 500 square foot area was excavated to a depth of 8 feet below ground surface where groundwater was encountered. Lab analysis of soil confirmation samples from the bottom of the excavation were above Method 2 cleanup levels for DRO, below for BTEX. Groundwater was not sampled. Lab analysis of soil confirmation samples from the walls of the excavation at 4-feet below ground surface fell below Method 2 cleanup levels. 166 tons of contaminated soil transported to OIT's Moose Creek facility for future treatment and disposal. 2007: According to the file, remaining issues at the site include current level of contamination in ground water and the delineation of the groundwater contamination. 2007: The responsible party was willing to do additional cleanup activities but a decision was made to conditionally close the site. Groundwater contamination was the main concern, but due to probable attenuation of DRO and lack of receptors in the area, the site was closed without current sampling.

3960	Residential Septic Crib TL-532	100.38.161	Cleanup Complete

Address: Mile 351 Richardson Highway
ADEC Summary: 2002: A phase 1 and 2 site assessment was conducted on this property by Shannon & Wilson for Williams Express. There used to be a residence on this property from 1952 to the early 1970s. The buildings were removed during the Richardson Highway upgrade. During the site assessment a residential septic crib was found and sampled. The results of soil sampling indicated that one of the ten soil samples collected in the area of the crib contained 3.39 mg/kg arsenic, 0.045 mg/kg TCE, and 0.284 mg/kg 1,3-dichlorobenzene. 2002: Closure Plan and Quality Assurance Project Plan approved and coordinated with Jonathan Williams with EPA Region 10 Underground Injection Control (UIC) program. Site Closure Approved letter issued. UIC Closure letter necessary from EPA Region 10 also.

Table 15
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Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
3233	Residence - Erin Drive HHOT	100.38.168	Active

Address: 3511 Erin Drive
ADEC Summary: On September 30, 1999, the current residents of 3511 Erin Drive hired a local contractor to replace their 500-gallon capacity heating oil tank. When the existing tank was removed, a large hole (approximately 2 square inches) was discovered in the side of the tank. Based on information provided by the homeowner, in March 1997, the tank had been moved from a location near the garage to the middle of the yard to meet distance requirements between the drinking water well and buried fuel storage. During the excavation of the former tank, stained soil was observed and hydrocarbon odors were noted by the homeowners. EMCON estimated the volume of contaminated soil to be 90 to 400 cubic yards. They estimated the volume of fuel released at this site is between approximately 300 to 1,500 gallons. Drive point wells were installed upgradient, in the source area and downgradient of the release. Benzene levels at the source area were 552 ppb benzene and 30.8 ppm DRO. No impact appeared to be present downgradient on-site. A responsible party was identified as Homestead Builders, 1235 Lakloey Drive, North Pole, AK 99705. They are unwilling to take responsibility for the hole in the 500 gallon heating oil tank that was the cause of the contamination. They were the contractors responsible for relocating the heating oil tank in 1997.

Shannon & Wilson Project 31-1-11310 information: We sampled the drive points on the site. DRO and benzene concentrations were about one-fifth previously measured but still exceeded groundwater cleanup levels. Water quality upgradient and downgradient of the spill site is not affected, as suggested by the absence of BTEX compounds and DRO in either well point DP-1 or DP-2. The water well sample collected by the owner in February 2006 shows the drinking water source also to not be affected. A review of ADEC file information regarding past site characterization activities indicates an estimated 90 to 400 cubic yards of contaminated soil were impacted by the leaking tank, of which approximately 60 cubic yards were removed in 1999. File information also indicates an estimated 300 to 1,500 gallons of fuel was spilled, of which approximately 75 gallons were recovered. Approximately 15 inches of product were observed in the recovery well on May 4, 2006. We recommended: an assessment of indoor air quality, consisting of air sampling, analysis, and data interpretation. The need for further corrective action would be based on the results of such sampling; continue to monitor groundwater quality on a periodic basis; sample the drinking water well at least every 5 years; remove and properly dispose of product currently collected in the recovery well; periodically monitor the well for recoverable quantities of product; establish procedures to inform any future residents and excavation contractors of the presence of soil contamination at the spill site; and ensure that any work involving exposure to potentially contaminated soil, groundwater, or outdoor air is conducted using adequate protective measures.

3954	Residence - Manley Street HHOT	100.38.174	Active

Address: 602 Manley Street
ADEC Summary: Home heating oil (diesel #2) release was discovered on July 17, 2002 at 602 Manley Street in North Pole, Alaska. The cause of the spill was from a corroded tank. The quantity of fuel lost is unknown. Fuel odors were observed when the tank was removed. Also, some diesel odor was detected in the basement during a high water event. 2005: ADEC received an Oil Spill Technology, Inc. report entitled Recovery and Monitoring Wells: Installation and Sampling for the Faulkner Residence at 602 Manley Street in North Pole, Alaska. Three monitoring wells and one recovery well were installed on-site. DRO and BTEX levels from the monitoring wells were below ADEC cleanup levels. A soil sample collected from the recovery well location had 1,970 mg/kg DRO. There is no mention of the contaminant levels at the water table in the recovery well. The consultant recommends conducting periodic sampling and collecting recovered product from the recovery well over the next several summers to make sure the contamination is migrating into the water table. ADEC sent letter requesting a summary of the volume of fuel recovered, and monitoring well sampling plan. 2006: Spoke to property owner regarding the groundwater samples required for a conditional closure at this site. She indicated that she had contacted a contractor for an estimate, and it was more than she could afford.

4031	Residence - Mandeville Loop HHOT	100.38.177	Cleanup Complete - Institutional Controls

Address: 3577 Mandeville Loop
ADEC Summary: 2004: The site involved heating oil contamination in the crawl space of a residence from a leaking fuel line. Contaminated gravel and groundwater was identified. Groundwater well approximately 30 feet from the leak site. Contaminated gravel was

4208	Residence - 2092 Jackson Street HHOT	100.38.194	Active

Address: 2092 Jackson Street
ADEC Summary: Property Manager dug a trench to insulate the water line from the well to the apartment building. Badger Fuel filled the nearby 1,000-gallon above ground home heating oil tank (HHOT) and it subsequently fell over into the trench. Approximately 125 gallons of #1 diesel spilled from a broken fuel line. The bottom of the trench was gravel; and some of the fuel ran under the building. The Fire Department responded to the spill and discovered that the tank was intact but leaking from the broken fuel line. The Fire Department plugged the fuel line to stop the release. Badger Fuel emptied the tank. Lyle Gresehover (ARES) was contracted to remove the tank from the trench. Approximately 20 cubic yards of contaminated soil was remove and taken to OIT for thermal desorption. The contractor determined that further soil removal would destabilize the building foundation. Oil was observed floating on the groundwater at the bottom of the excavation. Three permanent monitoring wells were installed in August 2005, groundwater was observed at 8 feet below ground surface. Benzene was detected in MW-2 at 5.5 µg/L and 6.4 µg/L in a duplicate sample from this well. DRO was detected at 0.15 mg/L. The drinking water well was sampled and analyzed for VOCs by EPA Method 524.2, no analytes were detected above the method reporting limit. Soil samples taken from the excavation contained DRO ranging from 7 to 884 mg/kg, and benzene, ethylbenzene and toluene also exceeded cleanup levels. 2008: Received GW report from Nov 2007 sampling event. Benzene is ND in all wells. DRO is 7.54 mg/L in recovery well- only analyte above MCLs. Plume may be expanding as some DRO levels have increased but remained below MCLs. ARES recommends annual groundwater event for Aug 2008.

4307	Doyon Properties Tax Lot 1524	100.38.203	Cleanup Complete

Address: about 2.6 Mile Old Richardson Highway
ADEC Summary: During a geotechnical investigation on June 2, 2005, diesel range organics were discovered in the soil and groundwater. There was no known source area identified and soil was excavated and stored on site. 2006: Received Report from Travis/Peterson with confirmation samples at limits of the August excavation. Sample results were non-detect, but a sheen was observed on the groundwater at the base of the excavation. Contaminated soil was land spread on a liner at the site. The groundwater (estimated at 4 feet bgs) impacts are currently unknown but Consultant was advised to draft a work plan to delineate groundwater contamination. Received groundwater monitoring data for MW-1, 2, and 3 on the western property boundary. Results are non-detect except for MW-2 which detected below cleanup level result for DRO. Benzene was not detected in any of the groundwater samples. 2007: Travis Peterson provided August 2007 sample results from soil stockpile and groundwater. The 4 soil samples ranged from 114 to 705 mg/kg as compared to 2006 results of 136 to 1640 mg/kg. The groundwater sample result was 0.463 mg/L below the 1.5 mg/L cleanup level. 2008: Travis Peterson reported that the 500 cubic yards of impacted soil was land spread on site and they plan to sample in late 2008 field season to confirm current concentrations. ADEC had recommended a composite sample approach. It entailed establishing grids of the area and 5 to 10 samples per grid would be "composited" into one sample per grid. Cleanup complete determination issued.

Table 15
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Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
4308	Residence - 2837 Horseshoe Way HHOT	100.38.204	Active

Address: 2837 Horseshoe Way
ADEC Summary: 2005: Owner reported petroleum odor in well water. Reported that an analytical sample had 55 micrograms per liter of benzene, above ADEC levels. The fill pipe on this residential home heating oil tank was mis-threaded into the top of the tank which led to a release of diesel fuel each time the tank was filled (approximately 5 times). Volume of release estimated at 10 to 25 gallons. Soil and drinking water well were contaminated by the release of fuel. Soil/gravel was removed and stockpiled off site. Water was pumped and treated. RP will install alternate drinking water system. Analytical sample of drinking water at 2837 Horseshoe Way taken. Benzene detected at 20.6 micrograms per liter. Analytical sample from neighbor 2829 Horseshoe Way was non-detect for petroleum contamination. 2006: Institutional control record established. If the well is to be used as a potable water source, a treatment system (such as a carbon filtration or tank/hauled water system) must be installed and maintained yearly. The drinking water well must be sampled annually for DRO and BTEX. 2007: Telephone conversation with former property manager Bill Holland. Site is currently foreclosed. Approximately 10 cubic yards of contaminated soil were removed from the site and stockpiled at 1477 Levee Way. Mr. Holland is actively land farming the soil by fertilizing and aerating the soil throughout the summer months. Mr. Holland installed a carbon filtration system to treat the drinking water in September of 2006. Staff sampled the drinking water well from the tap at 2829 Horseshoe Way, the immediate downgradient neighbor to 2837 where the release occurred. The sample results were all below cleanup levels. 2009: Staff received drinking water results from the homeowner. She collected a sample from her tap and sent it to SGS for analysis of DRO and BTEX. Results were ND for benzene, toluene, and diesel range organics. Ethylbenzene and xylenes were detected at 3.5 and 5 ppb respectively, well below the cleanup levels. 2010: Received LUST Site Assessment Report from Nortech Environmental. Nortech sampled water from the recovery well and then removed the well by excavation. No petroleum contaminants were detected above cleanup levels in soil samples taken from the excavation. A fabric liner over bull rock was found at approximately 7 feet below grade. The recovery well was placed above the fabric liner and the bull rock beneath the liner appeared dry; therefore the water sample collected from the recovery well probably did not represent groundwater. 2011: DEC collected a water sample from the well at 2837 Horseshoe Way. The sample was collected before the water softener and the sediment filter. Sample will be analyzed for AK101 by SGS. Letter providing results sent to homeowner and RP. Site closed based on recent drinking water well samples and soil investigation when recovery well was removed.

4342	Residence - 904 Les Rogers Turnaround HHOT	100.38.210	Active

Address: 904 Les Rogers Turnaround
ADEC Summary: 2006: As part of a fencing project a post was placed at the corner of the house. The fence post severed the heating oil return line. Over the next three weeks approximately 1,000 gallons of #2 diesel heating oil were released to the subsurface. Response actions included the removal of 143.5 tons of contaminated soil and the recovery of approximately 500 gallons of fuel from the ground water surface. 2008: Impacted soils remain beneath the house. Some free phase petroleum remains on the water table and a groundwater plume that has not been completely delineated. The plume, however, appears to be fairly limited in extent based on sampling neighboring drinking water wells and one on site monitoring well. ADEC has requested additional monitoring.

4345	Residence - 687 Blanket Boulevard HHOT	100.38.212	Cleanup Complete

Address: 687 Blanket Boulevard
ADEC Summary: An undetermined amount of diesel fuel was released due to a break in the fuel line of an underground home heating oil tank. Contaminated soil above ADEC cleanup levels remain underneath the foundation of the residence and within the vadose zone and could not be removed due to structural limitations. Approximately 50 cubic yards of petroleum-contaminated soil were removed and hauled off-site for thermal remediation. An undetermined amount of free product was also recovered from the site using sorbent pads. The site investigation included sampling of soil and groundwater as part of the site investigation. A total of six soil samples and four groundwater samples were collected as part of the 2006 Phase II Environmental Site Assessment. A groundwater sample collected from the excavation pit adjacent to the house indicated that groundwater contamination was above ADEC cleanup levels. Groundwater samples collected from monitoring wells placed down-gradient from the source area were non-detect for DRO and BTEX compounds, indicating that contaminated groundwater had not migrated off-site. Property boundary to the southwest is adjacent to Beaver Creek.

4439	Cornwall Property HOT	100.38.216	Active

Address: 297 Fifth Street
ADEC Summary: In November, 2006 an underground heating oil tank (no longer in use due to suspicion of leaking) was filled in error. Upon realizing the error, approximately one week after filling, the tank was pumped empty, however 215 gallons had already leaked. In April 2007, Hot Shot Excavating, the building owner's company removed the tank and excavated to groundwater with assistance from Nortech. Numerous small holes were observed in the bottom of the tank and 3-4 inches of free product was observed on the water table. Excavation could not continue due to the foundation of the building being only a couple of feet away. Amount(s) of historic release(s) are unknown. Ground water at the site is ~10 feet below ground surface. Contamination appears extensive and groundwater contamination is expected to extend beneath the adjacent building. A daycare has been in operation at the facility from approximately February 2006 until July 31, 2007. Site was Circle of Love Daycare at the time of release and was named such in PERP database. Name was changed when the daycare closed on July 31, 2007. During initial excavation for tank removal, ~5 gallons of fuel were recovered from the surface of the ground water, but no further recovery or assessment has been completed. One soil sample was collected from the excavation that indicated 9 mg/kg benzene, 65,500 mg/kg diesel range organics, and 1,210 mg/kg gasoline range organics.

4681	Residence - 3359 Lineman Avenue Drums	100.38.219	Active

Address: 3359 Lineman Avenue aka 2510 Barrett Court
ADEC Summary: Surface soil and drinking water sampling were conducted on June 13, 2008 in response to the discovery of drums on a residential property. Drinking water results were all below ADEC cleanup levels. Surface soil contained the following contaminants above ADEC cleanup levels: Aroclor 1254 at 2.21 mg/kg, pentachlorophenol at 0.67 mg/kg, arsenic at 8.67 mg/kg, and methylene chloride at 93 mg/kg. The drums were located ~100 feet SW of the residence and ~50 feet SW of the residential drinking water well. PRP Letters sent to Eielson AFB and the property owners. 2010: Letter sent to landowner asking for update on site and any actions that have been taken to prevent exposure in the area where the drum was removed.

25293	Residence - 204 Cross Way HHOT	100.38.221	Active

Address: 204 Cross Way

Table 15
Contaminated Site Summary Information
North Pole Refinery
Flint Hills Resources Alaska, LLC

Hazard ID	Site Name	ADEC File Number	Status
23787	Stage Stop Station	100.26.001	Cleanup Complete - Institutional Controls
ADEC Summary: According to the maintenance manager, a 250-gallon heating oil aboveground storage tank (AST) was installed in January, 2008 to replace a 300-gallon underground storage tank (UST) that had been closed in place due to high fuel usage and a suspected leak based on the opinion of a contractor. The AST was initially filled with 100 gallons of #1 diesel fuel and a drain plug became dislodged during the night and released all 100 gallons of fuel onto the ground surface adjacent to the mobile home residence. Field activities in June and July, 2008 included removal of both the AST, UST, and associated piping; and excavation of ~8 cubic yards of petroleum-contaminated soil. Based on field observations, the source of contamination was believed to only be the release from the AST. Due to structural limitations, contaminated soil remains beneath and directly adjacent to the residence. Groundwater wells were installed in October 2008. Initial groundwater analysis indicated the presence of petroleum constituents below ADEC cleanup levels.			
25469	City of North Pole Fire Well Pump House 8th Avenue	100.38.224	Active
Address: 2705 Old Richardson Highway ADEC Summary: On July 8, 2009, a fuel pump malfunctioned causing an underground day tank to overflow and release diesel from the vent pipe to the ground surface outside the west side of the pump house. The fire well pump house is on the far NW corner of the property where North Pole Middle School is located. Shannon & Wilson Project 31-1-11470 additional information: We measured a 2- to 3-inch-thick layer of NAPL floating in the groundwater-monitoring well northwest of the building. About 69 tons of fuel-contaminated soil were excavated and transported to OIT. A product-recovery well was installed in the excavation. Soil contamination exceeding the ADEC MTG soil-cleanup levels for GRO, DRO, and BTEX remains at the limits of the excavation. We understand City of North Pole personnel have been recovering about 3 gallons of NAPL per day from the recovery well, recovering a total of about 50 gallons of fuel by August 28. We recommended installing additional monitoring wells to check for off-site migration of dissolved hydrocarbons.			
2318	GVEA North Pole Power Plant	103.38.003	Active
Address: 1100 H & H Lane ADEC Summary: GVEA sampled soils beneath one decommissioned tank showed elevated levels of DRO at 1-3 feet below grade. Vertical and horizontal extent of soil contamination unknown. Ground water impact unknown. Class C water well present on site. GVEA wishes to decommission tanks into smaller facility. 1994: Requested that GVEA conduct comprehensive site assessment to determine extent of soil and GW contamination. ADEC would not accept encapsulation without verifying no risk or impact to groundwater and knowledge of full extent of soil contamination. Received and reviewed soil boring data conducted by S&W for GVEA. Report included GVEA's request to encapsulate soils. ADEC conditionally approved cleanup action, based on: 1. That a plan be submitted to ADEC for approval. 2. That encapsulation include the entire area inside the ring wall. 3. That the site is not eligible for NFA based on current levels. 4. That ADEC can reopen the case and require cleanup if new information shows contamination.			
1969	Alyeska North Pole Meter Station	330.38.036	Cleanup Complete
Address: Irene May Street ADEC Summary: Residual oil contamination was discovered during a pipeline corrosion survey on 6/1/93. Excavation revealed a faulty valve vent plug on a 6" residuum pipeline. Groundwater contamination found on site. Toluene contamination below MCL discovered at nearby residential well. Cross reference file #s 330.02.100 and 330.45.020. Lots 2, 5, 9, and 10, Diamond Willow Subdivision. 1994: Groundwater monitoring continuing on a quarterly basis. BTEX and TPH all non-detectable in monitoring well in 1994 sampling events. 1995: Site closure approved. 2008: Received Trans Alaska Pipeline System: 2007 Monitoring Well Decommissioning Report. The four monitoring wells installed with stickup completion at this site were not located and assumed to be decommissioned as suggested by on-site staff.			

Table 16
Constituents of Interest in Soil and Groundwater
North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituent of Interest	Constituent Included in Analyte List				Included on Refinery Laboratory Spilled Material "Ingredient" List	Toxicity Values Available from USEPA			
	2000 Characterization Study-Soil [a]	2001 Characterization Study-Soil [b]	2009-2010 Characterization Study-Soil [c]	Historical Groundwater [d]		Oral CSF	IUR	Oral RfD	Inhalation RfC
VOCs									
1,1-Dichloroethene		X	X	X				X	X
1,2,4-Trimethylbenzene		X	X	X	X				X
1,3,5-Trimethylbenzene		X	X	X				X	
1-Chloronaphthalene				X				X	
4-Isopropyltoluene(p-cymene)		X	X	X					
Benzene	X	X	X	X	X	X	X	X	X
Chlorobenzene			X	X				X	X
cis-1,2-Dichloroethene		X		X				X	
Cyclohexane					X				X
Ethylbenzene	X	X	X	X	X	X	X	X	X
Isopropylbenzene (cumene)		X	X	X	X			X	X
Methyl tert-butyl ether (MTBE)				X		X	X		X
Methylene chloride	X			X		X	X	X	X
n-Butylbenzene			X	X				X	
n-Hexane					X			X	X
N-Propylbenzene		X	X	X				X	X
Propylene gylcol (1,2,-Propanediol)					X			X	
Pyridine		X		X				X	
sec-Butylbenzene		X	X	X					
tert-Butylbenzene		X	X	X					
Toluene	X	X	X	X	X			X	X
Trichlorofluoromethane (Freon 11)		X		X				X	X
Xylenes	X	X	X	X	X			X	X
SVOCs									
1,2-Dichlorobenzene		X	X	X				X	X
1,2-Diphenylhydrazine (as Azobenzene)		X		X		X	X		
1,3-Dichlorobenzene		X	X	X					
1-Methylnaphthalene				X		X		X	
2,4,5-Trichlorophenol		X	X	X				X	
2,4,6-Trichlorophenol		X	X	X		X	X	X	
2,4-Dichlorophenol		X	X	X				X	
2,4-Dimethylphenol		X		X				X	
2,4-Dinitrophenol		X	X	X				X	
2,4-Dinitrotoluene		X	X	X		X	X	X	
2,6-Dinitrotoluene		X	X	X				X	
2-Chloronaphthalene		X	X	X				X	
2-Chlorophenol		X	X	X				X	
2-Methylnaphthalene		X	X	X				X	
2-Methylphenol (o-Cresol)		X	X	X				X	X
2-Nitroaniline		X	X	X				X	X
2-Nitrophenol		X	X	X					
3 & 4-Methylphenol (m,p-Cresol)		X	X	X				X	X
3,3-Dichlorobenzidine		X	X	X		X	X		
3-Nitroaniline		X	X	X					
4,6-Dinitro-2-methylphenol		X	X	X					
4-Bromophenyl phenyl ether		X	X	X					

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	2000 Characterization Study-Soil [a]	2001 Characterization Study-Soil [b]	2009-2010 Characterization Study-Soil [c]	Historical Groundwater [d]		Oral CSF	IUR	Oral RfD	Inhalation RfC
4-Chloro-3-methylphenol		X	X	X					
4-Chloroaniline		X	X	X		X		X	
4-Chlorophenyl phenyl ether		X	X	X					
4-Nitroaniline		X	X	X				X	X
4-Nitrophenol		X	X	X					
Acenaphthene		X	X	X				X	
Acenaphthylene		X	X	X					
Anthracene		X	X	X				X	
Benzo (a) anthracene		X	X	X		X	X		
Benzo (a) pyrene		X	X	X		X	X		
Benzo (b) fluoranthene		X	X	X		X	X		
Benzo (g,h,i) perylene		X	X	X					
Benzo (k) fluoranthene		X	X	X		X	X		
Benzidine				X		X	X	X	
Benzoic Acid		X	X	X				X	
Benzyl alcohol		X	X	X				X	
Bis(2-chloroethoxy)methane		X	X	X				X	
Bis(2-chloroethyl)ether		X	X	X		X	X		
Bis(2-chloroisopropyl)ether		X	X	X		X	X	X	
Bis(2-ethylhexyl)phthalate		X	X	X		X	X	X	
Butyl benzyl phthalate		X	X	X		X		X	
Carbazole				X					
Chrysene		X	X	X		X	X		
Dibenzo (a,h) anthracene		X	X	X		X	X		
Dibenzofuran		X	X	X					
Diethyl phthalate		X	X	X				X	
Dimethyl phthalate		X	X	X					
Di-n-butyl phthalate		X	X	X				X	
Di-n-Octylphthalate			X	X					
Fluoranthene		X	X	X				X	
Fluorene		X	X	X				X	
Hexachlorobenzene		X	X	X		X	X	X	
Hexachlorobutadiene		X	X	X		X	X	X	
Hexachlorocyclopentadiene		X	X	X				X	X
Hexachloroethane		X	X	X		X	X	X	
Indeno (1,2,3-cd) pyrene		X	X	X		X	X		
Isophorone		X	X	X		X		X	X
Isopropanol (propanol)					X				X
Naphthalene		X	X	X	X		X	X	X
Nitrobenzene		X	X	X			X	X	X
N-Nitrosodimethylamine		X	X	X		X	X	X	X
N-Nitrosodi-n-propylamine		X	X	X		X	X		
N-Nitrosodiphenylamine		X	X	X		X	X		
Pentachlorophenol		X	X	X		X	X	X	
Phenanthrene		X	X	X					
Phenol		X	X	X				X	X

Table 16
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Constituent of Interest	Constituent Included in Analyte List				Included on Refinery Laboratory Spilled Material "Ingredient" List	Toxicity Values Available from USEPA			
	2000 Characterization Study-Soil [a]	2001 Characterization Study-Soil [b]	2009-2010 Characterization Study-Soil [c]	Historical Groundwater [d]		Oral CSF	IUR	Oral RfD	Inhalation RfC
Pyrene		X	X	X				X	
Metals									
Antimony	X	X		X				X	
Arsenic	X	X		X	X	X	X	X	X
Barium		X		X	X			X	X
Cadmium		X		X	X		X	X	X
Chromium Total	X	X		X	X	X	X	X	X
Copper				X	X			X	
Iron				X	X			X	
Lead		X		X	X				
Mercury		X		X	X			X	X
Nickel				X	X		X	X	X
Selenium	X			X	X			X	X
Silver		X		X				X	
Zinc				X	X			X	
Other									
Alkanol amines					X				
Alkylamines					X				
Alkylene amines					X				
Calcium					X				
Chloride					X				
Cyanide					X			X	
Di-n-Octylphthalate				X					
Dinonylnaphthylsulfonic acid					X				
Fluoroalkyl Surfactant					X				
Iron Oxides					X				
Isopropanol (propanol)					X				X
2-Methoxymethylethoxy propanol					X				
Monoethanolamine					X				
Montmorillonite, calcined					X				
Phenol					X			X	X
Propylene glycol (1,2-Propanediol)					X			X	
Silica					X				X
Sulfate				X					
Sulfolane			X	X	X			X	
GRO		X	X	X					
DRO		X	X	X					
RRO		X	X	X					
Heavy aromatic naptha (Naphtha, High Flash Aromatic [HFAN])					X				
Heavy paraffinic distillate (mixture)					X				

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North Pole Refinery
Flint Hills Resources Alaska, LLC

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	2000 Characterization Study-Soil [a]	2001 Characterization Study-Soil [b]	2009-2010 Characterization Study-Soil [c]	Historical Groundwater [d]		Oral CSF	IUR	Oral RfD	Inhalation RfC

Notes:
a - Shannon and Wilson, Inc. 2000. Draft Site Characterization and Corrective Action Plan, Williams Alaska Petroleum, Inc., North Pole Refinery. December 2000.
b - Shannon and Wilson, Inc. 2001. Contaminant Characterization Study, Williams Alaska Petroleum, Inc., North Pole Refinery, North Pole, Alaska. October 2001.
c - Barr Engineering Company. 2011. Site Characterization and First Quarter 2011 Groundwater Monitoring Report. May 2011.
d - Included in SWI groundwater database, dated June 2011
USEPA = United States Environmental Protection Agency Integrated Risk Information System (2011)
CSF = Cancer Slope Factor
IUR= Inhalation Unit Risk
RfD = Reference Dose
RfC = Reference Concentration
VOCs - volatile organic compounds
SVOCs - semi-volatile organic compounds
Note, lead is evaluated based on blood lead level.

Table 17
Constituents of Potential Concern in Soil and Groundwater
North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituents of Interest	Maximum Soil Concentration (mg/kg)	Source	Maximum Observation or MRL	ADEC Soil Cleanup Level Based on Migration to Groundwater (mg/kg)	ADEC Soil Cleanup Level Based on Direct Contact (mg/kg)	ADEC Soil Cleanup Level Based on Outdoor Inhalation (mg/kg)	Selected Soil Screening Level[g] (mg/kg)	COPC in Soil	Maximum Groundwater Concentration (ug/L)	Source	Maximum Observation or MRL	ADEC Groundwater Screening Level (ug/L)	Source	COPC in Groundwater
VOCs														
1,1-Dichloroethene	<0.835	d	5/30/2001 at B1-3	0.03	14	0.85	0.03	Yes	4.77	b	5/10/2001 at MW-125	0.7	e	Yes
1,2,4-Trimethylbenzene	22.2	c	9/29/2010 at MW175	23	5,100	49	4.9	Yes	621	b	5/10/2001 at MW-116	180	e	Yes
1,3,5-Trimethylbenzene	81.1	c	10/20/2010 at O-2	23	5,100	42	4.2	Yes	203	b	5/10/2001 at MW-116	180	e	Yes
1-Chloronaphthalene	--			na	na	na	na	No[i]	<21.3	h	11/17/2006 at MW-106	290	f	No[i]
4-Isopropyltoluene (p-cymene)	20.2	c	10/20/2010 at O-2	na	na	na	na	Yes	18.3	b	5/10/2001 at MW-116	na		Yes
Benzene	140	a	Before 1991 MW115	0.025	150	11	0.025	Yes	53,000	h	9/11/2002 at MW-138	0.5	e	Yes
Chlorobenzene	--			0.63	2,000	200	0.63	Yes	< 1 - <400	h	04/17/2007 at MW-138	10	e	No
cis-1,2-Dichloroethene	<0.835	d	5/30/2001 at B1-3	0.24	1,000	130	0.24	Yes	2.84	b	5/10/2001 at MW-116	7	e	No
Cyclohexane	--			13	7,000	na	13	Yes	-			1,300	f	Yes
Ethylbenzene	220	a	Before 1991 MW115	6.9	10,100	110	6.9	Yes	33,000	h	7/10/2003 at MW-138	70	e	Yes
Isopropylbenzene (cumene)	6.78	c	9/29/2010 at MW175	51	10,100	62	6.2	Yes	106	h	5/10/2001 at MW-116	370	e	No
Methyl tert-butyl ether	--			1.3	4,600	290	1.3	Yes	77.3	h	7/18/2006 at MW-140	47	e	Yes
Methylene chloride	0.054	a	Before 1991 MW114	0.016	1,100	160	0.016	Yes	<10	d	5/10/2001 at MW-116	0.5	e	Yes
n-Butylbenzene	34.3	c	10/20/2010 at O-2	15	1,000	42	4.2	Yes	14.3	b	5/10/2001 at MW-116	37	e	No
n-Hexane	--			6.2	570	na	6.2	Yes	-			88	f	Yes
n-Propylbenzene	9.26	c	9/29/2010 at MW175	15	1,000	42	4.2	Yes	162	b	5/10/2001 at MW-116	37	e	Yes
Propylene gylcol (1,2,-Propanediol)	--			150	1,200,000	na	150	Yes	-			73,000	f	Yes
Pyridine	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<21.3	h	11/17/2006 at MW-106	3.7	f	No[i]
sec-Butylbenzene	3.7	c	9/29/2010 at MW175	12	1,000	41	4.1	No	18.6	b	5/10/2001 at MW-116	37	e	No
tert-Butylbenzene	<12.8	b	3/8/2001 at MW135	12	1,000	70	7	Yes	<0.002	d	5/10/2001 at MW-116	37	e	No
Toluene	590	a	Before 1991 MW115	6.5	8,100	220	6.5	Yes	49,000	h	9/11/2002 at MW-138	100	e	Yes
Trichlorofluoromethane (Freon 11)	22.7	b	3/8/2001 at MW135	86	30,400	990	86	No	<2	d	2001 all MWs analyzed	1,100	e	No
Xylenes	970	a	Before 1991 MW115	63	20,300	63	6.3	Yes	23,000	h	4/29/2003 at MW-138	1,000	e	Yes
SVOCs														
1,2-Dichlorobenzene	<35.9	d	5/30/2001 at B1-4	5.1	9,100	45	4.5	Yes	1.4	h	04/17/2007 at MW-116	60	e	No
1,2-Diphenylhydrazine (as Azobenzene)	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<21.3	h	11/17/2006 at MW-106	0.084	f	No[i]
1,3-Dichlorobenzene	<35.9	d	5/30/2001 at B1-4	28	9,100	69	6.9	Yes	< 1-< 400	h	04/17/2007 at MW-138	330	e	No
1-Methylnaphthalene	--			6.2	280	760	6.2	Yes	< 20	h	09/19/2006 at MW-106	15	e	Yes
2,4,5-Trichlorophenol	<35.9	d	5/30/2001 at B1-4	67	6,500	na	67	No	<10.6	h	11/17/2006 at MW-106	370	e	No
2,4,6-Trichlorophenol	<35.9	d	5/30/2001 at B1-4	1.4	460	4,100	1.4	Yes	<10.6	h	11/17/2006 at MW-106	7.7	e	No[i]
2,4-Dichlorophenol	<35.9	d	5/30/2001 at B1-4	1.3	230	na	1.3	Yes	<10.6	h	11/17/2006 at MW-106	11	e	No
2,4-Dimethylphenol	<35.9	d	5/30/2001 at B1-4	8.8	1,300	na	8.8	Yes	22	b	5/10/2001 at MW-116	73	e	No
2,4-Dinitrophenol	<182	d	5/30/2001 at B1-4	0.54	160	na	0.54	Yes	<21.3	h	11/17/2006 at MW-106	7.3	e	No[i]
2,4-Dinitrotoluene	<35.9	d	5/30/2001 at B1-4	0.0093	8.8	na	0.0093	Yes	<10.6	h	11/17/2006 at MW-106	0.13	e	No[i]
2,6-Dinitrotoluene	<35.9	d	5/30/2001 at B1-4	0.0094	8.9	na	0.0094	Yes	<10.6	h	11/17/2006 at MW-106	0.13	e	No[i]
2-Chloronaphthalene	<35.9	d	5/30/2001 at B1-4	120	4,700	na	120	No	<10.6	h	11/17/2006 at MW-106	290	f	No
2-Chlorophenol	<35.9	d	5/30/2001 at B1-4	1.5	510	2,300	1.5	Yes	<10.6	h	11/17/2006 at MW-106	18	e	No
2-Methylnaphthalene	27.6	c	10/1/2010 at MW176	6.1	280	750	6.1	Yes	70	b	5/10/2001 at MW-116	15	e	Yes
2-Methylphenol (o-Cresol)	<35.9	d	5/30/2001 at B1-4	15	3,200	na	15	Yes	<10.6	h	11/17/2006 at MW-106	180	e	No

Table 17
Constituents of Potential Concern in Soil and Groundwater
North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituents of Interest	Maximum Soil Concentration (mg/kg)	Source	Maximum Observation or MRL	ADEC Soil Cleanup Level Based on Migration to Groundwater (mg/kg)	ADEC Soil Cleanup Level Based on Direct Contact (mg/kg)	ADEC Soil Cleanup Level Based on Outdoor Inhalation (mg/kg)	Selected Soil Screening Level[g] (mg/kg)	COPC in Soil	Maximum Groundwater Concentration (ug/L)	Source	Maximum Observation or MRL	ADEC Groundwater Screening Level (ug/L)	Source	COPC in Groundwater
2-Nitroaniline	<182	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<21.3	h	11/17/2006 at MW-106	37	f	No
2-Nitrophenol	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
3 & 4-Methylphenol (m,p-Cresol)	<35.9	d	5/30/2001 at B1-4	1.5	350	na	1.5	Yes	<10.6	h	11/17/2006 at MW-106	18	e	No
3,3-Dichlorobenzidine	<73	d	5/30/2001 at B1-4	0.19	11	na	0.19	Yes	<21.3	h	11/17/2006 at MW-106	0.19	e	No[i]
3-Nitroaniline	<182	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
4,6-Dinitro-2-methylphenol	<182	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
4-Bromophenyl phenyl ether	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
4-Chloro-3-methylphenol	<73	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
4-Chloroaniline	<73	d	5/30/2001 at B1-4	0.057	90	na	0.057	Yes	<10.6	h	11/17/2006 at MW-106	1.6	e	No[i]
4-Chlorophenyl phenyl ether	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
4-Nitroaniline	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	3.4		No[i]
4-Nitrophenol	<182	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	na		No[i]
Acenaphthene	<35.9	d	5/30/2001 at B1-4	180	2,800	na	180	No	<10.6	h	11/17/2006 at MW-106	220	e	No
Acenaphthylene	<35.9	d	5/30/2001 at B1-4	180	2,800	na	180	No	<10.6	h	11/17/2006 at MW-106	220	e	No
Anthracene	<35.9	d	5/30/2001 at B1-4	2,000	20,600	na	2,000	No	<10.6	h	11/17/2006 at MW-106	1,100	e	No
Benzidine	--			na	na	na	na	No[i]	<21.3	h	11/17/2006 at MW-106	0.000094	f	No[i]
Benzo (a) anthracene	<35.9	d	5/30/2001 at B1-4	3.6	4.9	na	0.49	Yes	<10.6	h	11/17/2006 at MW-106	0.12	e	Yes
Benzo (a) pyrene	<35.9	d	5/30/2001 at B1-4	2.1	0.49	na	0.049	Yes	<10.6	h	11/17/2006 at MW-106	0.012	e	Yes
Benzo (b) fluoranthene	<35.9	d	5/30/2001 at B1-4	12	5	na	0.49	Yes	<10.6	h	11/17/2006 at MW-106	0.12	e	Yes
Benzo (g,h,i) perylene	<35.9	d	5/30/2001 at B1-4	38,700	1,400	na	140	No	<10.6	h	11/17/2006 at MW-106	110	e	No
Benzo (k) fluoranthene	<35.9	d	5/30/2001 at B1-4	120	49	na	4.9	Yes	<10.6	h	11/17/2006 at MW-106	1.2	e	Yes
Benzoic Acid	<182	d	5/30/2001 at B1-4	410	317,000	na	410	No	< 106	h	11/17/2006 at MW-106	15,000	e	No
Benzyl alcohol	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	370	f	No
Bis(2-chloroethoxy)methane	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[i]	<10.6	h	11/17/2006 at MW-106	11	f	No
Bis(2-chloroethyl)ether	<35.9	d	5/30/2001 at B1-4	0.0022	7.5	3.3	0.0022	Yes	<10.6	h	11/17/2006 at MW-106	0.077	e	No[i]
Bis(2-chloroisopropyl)ether	<35.9	d	5/30/2001 at B1-4	na	na	na	na	No[j]	<10.6	h	11/17/2006 at MW-106	na		No
Bis(2-ethylhexyl)phthalate	<35.9	d	5/30/2001 at B1-4	13	220	na	13	Yes	< 53.2	h	11/17/2006 at MW-106	0.6	e	No[i]
Butyl benzyl phthalate	<35.9	d	5/30/2001 at B1-4	920	2,900	na	290	No	<10.6	h	11/17/2006 at MW-106	730	e	No

Table 17
Constituents of Potential Concern in Soil and Groundwater
North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituents of Interest	Maximum Soil Concentration (mg/kg)	Source	Maximum Observation or MRL	ADEC Soil Cleanup Level Based on Migration to Groundwater (mg/kg)	ADEC Soil Cleanup Level Based on Direct Contact (mg/kg)	ADEC Soil Cleanup Level Based on Outdoor Inhalation (mg/kg)	Selected Soil Screening Level[g] (mg/kg)	COPC in Soil	Maximum Groundwater Concentration (ug/L)	Source	Maximum Observation or MRL	ADEC Groundwater Screening Level (ug/L)	Source	COPC in Groundwater
Carbazole	--			6.5	290	na	6.5	No	<10.6	h	11/17/2006 at MW-106	4.3	e	No[i]
Chrysene	<35.9	d	5/30/2001 at B1-4	360	490	na	49	No	<10.6	h	11/17/2006 at MW-106	12	e	No
Dibenzo (a,h) anthracene	<35.9	d	5/30/2001 at B1-4	4	0.49	na	0.049	Yes	<10.6	h	11/17/2006 at MW-106	0.012	e	Yes
Dibenzofuran	<35.9	d	5/30/2001 at B1-4	11	200	na	11	Yes	<10.6	h	11/17/2006 at MW-106	7.3	e	Yes
Diethyl phthalate	<35.9	d	5/30/2001 at B1-4	130	61,900	na	130	No	<10.6	h	11/17/2006 at MW-106	2,900	e	No
Dimethyl phthalate	<35.9	d	5/30/2001 at B1-4	1,100	773,000	na	1,100	No	<10.6	h	11/17/2006 at MW-106	37,000	e	No
Di-n-butyl phthalate	<35.9	d	5/30/2001 at B1-4	80	7,900	na	80	No	<10.6	h	11/17/2006 at MW-106	na		No[i]
Di-n-Octylphthalate	<35.9	d	5/30/2001 at B1-4	3,800	3,100	na	310	No	12	b	5/10/2001 at MW-225	150	e	No
Fluoranthene	<35.9	d	5/30/2001 at B1-4	1,400	1,900	na	190	No	<10.6	h	11/17/2006 at MW-106	150	e	No
Fluorene	<35.9	d	5/30/2001 at B1-4	220	2,300	na	220	No	<10.6	h	11/17/2006 at MW-106	150	e	No
Hexachlorobenzene	<35.9	d	5/30/2001 at B1-4	0.047	3.2	1.5	0.047	Yes	<10.6	h	11/17/2006 at MW-106	0.1	e	No[i]
Hexachlorobutadiene	<35.9	d	5/30/2001 at B1-4	0.12	13	3.8	0.12	Yes	<10.6	h	11/17/2006 at MW-106	0.73	e	No[i]
Hexachlorocyclopentadiene	<35.9	d	5/30/2001 at B1-4	1.3	390	2	0.2	Yes	<10.6	h	11/17/2006 at MW-106	5	e	No[i]
Hexachloroethane	<35.9	d	5/30/2001 at B1-4	0.21	63	170	0.21	Yes	<10.6	h	11/17/2006 at MW-106	4	e	No[i]
Indeno (1,2,3-cd) pyrene	<35.9	d	5/30/2001 at B1-4	41	5	na	0.49	Yes	<10.6	h	11/17/2006 at MW-106	0.12	e	Yes
Isophorone	<35.9	d	5/30/2001 at B1-4	3.1	5,300	na	3.1	Yes	<10.6	h	11/17/2006 at MW-106	90	e	No
Isopropanol (propanol)	--			na	na	na	na	Yes	-			na		Yes
Naphthalene	12.7	c	9/29/2010 at MW175	20	1,400	28	2.8	Yes	420	h	4/4/2008 at MW-116	73	e	Yes
Nitrobenzene	<35.9	d	5/30/2001 at B1-4	0.094	51	120	0.094	Yes	<10.6	h	11/17/2006 at MW-106	1.8	e	No[i]
N-Nitrosodimethylamine	<35.9	d	5/30/2001 at B1-4	0.000053	0.16	0.19	0.000053	Yes	<21.3	h	11/17/2006 at MW-106	0.0017	e	No[i]
N-Nitrosodi-n-propylamine	<35.9	d	5/30/2001 at B1-4	0.0011	0.52	na	0.0011	Yes	<10.6	h	11/17/2006 at MW-106	0.012	e	No[i]
N-Nitrosodiphenylamine	<35.9	d	5/30/2001 at B1-4	15	750	na	15	Yes	<10.6	h	11/17/2006 at MW-106	17	e	No
Pentachlorophenol	<182	d	5/30/2001 at B1-4	0.0047	39	na	0.0047	Yes	<10.6	h	11/17/2006 at MW-106	0.1	e	No[i]
Phenanthrene	<35.9	d	5/30/2001 at B1-4	3,000	20,600	na	2,060	No	<10.6	h	11/17/2006 at MW-106	1,100	e	No
Phenol	<35.9	d	5/30/2001 at B1-4	68	23,200	na	68	No	<10.6	h	11/17/2006 at MW-106	1,100	e	No
Pyrene	<35.9	d	5/30/2001 at B1-4	1,000	1,400	na	140	No	<10.6	h	11/17/2006 at MW-106	110	e	No

Table 17
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North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituents of Interest	Maximum Soil Concentration (mg/kg)	Source	Maximum Observation or MRL	ADEC Soil Cleanup Level Based on Migration to Groundwater (mg/kg)	ADEC Soil Cleanup Level Based on Direct Contact (mg/kg)	ADEC Soil Cleanup Level Based on Outdoor Inhalation (mg/kg)	Selected Soil Screening Level[g] (mg/kg)	COPC in Soil	Maximum Groundwater Concentration (ug/L)	Source	Maximum Observation or MRL	ADEC Groundwater Screening Level (ug/L)	Source	COPC in Groundwater
Metals														
Antimony	97	a	Before 1991 B111	3.6	41	na	3.6	Yes	21	a	5/11/1988 at MW-107	0.6	e	Yes
Arsenic	23	a	Before 1991 B106-B122	3.9	4.5	na	0.45	Yes	68.5	b	5/10/2001 at MW-116	1	e	No[j]
Barium	103	b	5/30/2001 at B-3	1,100	20,300	na	1,100	No	601	b	5/10/2001 at MW-115	200	e	Yes
Cadmium	0.469	b	5/30/2001 at B-3	5	79	na	5	No	10	a	5/11/1988 at MW-107	0.5	c	Yes
Chromium, Total	35.8	a	Before 1991 MW110	25	300	na	25	Yes	29.7	b	6/13/2001 at MW-110	10	e	Yes
Copper	--			460	4,100	na	410	Yes	7.28	k	3/8/2011 at MW-167B	100	e	No
Iron	--			640	55,000	na	640	Yes	11,700	k	2/18/2011 at MW-162A	2,600	f	Yes
Lead	7.48	b	5/30/2001 at B-3	na	400	na	40	No	26	a	5/22/1990 at MW-104	1.5	e	Yes
Mercury	<0.0418	b	3/8/2001 at MW135	1.4	30	18	1.4	No	<0.2	b	2001 all MWs analyzed	0.2	e	No
Nickel	--			8.6	2,000	na	8.6	Yes	9.57	k	3/4/2011 at MW-171A	10	e	No
Selenium	21	a	Before 1991 B118	3.4	510	na	3.4	Yes	5.66	b	5/10/2001 at MW-115	5	e	Yes
Silver	<0.191	b	3/8/2001 at MW135	11.2	510	na	11.2	No	5.02	b	5/10/2001 at MW-115	10	e	No
Zinc	--			4,100	30,400	na	3,040	Yes	9.17	k	3/8/2011 MW-171A	500	e	No
Other														
Alkanol amines	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Alkylamines	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Alkylene amines	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Calcium								No[l]				na		No[l]
Chloride								No[l]				na		No[l]
Dinonylnaphthylsulfonic acid	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Fluoroalkyl Surfactant	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Heavy aromatic naptha (Naphtha, High Flash Aromatic [HFAN])								No[m]				na		No[m]
Heavy paraffinic distillate (mixture)								No[m]				na		No[m]
Iron Oxides	--			na	na	na	na	Yes[o]	--			na		Yes[o]
2-Methoxymethylethoxy propanol	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Monoethanolamine	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Montmorillonite, calcined	--			na	na	na	na	No[n]				na		No[n]
Silica	--			na	na	na	na	Yes[o]	--			na		Yes[o]
Cyanide	--			27	2,000	na	27	Yes[o]	--			20	e	Yes[o]
Sulfate	--			na	na	na	na	No[j]	38,000	h	03/09/2011 at MW-127	na		No[j]
Sulfolane	<5.4	c	9/17/10 at MW178	0.073	250	na	0.073	Yes	94,000	h	09/10/2004 at MW-110	5	e	Yes
GRO	7,730	b	3/8/2001 at MW135	300	1,400	1,400	140	Yes	36,800	b	5/10/2001 at MW-116	220	e	Yes
DRO	6,760	c	10/1/2010 at MW176	250	10,250	12,500	250	Yes	4,570	b	5/10/2001 at MW-116	150	e	Yes
RRO	<1,050	b	3/8/2001 at MW135	11,000	10,000	22,000	1,000	Yes	<1,050	b	5/10/2001 at MW-135	110	e	Yes

Table 17
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North Pole Refinery
Flint Hills Resources Alaska, LLC

Constituents of Interest	Maximum Soil Concentration (mg/kg)	Source	Maximum Observation or MRL	ADEC Soil Cleanup Level Based on Migration to Groundwater (mg/kg)	ADEC Soil Cleanup Level Based on Direct Contact (mg/kg)	ADEC Soil Cleanup Level Based on Outdoor Inhalation (mg/kg)	Selected Soil Screening Level[g] (mg/kg)	COPC in Soil	Maximum Groundwater Concentration (ug/L)	Source	Maximum Observation or MRL	ADEC Groundwater Screening Level (ug/L)	Source	COPC in Groundwater

Notes:
"mg/kg" = milligrams per kilogram.
"µg/L" = micrograms per liter.
"ADEC" = Alaska Department of Environmental Conservation.
USEPA = United States Environmental Protection Agency Integrated Risk Information System (2011)
[a] SWI 2000, soil data on Page 11 and groundwater data on Page 9
[b] SWI 2001, soil Tables 3 to 6, groundwater Tables 7 to 11.
[c] SWI 2010, Table 3
[d] CT&E 2001 lab sheets
[e] ADEC 2009 Table C Method Two groundwater cleanup level modified to 1E-6 target risk or 0.1 hazard quotient
[f] USEPA (2011) Regional Screening Level modified to 1E-6 target risk or 0.1 hazard quotient.
[g] Based on the lowest of: migration to groundwater CUL, or 1/10th of the direct contact or outdoor inhalation CUL, provided in Tables B1 and B2 of 18 AAC75
h - SWI database, dated Feb-March 2011
i- COI not included on ingredient list, but was analyzed in soil or groundwater as part of full-scan VOC analyses. Not selected as COPC because constituent was not detected above the MDL.
j concentrations within range of regional background levels, not selected as a COPC (USGS Fact Sheet FS-111-01)
k - SWI database, dated June 2011
l - ubiquitous in natural waters, not selected as a COPC
m -compound is a petroleum distillate composed of several individual substances, not selected as a COPC
n - this is a type of clay, not selected as a COPC
o -subject to further discussion with ADEC
The USEPA (2010) Regional Screening Level Tables were the source of screening levels for 1,2-Diphenylhydrazine (as Azobenzene), and Benzidine
The USEPA (2010) Regional Screening Level Tables were adjusted for a hazard index of 0.1 for non-cancer screening levels for 1-Chloronaphthalene, 2-Chloronaphthalene, 2-Nitroaniline, Benzyl alcohol, Bis(2-chloroethoxy)methane, Cyclohexane, h-Hexane, Iron, Propylene glycol, and Pyridine.
sulfolane values based on calculations provided in ADEC (2008) Cleanup Level Guidance
Total petroleum hydrocarbons gasoline range organics = GRO
Total petroleum hydrocarbons diesel range organics = DRO
Total petroleum hydrocarbons residual range organics = RRO
"<" = not detected at the PQL indicated.
"--" = not analyzed.
"na" = not available.

Table 18
Permafrost Descriptions
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well	Install Date	Depth to Top of Permafrost (feet BGS)	Soil Description
MW-148D	9/26/11	151.5	Dark gray, gravelly SAND; frozen Nbn
MW-151C	2/18/10	65.0	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL/gravelly SAND; frozen Nf
MW-152C	9/28/11	67.5	Grayish brown, sandy GRAVEL (rounded to subrounded) with cobbles at trace silt; wet; frozen Nbe to Nbn
MW-153B	4/20/10	59.0	Very dense, gray, slightly, silty, fine to medium, SAND; frozen Nbn, very well bonded.
MW-154B	2/20/10	102.0	Very dense, gray to light gray-green, fine sandy SILT/silty SAND, trace gravel (<0.5 inch); frozen Nf.
MW-155B	9/11/10	67.0	Dense, gray, slightly fine sandy, SILT; frozen from 67 to 70 feet bgs Vx, visible ice between sand.
MW-156B	2/17/10	51.5	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen Nf.
MW-157B	9/30/11	40.0	Medium to very dense, grayish brown, silty, sandy GRAVEL rounded to subrounded)/gravelly SAND; frozen Nbn to Nbe.
MW-158B	9/23/10	65.0	Very dense, gray fine SAND; trace silt; frozen Nbn.
MW-159C	9/29/11	72.5	Gray, gravelly SAND with trace silt; frozen Nbe.
MW-160B	2/19/10	91.0	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen Nf.
MW-162B	2/21/10	67.5	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen Nf.
MW-163B	9/13/10	40.0	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL/ gravelly SAND; frozen Nf.
MW-164C	8/17/11	63.0	Gray, slightly silty, fine to coarse, sandy GRAVEL; frozen Nbn.
MW-166B	3/15/10	33.0	Very dense, light gray, medium to coarse sandy GRAVEL; frozen and bonded Nbn.
MW-167B	3/23/10	33.5	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen and bonded Nbn.
MW-168B	10/1/11	55.0	Gray to rusty brown, silty to slightly silty GRAVEL; frozen Nbn.
MW-169C	9/1/11	69.0	Gray, silty, fine to coarse, sandy GRAVEL; frozen Nbn.
MW-170C	3/4/10	135.0	Dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen, friable Nf.
MW-171B	3/16/10	42.0	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen Nbn to Nf.
MW-172B	3/27/10	150.5	Very dense, gray, slightly silty, fine to coarse sandy GRAVEL; frozen Nbn to Nf.
MW-179D	8/12/11	140.0	Brown to gray, trace to slightly silty, fine to coarse, sandy, fine to coarse GRAVEL; frozen Nf.
MW-182B	8/22/11	46.0	Grayish brown, SAND to sandy GRAVEL; frozen Nbn.
MW-183B	8/29/11	58.7	Grayish brown, fine to medium SAND, trace silt; frozen Nbn.
MW-184	10/11/10	45.0	Very dense, gray, slightly silty, gravelly SAND; frozen, bonded Nbn.
MW-185C	10/2/11	121.0	Grayish brown, sandy GRAVEL; frozen Nbn.
MW-188	11/24/10	45.5	Very dense, grayish brown, sandy GRAVEL; trace to slightly silty, frozen Nbn.
MW-193B	8/30/11	58.0	Grayish brown, sandy GRAVEL, trace silt; frozen Nbn.
MW-194B	8/31/11	39.0	Grayish brown, sandy GRAVEL, trace to slightly silty; frozen Nbn.
MW-301-70	10/9/11	71.5	Gray-brown, gravelly SAND with trace silt; frozen Nf to Nbn.
MW-302-110	10/17/11	110.0	Gray, slightly silty, sandy GRAVEL; frozen Nbn.
MW-303-130	10/18/11	110.0	Gray, silty SAND with trace gravel; frozen Nf to Nbn.
MW-305-100	10/8/11	110.0	Grayish-brown, sandy GRAVEL; frozen Nf to Nbn.

Notes:
BGS Below ground surface

Table 19
Private Well Depth Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1976	315494	No	29				
1999	508195	Yes	42			8/6/1999	Driven well; No soil log
1977	315460	Yes	45			4/11/1991	
1992	409669	No	35				
1984	395064	No	40				
2007	408611	No	40				
1985	383821	Yes	50	7	31	7/12/1985	
1984	383813	Yes	40	3	18	6/18/1984	
1983	375586	Yes	76			6/9/1983	
1983	375594	Yes	53			6/10/1983	
1998	348571	Yes	60				
1998	348554	Yes	40	1	8		
1998	348589	Yes	34				
1985	315290	Yes	122	5	110		
1977	296121	Yes	230	16	220	9/24/1985	
1982	347701	No	40				
	395030	No	140				
1998	458091	Yes	60			3/4/1998	
1998	458082	Yes	34			6/15/1998	
1984	394947	No	40				
1969	481629	Yes	63	40	50	9/29/1995	
1984	395447	Yes	60			5/24/1984	Address not sure if match right PAN.
1982	296538	No	180				
1983	379832	No	40				
2007	408565	No	40				
1995	432661	Yes	40			7/3/1995	
2001	317284	Yes	40				
1999	508225	Yes	40				
2004	499366	No	42				
2000	315206	Yes	98	25	90		
1995	430749	No	40				
1984	394963	No	40				
2003	508161	Yes	50			8/26/2003	
1996	458112	Yes	40			8/8/1996	
1990	458104	Yes	40			5/16/1990	
1997	458066	No	41				
1989	325830	Yes	40	34	40	9/17/1984	
1968	288365	Yes	40			11/1/1995	
	288471	No	30				
1991	432776	Yes	40			8/7/1991	
2005	558451	Yes	60			7/14/2005	
	368733	Yes	120			7/11/1982	
1983	370843	No	43				
1985	296775	No	160				
1982	296783	Yes	186			9/1/1982	no soil log; USGS data sheet
2004	539066	Yes	40			6/7/2004	
2005	542296	Yes	40			6/18/2005	
1985	525812	No	100				
1973	325562	No	90				
2005	542407	Yes	40			4/4/2005	
2006	581534	Yes	40			6/22/2006	
2003	531596	Yes	40			9/30/2003	
1981	333891	Yes	140	3	120		
1985	315338	Yes	120	5	115		
1977	315320	Yes	127	4	117		
	460079	Yes	40			9/26/2008	

Table 19
Private Well Depth Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
2006	558559	No	85				
2000	318043	Yes	40				
1999	317918	Yes	40				
1999	372943	Yes	51				
1988	406333	Yes	353	30	230		
1985	406341	Yes	293	7	238		
2003	508276	Yes	40			8/1/2003	
1976	296635	No	49				
1969	580660	No	30				
1972	328383	Yes	40				
2006	348481	Yes	32				
1985	296813	Yes	40	34	40	9/27/1985	
1982	296830	Yes	205			6/22/1982	no soil log; USGS data sheet
1983	348473	No	36				
1983	375608	Yes	42			5/26/2008	
1982	296805	Yes	200			1/8/1990	No soil log; date may be repair not installation date
1984	383805	No	40				
1983	375578	Yes	63			5/23/1983	
1979	296759	No	63				
1979	296767	No	63				
1976	296724	No	40				
1982	296589	No	220				
1982	347256	No	44				
1982	347213	No	44				
	296686	No	40				
1976	296295	Yes	67			5/30/1986	
1984	381021	Yes	42			5/3/1984	
1982	347680	Yes	42			4/14/1982	
1982	326186	No	40				
1982	326186	No	40				
1982	347698	No	35				
1982	347299	No	40				
2007	408590	No	40				
2007	408719	No	40				
1984	391565	Yes	120	36	105		
1984	391557	Yes	150	40	150		
1984	391531	Yes	205	24	205		
2006	565822	Yes	40				
2005	565831	Yes	40				
	327921	Yes	40	34	40		
1998	484067	Yes	40				
1999	348520	Yes	55	5	12		
1984	375721	Yes	42				
1984	375705	Yes	57			6/6/1905	
1985	383899	Yes	50				
2000	508241	Yes	40			9/10/2000	Driven well; No soil log
1975	315583	No	40				
1985	296732	Yes	41			8/5/1985	
1983	348465	Yes	40				
2004	317225	No	40				
2001	317217	Yes	40				
1991	317195	Yes	50				
1986	427063	No	220				
1997	296856	Yes	218			7/8/1982	no soil log; USGS data sheet
1996	348902	Yes	40				
1986	296571	No	48				

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1975	288152	Yes	60			6/14/1991	
2007	408689	No	40				
2007	408701	No	40				
	432555	Yes	40			10/16/1991	
2005	432547	Yes	60			5/21/2005	
2002	432539	Yes	60			9/12/2002	
1982	403202	No	28				
1975	292842	No	30				
2001	432512	No	60				
2001	432504	Yes	40			9/1/2001	
2001	432491	No	60				
	287873	Yes	40			9/29/1984	
1983	370738	Yes	160	23	138	8/6/1987	
1984	408671	Yes	173	20	167	9/26/1984	
2005	539228	Yes	40			9/1/2004	
2006	565521	Yes	50				
2002	519359	Yes	40				
2002	303836	No	30				
1998	348546	Yes	33				
1984	386677	No	36				
2004	508144	No	30				
	485861	Yes	70	29	34	7/22/1991	
2005	542253	Yes	40			4/7/2005	
1977	296741	Yes	230				No installation date.
1997	458031	Yes	50			10/10/1997	
1974	565326	Yes	60			6/17/1905	
1995	565318	No	50				
1984	375551	Yes	48			4/18/1984	
1983	375543	Yes	53			5/10/2008	
1964	288551	Yes	40			4/24/1997	
1989	430714	Yes	40			12/20/1999	
1966	288501	Yes	40			10/20/1994	
1977	305430	No	22				
1983	379859	No	35				
1983	379930	No	30				
1983	379905	Yes	48			12/1/1993	No soil log
1982	347671	Yes	42			4/12/1982	
1982	347230	No	30				
1983	375535	Yes	42			5/17/1983	
1982	295981	No	60				
2000	295990	No	40				
1982	347507	No	42				
1982	347591	No	33				
	347418	No	39				
1982	347345	No	30				
1983	347604	No	30				
	525197	Yes	40			6/17/1905	
1983	347426	No	40				
1986	347493	No	35				
2004	555606	Yes	40			7/1/2004	
1976	298590	Yes	40			6/30/1998	Conflicting address, assume Lot and Block OK
1982	347655	No	30				
1982	347353	No	40				
1975	296945	Yes	40				
1985	296937	Yes	220	20	210		
1984	316679	Yes	80				

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1984	316687	Yes	40				
	432431	No	30				
1994	430757	No	30				
2004	539031	No	43				
2003	539074	Yes	40			9/15/2003	
2006	539082	Yes	40			8/4/2006	
	587648	Yes	40			8/20/2009	
1976	288128	No	35				
2006	318191	Yes	40				
1995	430684	No	30				
1993	430676	No	30				
1983	373125	Yes	80	8	67	10/25/1983	
2005	542300	Yes	40			5/12/2005	
2004	542440	Yes	40			6/10/2004	
2004	539104	Yes	40			4/23/2004	
2005	542458	No	40				
2003	542466	No	40				
2004	542431	Yes	40			6/7/2004	
1983	426016	Yes	40			6/2/1990	
1983	370827	No	40				
	287865	No	40				
1984	408697	Yes	193	22	176	7/15/1984	
2006	565717	Yes	50				
1997	432083	No	65				
1985	382248	No	40				
1984	395471	Yes	80	9	74	7/12/1984	
1979	294501	Yes	36				
1997	305278	No	30				
1981	288357	No	40				
2000	305294	Yes	40			6/1/2000	
1999	305308	Yes	40				
1984	379921	No	30				
1977	305481	Yes	63	34	46	7/6/1984	
1974	298824	No	60				
1981	288349	No	40				
	558541	No	30				
2004	542229	No	60				
1981	296473	No	35				
1977	296481	No	40				
1981	296503	Yes	60			10/23/1981	no soil log; USGS data sheet
1976	453293	Yes	40			6/28/1995	Conflicting address, assume Lot and Block OK
1998	348716	No	40				
1985	296708	Yes	40			7/16/1985	
1985	296384	No	120				
1985	296392	Yes	40	24	32	9/23/1985	
1984	383716	Yes	46			5/14/1984	
2006	565636	Yes	40				
1975	287989	No	40				
1975	305260	No	35				
1983	379867	No	40				
1984	391361	Yes	133	19	133		
1984	391344	Yes	202	7	202		
1987	391336	Yes	320	5	195		
1980	307009	Yes	40			6/12/1999	
1975	325457	Yes	110	9	58	10/3/1990	
2000	508179	Yes	40			11/9/1999	

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
2007	539091	Yes	40			8/4/2006	
1985	383881	No	45				
1979	310191	Yes	40			10/2/1996	
1983	348104	Yes	56			8/23/1983	
1984	348139	Yes	50			5/24/1984	
1984	348350	Yes	70			8/11/1983	
1983	348171	Yes	42			7/7/1983	
1984	348155	Yes	40			5/28/1984	
2004	539490	No	40				
2006	565709	Yes	40				
1996	315192	Yes	89	22	70		
1989	316512	Yes	11				
	327921	Yes	40	34	40		
1986	383830	Yes	62			11/13/1985	
1987	426024	Yes	42			6/9/1986	
1987	426032	Yes	40			9/24/1986	
2005	554189	Yes	40			9/1/2004	
1955	475998	No	20				
1984	383791	Yes	42			5/15/1984	
1983	375560	Yes	42			5/12/1983	
1984	348074	Yes	53			9/27/1984	
1983	348082	Yes	50			9/1/1983	
2008	415111	No	30				
2004	321494	Yes	40			6/16/1905	
1975	321508	No	18				
1974	461679	Yes	40			4/13/1995	
1983	347990	Yes	42			7/19/1983	
2004	542288	Yes	40			5/26/2004	
1978	298883	No	45				
2005	305341	No	40				
1993	305367	Yes	40			10/4/1989	
1986	408514	Yes	160			8/14/1985	
1978	305405	Yes	52	35	47		no installation date
1983	379913	No	30				
1983	379841	No	35				
1984	395340	Yes	218	65	215		
1983	347779	Yes	50			8/26/1983	
1998	432113	Yes	35			5/22/1998	
1998	432105	Yes	34			5/23/1998	
1997	432024	Yes	44			9/2/1998	
2000	297046	Yes	40				
1985	303917	Yes	223	11	217		
2003	317497	Yes	40				
2005	317969	Yes	40				
1984	379824	No	40				
1984	379883	No	33				
1984	379875	No	35				
1984	395099	No	74				
1985	406384	Yes	33				
1983	347281	No	40				
1984	381039	Yes	42			5/3/1984	
1983	370746	Yes	180	12	168	10/8/1983	
2002	403211	Yes	40			5/31/2002	
1975	292834	No	35				
1991	432741	No	45				
1983	347388	No	45				

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1984	369993	Yes	38			7/21/1997	
1976	298581	No	40				
1984	348317	Yes	42			9/27/1984	
2005	539473	Yes	40			8/5/2009	
2005	539481	Yes	40			8/5/2004	
1984	394971	No	40				
1997	432075	Yes	35			6/30/1997	
1984	395480	Yes	86	9	71	5/26/1984	
1998	432067	Yes	40			6/15/1998	
1998	432059	Yes	40			10/18/1997	
1996	458058	Yes	30			6/15/1996	
1981	333883	Yes	196	12	180		
	522147	No	40				
1984	370851	No	167				
2001	432628	Yes	40			7/9/2001	No soil log
2007	408603	No	40				
2002	432610	Yes	40			9/12/2001	No soil log
1997	298875	yes	60			4/29/1998	
2003	288381	No	12				
2003	539287	No	30				
2004	539279	Yes	40			9/12/2003	
	287857	Yes	35			8/10/1984	
1984	379964	No	34				
2006	565695	Yes	40				
1986	383848	Yes	40			6/30/1986	
1977	321257	No	33				
1982	347540	Yes	47			4/10/1982	
1983	347531	No	35				
1975	296252	Yes	80	12	49	9/6/1989	
1982	347469	No	44				
1984	295884	No	35				
1976	296104	No	35				
1994	296201	Yes	80			7/20/1994	
1982	347311	Yes	42			7/1/1982	
1983	347728	No	70				
1983	347523	No	30				
1984	395218	Yes	70	32	70		
1984	386685	No	40				
2005	304034	Yes	54				
1964	535885	Yes	40				
2005	317420	Yes	40				
2001	499897	Yes	40				
	333859	Yes	234	8	220		
2001	333778	Yes	236	8	230		
1982	333905	Yes	60				
1984	386634	Yes	60			12/15/1994	
1985	408654	Yes	200	25	175	6/26/1985	
1985	408620	No	180				
1996	458074	Yes	32			6/30/1996	
1977	296465	No	40				
1978	296457	No	40				
1977	296449	Yes	200				no installation date
1979	296422	Yes	60	4	15		no installation date
1982	296414	No	80				
1982	296406	Yes	287	16	204		date
2001	427055	Yes	140				

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1982	296376	No	160				
1982	296881	Yes	168	4	149	7/27/1983	
1982	347451	No	40				
1988	296091	Yes	40			5/17/1988	
1994	296198	No	40				
1985	296261	No	40				
1983	347329	No	40				
1983	347582	No	32				
1982	347574	No	40				
2006	295892	Yes	60				
1976	296643	No	45				
1980	290670	Yes	40				
2004	542326	Yes	40			5/15/2004	
2004	539210	Yes	40			4/23/2004	
1978	288306	No	26				
	287946	No	40				
1965	386626	Yes	60			8/16/1993	
1969	386618	No	40				
1984	379972	No	40				
1987	297135	Yes	40				
2000	508314	Yes	40			11/10/1999	
1999	508373	Yes	40	8	22	8/6/1999	
1983	347639	No	40				
1983	347396	Yes	60			7/31/2004	
1985	287971	No	40				
2007	305448	Yes	40	1	40	6/29/1905	
1975	298841	No	50				
1975	298859	No	28				
1983	379891	No	36				
2004	348724	Yes	40				
2007	395668	Yes	33				
1984	408468	Yes	181	2	140	6/29/1984	
1975	288098	No	28				
1984	348333	Yes	57			8/24/1983	
1986	287962	Yes	40			7/19/1984	
1975	287954	No	40				
1976	305251	Yes	65	28	55	7/6/1987	
	600524	Yes	60			6/5/1981	Lot 3 and 2W
	325627	Yes	40	18	25	5/25/1979	
2005	318205	Yes	40				
2003	508438	No	30				
1998	458040	Yes	40			7/14/1998	
1984	395005	No	63				
2003	508462	Yes	40			8/26/2003	
2006	539376	Yes	40				
2005	539384	Yes	40			5/31/2005	
	430463	Yes	60				
2006	565512	Yes	50				
1984	391409	Yes	255	19	146		
1985	429929	Yes	305	8	228		
1985	333794	Yes	40	27	40		
1985	333786	Yes	42	23	38		
1984	399248	Yes	65				
1997	445606	Yes	28			6/19/1905	2156 Bunge Street (log)
1979	310212	Yes	40				
1973	325376	Yes	60			3/24/1997	

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
	287849	No	40				
	445657	Yes	215	5	205		
2005	296210	No	52				
1977	296040	No	90				
1982	347485	No	40				
1982	347477	No	30				
1982	347302	No	40				
1976	296163	Yes	40				No installation date
2006	565849	Yes	40				
1983	347957	Yes	53			7/6/1983	
1984	347965	Yes	70			8/24/1983	
1984	347973	Yes	40			9/1/1983	
1983	347981	Yes	42			7/6/1983	
1985	348007	Yes	40			11/11/1998	
1983	348341	Yes	80			8/23/1983	
1984	348384	Yes	47			9/26/1984	
1983	348236	Yes	42			4/12/1982	
1984	347906	Yes	60			8/12/1983	
1982	348210	Yes	53			8/1/1982	
2004	539449	Yes	40			4/23/2004	
2004	539457	Yes	40			4/27/2004	
1976	288195	Yes	90			10/16/1991	
1972	424391	Yes	60				
1979	296333	Yes	60			5/24/1979	
1982	296350	No	127				
1982	347663	Yes	42			4/15/1982	
2004	429911	Yes	40				
1999	508233	Yes	40				
2006	565652	Yes	60				
2005	565661	Yes	40				
1975	288268	No	40				
1999	305413	No	60			6/26/1905	
1983	370819	No	36				
2003	317926	Yes	40				
1967	406309	Yes	21				
2002	460800	Yes	40				
2003	317713	Yes	40				
1974	303844	Yes	60	36	56	5/13/1987	
1999	348538	Yes	55	8	13		
2004	348651	Yes	40				
1984	408638	Yes	170	24	164	10/12/1984	
1992	432768	Yes	40			10/2/1996	No soil log
	370835	No	43				
1983	375641	Yes	42			7/8/1983	
1983	375632	Yes	42			7/11/1983	
1984	383856	No	40				
1984	375624	Yes	40			10/26/1983	
	344648	Yes	231	33	205		
1982	347558	No	60				
1973	287938	Yes	40			7/1/2003	
1984	395081	Yes	77	8	68	5/30/1984	
2007	408573	No	40				
1984	386642	No	30				
1975	321184	No	70				
2006	547468	No	40				
1981	321273	Yes	84	28	84	6/11/1905	

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
2001	508489	Yes	60			5/25/2001	
1983	347337	No	40				
1979	295922	No	35				
1979	295957	Yes	42				
1985	295965	No	42			10/1/1985	
1981	295973	Yes	42				
1983	347400	No	33				
1982	347647	No	44				
1983	348406	Yes	50			8/12/1983	
1976	321460	No	35				
1984	347931	Yes	40			8/26/1983	
1983	347922	Yes	40			8/25/1983	
2004	539350	Yes	40			6/7/2004	
1983	347876	Yes	42			8/1/1983	
1983	347868	Yes	42			8/1/1983	
2004	542318	Yes	40			6/7/2004	
2006	408581	No	40				
1984	302082	Yes	105	20	103		
1984	395072	No	40				
1984	394998	Yes	42	14	38	5/24/1984	
1984	394980	No	40				
1981	325490	Yes	89	22	70	8/21/1996	
1984	395200	Yes	236	55	230		
1984	395196	Yes	295	3	245		
2007	519308	Yes	47				
1998	348856	Yes	55				
1980	445584	No	41			6/27/1905	
	395251	Yes	38	12	27		
1998	348864	Yes	40				
2000	484105	Yes	40				
2004	312363	No	31				
1999	508209	No	42				
1992	448770	Yes	50				
1999	507075	Yes	40				
1999	508250	Yes	40			11/26/1999	Driven well; No soil log
1985	391514	Yes	105	17	103		
1984	391492	Yes	100				
1987	348619	Yes	42				
2006	519286	Yes	40				
1984	375659	Yes	65			10/26/1983	
1983	375667	No	42				
1983	375675	Yes	40			8/6/1983	
1984	383864	No	40				
1983	375683	Yes	42			7/29/1983	
1985	383872	No	34				
1984	394955	No	40				
1984	395455	Yes	84			7/17/1984	
1994	348503	Yes	60				
1983	348295	Yes	53			7/7/1983	
2006	539112	Yes	40			9/21/2005	
2006	539198	Yes	40			5/20/2005	
2004	539139	Yes	40			6/12/2006	
2005	565725	Yes	40				
2005	565733	Yes	50				
2005	565741	Yes	40				
1983	348449	No	40				

Table 19
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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1983	383767	No	50				
1984	383759	Yes	51			10/18/1983	
1976	296716	No	40				
1984	375501	Yes	59			4/20/1984	
1983	375519	Yes	63			5/7/1983	
1983	375527	Yes	53			4/27/1983	
1984	383724	No	53				
1983	383732	Yes	53			10/18/1983	
1982	375489	Yes	42			4/29/1983	
1983	375471	Yes	53			4/20/1983	
1983	375462	Yes	42			5/1/1983	
1983	375454	Yes	42			6/1/1983	
	404624	Yes	40				
2000	348732	Yes	40				
1982	347566	No	40				
1996	347515	Yes	30			6/18/1905	
1982	347442	No	40				
1999	508136	Yes	32			8/22/1999	
2006	581682	Yes	60			9/18/2006	
2006	547441	No	40				
1980	315559	No	34				
1996	481335	Yes	40			8/15/1995	
1984	348261	Yes	42			6/6/1984	
1985	348287	Yes	60			5/30/1984	
2007	579581	Yes	220	12	200		
1987	315249	Yes	40				
1998	429881	Yes	40				
1984	395021	Yes	105	4	105	7/15/1984	
1997	432032	Yes	40			10/1/1997	
1999	508365	Yes	40	3	30	8/6/1999	
1997	432091	Yes	42			9/17/1997	
1984	386669	No	34				
1984	386651	No	34				
2002	368903	Yes	96	16	85	4/1/1998	
	290190	Yes	238	6	215		
1983	297062	Yes	40				
	317462	Yes	18				
1980	296627	No	57				
1982	296601	No	158				
1984	296597	No	170				
	453277	Yes	40			6/25/2001	
1982	296864	No	200				
2006	539295	Yes	40			5/20/2005	
1976	315451	No	38				
1977	315478	Yes	66			6/1/1977	
1984	395013	No	84				
1984	395102	Yes	63	2	58	7/12/1984	
2000	508187	Yes	40			10/12/1999	No soil log
2007	508322	Yes	40			4/30/2007	
1984	395463	Yes	72	22	54	7/14/1984	
2006	581585	Yes	40			6/22/2006	
2006	581593	Yes	40			9/7/2006	
2006	581607	Yes	40			7/22/2006	
2006	581615	Yes	40			9/18/2006	
2006	581623	Yes	40			9/29/2006	
2007	581631	Yes	40			5/24/2007	

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YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
2007	581640	Yes	40			5/24/2007	
2007	581658	Yes	40			4/10/2007	
2006	581666	Yes	40			9/6/2006	
2006	581674	Yes	40			9/13/2006	
2006	581691	Yes	40			7/10/2006	
1997	414484	Yes	33			6/12/1905	
	587095	yes	60			7/30/2010	
2008	587087	Yes	40			8/4/2008	
2008	589969	Yes	40				
	590126	Yes	68	12	52	9/29/2009	installation year based on fax date
	590151	Yes	60			7/19/2010	
	590169	Yes	67	12	48	9/22/2010	
	591033	Yes	40			5/17/2010	
	591025	Yes	40			5/29/2009	
2007	591017	Yes	40			7/30/2007	
2007	591009	No	40				
2007	590991	Yes	40			6/25/2007	
2007	590983	Yes	60			9/20/2007	
2007	590975	Yes	40			6/30/2007	
2008	591041	Yes	40			9/15/2008	
2008	591050	Yes	40			8/5/2008	
	591068	Yes	40			6/10/2009	
	591076	Yes	40			10/5/2009	
2007	591157	Yes	40			7/31/2007	
	591165	Yes	60			9/11/2009	
2007	591181	Yes	40			6/25/2007	
2007	591190	Yes	40			4/10/2007	
	591092	Yes	40				
	591106	Yes	40			6/3/2009	
1998	429881	Yes	75	8	65		
2004	429911	Yes	40				
2004	429911	Yes	115	10	92		
1983	375586	Yes	76				
1983	375594	Yes	53				
1972	513431	No	27				
2000	315206	Yes	98	25	90		
1982	373834	No	20				
1985	296775	No	160				
1982	296783	Yes	186				
1976	296635	No	49				
1980	278912	No	30				
1985	296813	Yes	40	34	40		
1982	296830	Yes	205				
1983	348473	No	36				
1983	375608	Yes	42				
1982	296805	Yes	200				
1983	375578	Yes	63				
1979	296759	No	63				
1979	296767	No	63				
1976	296724	No	40				
1982	296589	No	220				
1993	130427	No	32				
1985	296732	Yes	41				
1983	348465	Yes	40				
1986	427063	No	220				
1997	296856	Yes	218				

Table 19
Private Well Depth Summary
North Pole Refinery
Flint Hills Resources Alaska, LLC

YEAR BUILT	PAN	Well Log?	Well Depth (feet)	Top of Permafrost (feet BGS)	Bottom of Permafrost (feet BGS)	Installed	Comments
1996	348902	Yes	40				
1986	296571	No	48				
1979	115525	No	40				
1978	278963	No	35				
2002	303836	No	30				
1998	513423	No	45				
1977	296741	Yes	230				
1984	375551	Yes	48				
1983	375543	Yes	53				
1997	401871	No	30				
1981	113964	No	30				
1985	383881	No	45				
1984	348155	Yes	40				
1986	383830	Yes	62				
1983	375560	Yes	42				
1972	403971	No	35				
1978	279111	No	31				
1984	277045	Yes	60	N/A			
1986	383848	Yes	40				
1984	295884	No	35				
1976	296643	No	45				
1979	113921	No	30				
2004	348724	Yes	40				
1976	296163	Yes	40				
1997	401951	No	35				
1976	288845	No	30				
1972	424391	Yes	51	3	20		
2004	348651	Yes	40				
1983	375641	Yes	42				
1983	375632	Yes	42				
1984	383856	No	40				
1984	375624	Yes	40				
1983	347400	No	33				
1984	375659	Yes	65				
1983	375667	No	42				
1983	375675	Yes	40				
1984	383864	No	40				
1983	375683	Yes	42				
1985	383872	No	34				
1983	348449	No	40				
1984	383759	Yes	51				
1976	296716	No	40				
2000	348732	Yes	40				
1984	346110	No	32				
1980	296627	No	57				
1982	296601	No	158				
1984	296597	No	170				

Table 20A
Hydraulic Conductivity and Grain Size Summary
North Pole Refinery
Flint Hills Resources, LLC

Boring	Sample ID	Sample Depth (ft)	Blow Count	Relative Density Classification	Grain Size Analysis								Soil Type	Hazen			Prugh		
					Gravel Content (%)	Sand Content (%)	Fines Content (%)	D_{10} (mm)	D_{20} (mm)	D_{50} (mm)	D_{60} (mm)	Cu		K D10 (m/s)	K D10 (cm/s)	K D10 (ft/day)	K D50 (m/s)	K D50 (cm/s)	K D50 (ft/day)
MW-144BR	S-17	92'-95'	29	D	48.0	50.9	1.1	2.220	2.800	4.570	5.870	2.60	SP	4.93E-02	4.93E+00	9.70E+00			
MW-148D	S-13	150'-152'	50 for 6"	VD	22.0	72.8	5.2	0.110	0.180	0.280	0.350	3.10	SP-SM	1.21E-04	1.21E-02	2.38E-02	1.50E-04	1.50E-02	2.95E-02
MW-151C	S-151C-1	15' - 16.5'	14	MD	52.0	43.5	4.5	0.150	0.220	5.40	9.740	64.10	GP	2.25E-04	2.25E-02	4.43E-02			
MW-151C	S-151C-2	25' - 26.5'	23	MD	0.0	94.0	6.0	0.100	0.170	0.610	4.430	44.30	SP-SM	1.00E-04	1.00E-02	1.97E-02			
MW-151C	S-151C-3	40' - 41.5'	24	MD	2.0	95.3	2.7	0.110	0.160	0.220	0.250	2.20	SP	1.21E-04	1.21E-02	2.38E-02	1.50E-03	1.50E-01	2.95E-01
MW-152C	S-4	60'-62'	20	MD	55.0	39.7	5.3	0.190	0.370	5.800	8.690	46.00	GP-GM	3.61E-04	3.61E-02	7.11E-02			
MW-153	S-3	59' - 60'	50/3"	D	47.0	48.4	4.6	0.160	0.230	3.070	7.290	46.70	SP	2.56E-04	2.56E-02	5.04E-02			
MW-154B	S-154-1	75' 76.5'	22	MD	43.0	36.7	6.3	0.110	0.190	2.340	5.730	50.70	SP-SM	1.21E-04	1.21E-02	2.38E-02			
MW-154B	S-154-2	90' - 91.5'	30	MD	0.0	94.7	5.3	0.160	0.250	2.190	4.360	27.50	SP-SM	2.56E-04	2.56E-02	5.04E-02			
MW-154B	S-154-3	103.5' - 104'	50/6"	D	0.0	85.6	14.4	0.020	0.160	2.500	4.440	227.50	SM	4.00E-06	4.00E-04	7.87E-04			
MW-156B	S-156-1	20' - 21.5'	28	MD	51.0	43.4	5.6	0.130	0.230	4.940	8.270	62.40	GP-GM	1.69E-04	1.69E-02	3.33E-02			
MW-156B	S-156-2	55' - 56'	50	D	48.0	46.8	5.2	0.140	0.230	3.160	6.960	51.50	GP-GM	1.96E-04	1.96E-02	3.86E-02			
MW-157B	S-2	25'-27'	22	MD	38.0	56.1	5.9	0.130	0.190	0.590	3.340	25.90	SP-SM	1.69E-04	1.69E-02	3.33E-02			
MW-158B	S-12	60' - 60.5'	50/5"	D	56.0	41.1	2.9	0.250	0.330	5.880	8.550	34.20	GP	6.25E-04	6.25E-02	1.23E-01			
MW-159C	S-7	70'-72'	26	MD	42.0	54.1	3.9	0.170	0.270	2.470	5.140	30.00	SP	2.89E-04	2.89E-02	5.69E-02			
MW-160B	S-160-1	20' - 21'	18	MD	0.0	96.3	3.7	0.150	0.180	0.280	0.310	2.10	SP	2.25E-04	2.25E-02	4.43E-02	3.30E-03	3.30E-01	6.50E-01
MW-160B	S-160-2	38' - 39.5'	19	MD	59.0	38.4	2.6	0.370	0.640	6.840	9.900	26.70	GW	1.37E-03	1.37E-01	2.69E-01			
MW-160B	S-160-3	55' - 56.5'	19	MD	69.0	28.3	2.7	0.230	0.620	9.370	11.990	51.90	GP	5.29E-04	5.29E-02	1.04E-01			
MW-160B	S-160-4	70' - 71.5'	22	MD	64.0	33.3	2.7	0.270	0.820	9.760	13.600	50.00	GW	7.29E-04	7.29E-02	1.44E-01			
MW-160B	S-160-5	90' - 91.5'	59	D	44.0	50.9	5.1	0.160	0.270	2.860	5.990	37.80	SP-SM	2.56E-04	2.56E-02	5.04E-02			
MW-161B	S-11	50' - 51.5'	77	D	74.0	24.6	1.4	0.320	2.710	10.910	14.210	44.20	GP	1.02E-03	1.02E-01	2.02E-01			
MW-162B	S-162-1	10' - 12'	26	MD	44.0	52.7	3.3	0.160	0.210	2.250	6.060	37.50	SP	2.56E-04	2.56E-02	5.04E-02			
MW-162B	S-162-2	30' - 32'	34	D	60.0	34.7	5.3	0.150	0.280	7.650	11.570	78.20	GP-GM	2.25E-04	2.25E-02	4.43E-02			
MW-162B	S-162-3	55' - 56.5'	20	MD	62.0	35.4	2.6	0.220	0.770	7.460	10.350	46.50	GP	4.84E-04	4.84E-02	9.53E-02			
MW-162B	S-162-4	65' - 66.1'	66	D	63.0	30.5	6.5	0.140	0.370	9.240	13.600	95.20	GW-GM	1.96E-04	1.96E-02	3.86E-02			
MW-163B	S	40' - 41.5'	50/2"	D	38.0	54.8	7.2	0.120	0.190	0.410	3.190	26.10	SP-SM	1.44E-04	1.44E-02	2.83E-02			
MW-164B	S	50' - 51.5'	18	MD	66.0	30.9	3.1	0.240	0.540	9.770	12.360	51.60	GP	5.76E-04	5.76E-02	1.13E-01			
MW-164C	S-1	50'-51.5'	19	MD	59.0	36.4	4.6	0.180	0.320	7.100	11.080	62.00	GP	3.24E-04	3.24E-02	6.38E-02			
MW168B	S-5	50'-52'	41	D	51.0	45.1	3.9	0.180	0.290	5.030	7.690	43.40	GP	3.24E-04	3.24E-02	6.38E-02			
MW-169B	S-1	50' - 51.5'	64	D	60.0	36.0	4.0	0.180	0.370	7.630	11.660	63.90	GW	3.24E-04	3.24E-02	6.38E-02			
MW-169C	S-1	60'-61.5	14	MD	68.0	30.1	1.9	0.190	0.380	10.370	15.450	82.00	GP	3.61E-04	3.61E-02	7.11E-02			
MW-170C	S-170C-3	55' - 56.5'	41	D	58.0	37.0	5.0	0.170	0.450	6.450	9.350	55.70	GP	2.89E-04	2.89E-02	5.69E-02			
MW-170C	S-170C-4	80' - 81.5'	26	MD	54.0	37.3	8.7	0.080	0.150	6.130	10.700	132.50	GP-GM	6.40E-05	6.40E-03	1.26E-02			
MW-170C	S-170C-5	95' - 96.5'	30	D	8.0	84.8	7.2	0.090	0.160	0.260	0.300	3.30	SP-SM	8.10E-05	8.10E-03	1.59E-02	1.05E-03	1.05E-01	2.07E-01
MW-170D	S-1	50' - 51.5'	31	D	68.0	27.2	4.8	0.180	0.400	11.620	15.830	86.60	SP	3.24E-04	3.24E-02	6.38E-02			
MW-174B	S-14	90' - 91.5'	32	D	33.0	60.1	6.9	0.120	0.250	2.040	3.350	28.10	SP-SM	1.44E-04	1.44E-02	2.83E-02			
MW-176A	S-1	15' - 16.5'	12	MD	61.0	36.0	3.0	0.180	0.390	7.830	11.380	62.70	GW	3.24E-04	3.24E-02	6.38E-02			
MW-176B	S-2	50' - 51.5'	13	MD	80.0	18.9	1.1	0.750	4.520	13.240	17.780	23.60	GP	5.63E-03	5.63E-01	1.11E+00			
MW-176C	Sample	90' - 91.5'	33	D	45.0	51.0	4.0	0.190	0.270	3.250	6.500	34.50	SP	3.61E-04	3.61E-02	7.11E-02			
MW-177	S-14	90' - 91.5'	22	MD	14.0	80.2	5.8	0.110	0.340	0.280	0.330	3.10	GP	1.21E-04	1.21E-02	2.38E-02	2.04E-03	2.04E-01	4.02E-01
MW-178C	S-14	90' - 91.5'	43	D	57.0	40.3	2.7	0.210	0.170	6.770	10.590	50.50	GP	4.41E-04	4.41E-02	8.68E-02			
MW-179C	S-14	90' - 91.5'	28	MD	57.0	39.9	3.1	0.270	0.760	6.370	9.790	35.60	GW	7.29E-04	7.29E-02	1.44E-01			
MW-179D	S-4A	130'-131.1'	47	D	5.0	78.8	6.2	0.090	0.170	0.210	0.240	2.60	SP-SM	8.10E-05	8.10E-03	1.59E-02	9.50E-05	9.50E-03	1.87E-02
MW-181A	Sample	15' - 16.5'	14	MD	48.0	50.3	1.7	0.190	0.300	4.030	6.800	35.20	SP	3.61E-04	3.61E-02	7.11E-02			
MW-181B	Sample	50' - 51.5'	34	D	43.0	53.5	3.5	0.160	0.210	2.250	6.160	38.40	SP	2.56E-04	2.56E-02	5.04E-02			
MW-181C	S-10	150'-152'	32	D	38.0	57.6	4.4	0.170	0.290	1.590	4.030	23.10	SP	2.89E-04	2.89E-02	5.69E-02			
MW-182	S-1	15' - 16.5'	5	L	34.0	61.4	4.6	0.130	0.180	0.400	2.470	19.70	GP	1.69E-04	1.69E-02	3.33E-02			
MW-183	S-1	15' - 16.5'	6	L	18.0	76.4	5.6	0.100	0.160	0.280	0.340	3.40	SP-SM	1.00E-04	1.00E-02	1.97E-02	2.50E-03	2.50E-01	4.92E-01
MW-183B	S-4B	58'-59.5'	50 for 6"	VD	59.0	34.8	6.2	0.120	0.330	7.100	10.590	87.70	GW-GM	1.44E-04	1.44E-02	2.83E-02			
MW-184	S-1	44' - 44.5'	50/1"	D	26.0	68.4	5.6	0.140	0.210	0.350	0.410	3.00	SP-SM	1.96E-04	1.96E-02	3.86E-02	3.30E-02	3.30E+00	6.50E+00
MW-185A	S-1	15' - 16.5'	10	L	46.0	52.7	1.3	0.180	0.250	2.270	6.960	37.90	SP	3.24E-04	3.24E-02	6.38E-02			
MW-185B	S-1	50' - 51.5'	21	MD	47.0	50.0	3.0	0.170	0.240	3.450	6.460	38.60	SP	2.89E-04	2.89E-02	5.69E-02			

Table 20A
Hydraulic Conductivity and Grain Size Summary
North Pole Refinery
Flint Hills Resources, LLC

Boring	Sample ID	Sample Depth (ft)	Blow Count	Relative Density Classification	Grain Size Analysis								Soil Type	Hazen			Prugh		
					Gravel Content (%)	Sand Content (%)	Fines Content (%)	D_{10} (mm)	D_{20} (mm)	D_{50} (mm)	D_{60} (mm)	Cu		K D10 (m/s)	K D10 (cm/s)	K D10 (ft/day)	K D50 (m/s)	K D50 (cm/s)	K D50 (ft/day)
MW-185C	S-8	120'-122'	72	VD	28.0	67.3	4.7	0.150	0.200	0.370	0.680	4.40	SP	2.25E-04	2.25E-02	4.43E-02	1.10E-04	1.10E-02	2.17E-02
MW-186	B-1	10' - 11.5'	4	L	72.0	25.3	2.7	0.380	2.640	7.560	9.330	24.40	GP	1.44E-03	1.44E-01	2.84E-01			
MW-186	B-2	20' - 21.5'	5	L	74.0	24.1	1.9	0.240	2.680	10.800	13.620	55.90	GP	5.76E-04	5.76E-02	1.13E-01			
MW-186	B-3	30' - 31.5'	16	MD	57.0	38.6	4.4	0.160	0.280	6.470	9.990	61.10	GP	2.56E-04	2.56E-02	5.04E-02			
MW-186	B-4	40' - 41.5'	10	L	76.0	22.5	1.5	0.450	3.260	12.360	16.640	37.30	GP	2.03E-03	2.03E-01	3.99E-01			
MW-186	B-5	50' - 51.5'	23	MD	74.0	23.5	2.5	0.330	2.700	12.030	17.500	53.60	GP	1.09E-03	1.09E-01	2.14E-01			
MW-186	B-6	60' - 61.5'	59	D	51.0	44.8	4.2	0.160	0.240	4.920	7.650	47.70	GP	2.56E-04	2.56E-02	5.04E-02			
MW-186C	S-1	100' - 101.5'	41	D	53.0	42.2	4.8	0.200	0.730	5.440	8.080	40.20	GW	4.00E-04	4.00E-02	7.87E-02			
MW-186D	S-2	130'-131.5'	44	D	46.0	48.0	6.0	0.180	0.310	3.960	5.980	32.50	Sw-SM	3.24E-04	3.24E-02	6.38E-02			
MW-187	S-1	15' - 16.5'	29	MD	55.0	40.8	4.2	0.180	0.300	5.780	8.660	49.50	GP	3.24E-04	3.24E-02	6.38E-02			
MW-189A	S-1	15'-17'	21	MD	63.0	33.6	3.4	0.190	0.600	8.080	11.180	58.80	GP	3.61E-04	3.61E-02	7.11E-02			
MW-189B	S-12	60'-61.5'	44	D	46.0	50.1	3.9	0.170	0.270	2.960	6.540	38.10	SP	2.89E-04	2.89E-02	5.69E-02			
MW-190A	S-1	14'-15.5'	11	MD	54.0	42.4	3.6	0.170	0.290	5.680	9.130	53.80	GP	2.89E-04	2.89E-02	5.69E-02			
MW-190B	S-10	60'-61.5'	21	MD	42.0	54.2	3.8	0.150	0.210	2.300	5.390	37.10	SP	2.25E-04	2.25E-02	4.43E-02			
MW-191A	S-1	13'-15'	20	MD	59.0	36.3	4.7	0.160	0.290	6.900	10.160	62.50	GP	2.56E-04	2.56E-02	5.04E-02			
MW-191B	S-10	60'-61.5'	60	VD	56.0	38.6	5.4	0.150	0.300	6.040	8.870	58.20	GW-GM	2.25E-04	2.25E-02	4.43E-02			
MW-193A	S-8	15'-17'	2	VL	0.0	62.5	37.5	0.030	0.044	0.100	0.130	3.90	SM	9.00E-06	9.00E-04	1.77E-03	2.00E-05	2.00E-03	3.94E-03
MW-193B	S-10	58'-60'	50 for 6"	VD	5.0	90.5	4.5	0.160	0.220	0.330	0.380	2.40	SP	2.56E-04	2.56E-02	5.04E-02	1.90E-04	1.90E-02	3.74E-02
MW-194B	S-6	11'-13'	18	MD	51.0	43.4	5.6	0.150	0.310	4.910	7.290	47.70	GP-GM	2.25E-04	2.25E-02	4.43E-02			
MW-194B	S-8	30'-31.5'	19	MD	70.0	24.0	6.0	0.150	1.100	13.080	17.730	122.10	GP-GM	2.25E-04	2.25E-02	4.43E-02			
MW-195	S-8	14'-16'	17	MD	1.0	90.8	8.2	0.080	0.130	0.190	0.210	2.70	SP-SM	6.40E-05	6.40E-03	1.26E-02	1.40E-04	1.40E-02	2.76E-02
MW-195B	MW-195B-150-150-151	150'-151'	72	VD	46.0	47.1	6.9	0.130	0.310	3.740	6.070	45.50	SP-SM	1.69E-04	1.69E-02	3.33E-02			
MW-196	S-8	14'-16'	21	MD	51.0	45.1	3.9	0.150	0.230	5.070	9.520	62.00	GP	2.25E-04	2.25E-02	4.43E-02			
MW-197B	S-12	150'-152'	50-6"	VD	58.0	35.2	6.8	0.130	0.340	6.500	9.710	75.40	GW-GM	1.69E-04	1.69E-02	3.33E-02			
MW-198	S-8	150'-152'	34	D	27.0	67.9	5.1	0.160	0.250	0.560	0.820	5.20	SP-SM	2.56E-04	2.56E-02	5.04E-02	1.10E-03	1.10E-01	2.17E-01
MW-199	S-10-(PF-2)	150'-151.5'	37	D	46.0	47.2	6.8	0.130	0.290	3.400	6.390	48.00	SP-SM	1.69E-04	1.69E-02	3.33E-02			
MW-300	MW-300-150-150-151	150'-150.5'	50-6"	VD	41.0	50.2	8.8	0.090	0.200	1.680	5.080	53.80	SP-SM	8.10E-05	8.10E-03	1.59E-02			
MW-302-110	S-7	110'-112'	39	D	43.0	47.1	9.9	0.080	0.270	2.580	5.390	70.50	SP-SM	6.40E-05	6.40E-03	1.26E-02			
MW-302-70	S-302-70-1	65'67'	33	D	60.0	32.8	7.2	0.130	0.280	8.360	13.010	102.40	GW-GM	1.69E-04	1.69E-02	3.33E-02			
MW-302-80	S-302-80-1	75'-77'	19	MD	62.0	32.0	6.0	0.140	0.270	9.390	13.880	97.90	SM	1.96E-04	1.96E-02	3.86E-02			
MW-303-130	S-9A	130'-131'	50 for 5"	VD	47.0	48.3	4.7	1.600	0.270	3.460	6.610	40.30	SP	2.56E-02	2.56E+00	5.04E+00			
MW-303-130	S-9B	131'-132'	50 for 5"	VD	36.0	50.0	14.0	0.040	0.180	0.840	3.290	90.50	SM	1.60E-05	1.60E-03	3.15E-03			
MW-303-70	S-1&2	65'-67'&70'-72'	20&16	MD&MD	49.0	45.5	5.5	0.170	0.300	4.440	6.820	39.90	GP-GM	2.89E-04	2.89E-02	5.69E-02			
MW-303-80	S-303-80-1	75'-77'	57	VD	38.0	49.4	12.6	0.040	0.170	0.810	3.770	85.00	SM	1.60E-05	1.60E-03	3.15E-03			
MW-304-150	S-2	150'-152'	46	D	52.0	39.3	8.7	0.100	0.310	5.140	7.960	83.60	GW-GM	1.00E-04	1.00E-02	1.97E-02			
MW-304-70	S-1	65'-67'	48	D	58.0	35.3	6.7	0.150	0.340	6.820	10.630	72.80	GW-GM	2.25E-04	2.25E-02	4.43E-02			
MW-304-80	S-304-80-1	75'-77'	29	MD	56.0	37.6	6.4	0.150	0.300	6.420	10.220	69.40	GP	2.25E-04	2.25E-02	4.43E-02			
MW-305-80	MW-305-80-1	75'-77'	30	Md	55.0	37.6	7.4	0.120	0.320	5.950	9.580	79.30	GP	1.44E-04	1.44E-02	2.83E-02			
MW-305A	S-6	100'-102'	39	D	44.0	51.7	4.3	0.150	0.240	3.020	5.820	38.40	SP	2.25E-04	2.25E-02	4.43E-02			
MW-306-70	S-14	70'-72'	66	VD	30.0	64.4	5.6	0.130	0.190	0.390	0.920	7.20	SP-SM	1.69E-04	1.69E-02	3.33E-02	3.50E-04	3.50E-02	6.89E-02
MW-306-70	S-306-70-1	65'-67'	21	MD	49.0	45.7	5.3	0.160	0.410	4.500	6.300	40.50	GW-GM	2.56E-04	2.56E-02	5.04E-02			
MW-306-80	S-306-80-1	75'-77'	32	D	66.0	28.0	6.0	0.150	0.370	10.280	14.180	96.10	SM	2.25E-04	2.25E-02	4.43E-02			
MW-306A	S-150	150'-152'	61	VD	45.0	49.9	5.1	0.160	0.290	3.090	5.750	35.10	SP-SM	2.56E-04	2.56E-02	5.04E-02			
MW-307	S-9	110.0'-111.5'	35	D	47.0	45.0	8.0	0.110	0.280	3.820	5.960	54.20	GP-GM	1.21E-04	1.21E-02	2.38E-02			
O-1	S-5	15' - 16.5'	46	D	61.0	33.8	5.2	0.160	0.310	8.630	12.670	81.30	GW-GM	2.56E-04	2.56E-02	5.04E-02			
O-2	S-5	15' - 16.5'	7	L	62.0	34.3	3.7	0.180	0.340	6.920	9.560	53.60	GW	3.24E-04	3.24E-02	6.38E-02			
O-3	S-5	15' - 16.5'	4	L	0.0	55.1	44.9	0.030	0.040	0.080	0.100	3.60	SM	9.00E-06	9.00E-04	1.77E-03	3.50E-04	3.50E-02	6.89E-02
O-4	S-5	15' - 16.5'	19	MD	28.0	69.3	2.7	0.150	0.200	0.360	0.420	2.70	SP	2.25E-04	2.25E-02	4.43E-02	3.70E-03	3.70E-01	7.28E-01
O-11	S-8	14'-16'	13	MD	61.0	36.4	2.6	0.200	0.390	7.670	11.080	56.70	GW	4.00E-04	4.00E-02	7.87E-02			
O-13	PO-7	12'-15.2'	33	D	66.0	27.4	6.6	0.110	0.320	9.510	12.810	117.20	GP-GM	1.21E-04	1.21E-02	2.38E-02			
O-14	PO-11-12	10'-14'	28	MD	57.0	38.1	4.9	0.150	0.260	6.190	8.920	59.20	GP	2.25E-04	2.25E-02	4.43E-02			
O-15	PO-14	10'-14'	18	MD	66.0	32.2	1.8	0.210	0.600	9.950	14.040	68.40	GP	4.41E-04	4.41E-02	8.68E-02			

Table 20A
Hydraulic Conductivity and Grain Size Summary
North Pole Refinery
Flint Hills Resources, LLC

Boring	Sample ID	Sample Depth (ft)	Blow Count	Relative Density Classification	Grain Size Analysis								Soil Type	Hazen			Prugh		
					Gravel Content (%)	Sand Content (%)	Fines Content (%)	D_{10} (mm)	D_{20} (mm)	D_{50} (mm)	D_{60} (mm)	Cu		K D10 (m/s)	K D10 (cm/s)	K D10 (ft/day)	K D50 (m/s)	K D50 (cm/s)	K D50 (ft/day)
O-16	S-6	10'-14'	21	MD	56.0	40.0	4.0	0.160	0.280	6.480	10.090	61.40	GP	2.56E-04	2.56E-02	5.04E-02			
O-17	S-8	14'-16'	15	MD	48.0	48.7	3.3	0.170	0.290	4.130	6.230	36.00	GP	2.89E-04	2.89E-02	5.69E-02			
O-18	S-7	14'-15'	31	D	50.0	44.2	5.8	0.110	0.200	4.500	7.620	69.10	GP-GM	1.21E-04	1.21E-02	2.38E-02			
O-20	S-8	14'-16'	28	MD	52.0	40.2	7.8	0.100	0.240	3.950	6.500	67.10	GP-GM	1.00E-04	1.00E-02	1.97E-02			
O-21	S-8	14'-16'	30	D	59.0	33.7	7.3	0.090	0.180	3.530	8.170	89.60	GP-GM	8.10E-05	8.10E-03	1.59E-02			

Notes:

nc	K D10 (Hazen) not calculable
-	Not determined
L	Loose
MD	Medium dense
D	Dense
VD	Very Dense

Table 20B
Hydrogeologic Parameters Measured at the Transect
North Pole Refinery
Flint Hills Resources, LLC

Sample	Depth	METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		API RP 40	API RP 40; ASTM D5084; EPA 9100		ASTM D425M
		Sample	Moisture	Density		Porosity, %Vb (2)		Total Pore Fluid	Effective (4,5)	Hydraulic	Porosity, percent bulk volume
		Orientation	Content	Bulk	Grain		Air	Saturations (3),	Permeability to Water	Conductivity (4,5),	Effective
ID.	ft.	(1)	% weight	g/cc	g/cc	Total	Filled	% Pv	millidarcy	(cm/s) / (ft/day)	
MW-306-70	10'-12'	V	12.1	1.94	2.67	27.1	3.6	86.6	82.99	8.61E-05 / 230	17.3

(1) Sample Orientation: H = horizontal; V = vertical
(2) Total Porosity = no pore fluids in place; all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids
(3) Water = 0.9996 g/cc
(4) Native State or Effective = With as-received pore fluids in place
(5) Permeability to water and hydraulic conductivity measured at saturated conditions
(6) Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

Table 21
Summary of Single Well Pumping Test Analyses
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Name	Well Depth (fbgs)	Transmissivity[1] (ft^2/d)	Screen Top (ft BGS)	Screen Bottom (feet BGS)	Saturated Screen Length[2] (ft)	Hydraulic Conductivity (ft/d)
MW-101	61	645	56	61	5	130
MW-101A	23	627	17.8	22.8	5	130
MW-102	71.5	503	61.5	71.5	10	50
MW-118	43	1365	38.5	43	4.5	300
MW-127	24.5	1096	20	24.5	4.5	240
MW-131	24.5	1360	20	24.5	4.5	300
MW-139[3]	25	2610	5.7	25	14	190
MW-143[3]	19.5	7231	4.7	19.5	10	720
MW-144A[3]	24.7	1039	5.7	24.7	14	74
MW-144B	90	1840	84.9	89.5	4.6	400
MW-154A	75.5	42960	71	75	4	10,700
MW-154B	95	1405	90.2	94.8	4.6	310
MW-186B	60.8	1045	50.7	60.4	9.7	110
MW-186C	100.8	4035	90.7	100.3	9.6	420
Geometric Mean of the Hydraulic Conductivites (all tests)						270
Geometric Mean of the Hydraulic Conductivites (excluding MW-154A)						200
Minimum Hydraulic Conductivity						50
Maximum Hydraulic Conductivity						10,700
Standard Deviation of Hydraulic Conductivity (all tests)						2,800
Standard Deviation of Hydraulic Conductivity (excluding MW-154A)						180

Notes:
fbgs = feet below ground surface.
ft^2/d = squared feet per da
ft/d = feet per day.
1 - Estimated from AQTESOLV using the Theis solution.
2 - Based on static water level and well construction information.
3 - Estimate based on Theis unconfined analysis.

Table 22
Summary of Pumping Rates During the 2011 Recovery System Aquifer Testing
North Pole Refinery
Flint Hills Resources Alaska, LLC

Recovery Well	Time of Shutdown on 8/30/11	Average Pumping Rate before Shutdown (gpm)	Time of Startup on 8/31/11	Average Pumping Rate after Startup (gpm)
R-21	10:09	61.3	10:15	100.7
R-35R	10:05	77	10:21	77.3
R-39	10:07	87	10:22	92.3
R-40	10:06	85.5	10:21	87.6
R-42	10:08	115.3	10:16	112.8

Table 23
Summary of Aquifer Parameter Estimates from the 2011 Recovery Well Pumping Test
North Pole Refinery
Flint Hills Resources Alaska, LLC

Observation Wells	Parameter					Appendix T Figure showing solution
	T (m^2/day)	S (unitless)	Sy (unitless)	Kz/Kr (unitless)	Kx (m/day)	
Recovery and Pumping Phases						
MW-186A, MW-186B, MW-186C	1.86E+04	1.53E-05	0.029	0.062	410	1
Other observation wells combined with MW-186b and MW-186c						
MW-111, MW-186B, MW-186C	2.04E+04	1.53E-05	0.024	0.04	450	2
MW-113, MW-186B, MW-186C	2.00E+04	1.50E-05	0.016	0.011	440	3
MW-125, MW-186B, MW-186C	1.88E+04	1.50E-05	0.022	0.014	410	4
MW-130, MW-186B, MW-186C	1.94E+04	1.50E-05	0.022	0.023	420	5
MW-135, MW-186B, MW-186C	1.90E+04	1.50E-05	0.025	0.03	420	6
O-2, MW-186b, MW-186c	1.62E+04	1.50E-03	0.032	0.054	350	7
Other observation wells combined with MW-186b						
MW-111, MW-186B	1.75E+04	1.50E-03	0.027	0.28	380	8
MW-113, MW-186B	1.86E+04	1.50E-05	0.018	0.015	410	9
MW-125, MW-186B	1.76E+04	1.50E-05	0.023	0.017	380	10
MW-130, MW-186B	1.73E+04	1.50E-05	0.022	0.04	380	11
MW-135, MW-186B	1.65E+04	1.50E-03	0.022	0.058	360	12
O-2, MW-186B	1.43E+04	1.50E-03	0.021	1	310	13
Pumping Phase with correction for continued recovery						
MW-186A, MW-186B, MW-186C	2.06E+04	1.50E-05	0.017	0.066	450	14
Mean value	1.82E+04		0.023	0.122	398	
Minimum Value	1.43E+04		0.016	0.011	310	
Maximum Value	2.06E+04		0.032	1	450	
With recharge boundary at Tanana River (for discussion purposes only)						
186ac	1.80E+04	1.50E-05	0.049	0.05	450	15

Table 24
Single Well Tracer Test Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well ID	Measured Well Depth (ft btoc)	Screen Length (ft)	2011 Hydraulic Conductivity Values from Single Well Pump Tests (ft/day)[1]	Aquifer Flux from SWTTs (q_A) (ft/day)
MW-101	64.59	5	12	0.022 - 0.23*
MW-101A	27.79	5	49	0.36
MW-102	68.15	10	9	*NC*
MW-131	26.66	4.5	94	0.046 - 0.14*
MW-139	26.95	19.3	190	0.17
MW-142	22.49	14	*NA*	0.04
MW-143	22.85	14.8	740	0.06
MW-144A	25.81	19	65	0.01
MW-145	22.82	14.3	*NA*	0.02
MW-150A	10.46	4.4	*NA*	0.01
MW-151A	14.64	5	*NA*	0.12
MW-152A	15.76	4.4	*NA*	0.066
MW-154A	78.38	4	670	0.009 - 0.14*
MW-154B	97.57	4.6	17	0.007 - 0.12*
MW-155A	14.21	9.7	*NA*	0.039
MW-170A	14.51	9.8	*NA*	0.044

Notes:
NA: Not available
NC: Test not complete
*: Well column was likely not fully mixed, therefore, a range of estimates are provided.
[1]: Single well pump tests were conducted during Additional Site Characterization Activities in 2011.

Table 25
Groundwater Elevation and LNAPL Thickness, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Location	Riser Elevation (ft MSL)	Apparent LNAPL Thickness (ft)	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft) MSL)
10/21/2011	MW-101	494.44	–	–	11.43	483.01
10/21/2011	MW-101A	495.93	–	–	12.92	483.01
10/21/2011	MW-102	495.94	–	–	12.85	483.09
10/21/2011	MW-104	496.01	–	–	12.84	483.17
10/21/2011	MW-106	499.21	–	–	15.01	484.20
10/21/2011	MW-109	495.17	–	–	10.49	484.68
10/21/2011	MW-110	496.64	–	–	12.21	484.43
10/21/2011	MW-111	493.53	–	–	9.56	483.97
10/21/2011	MW-113	494.38	–	–	10.71	483.67
10/21/2011	MW-115	495.88	0.08	10.84	10.92	485.03
10/21/2011	MW-116	496.19	–	–	11.25	484.94
10/21/2011	MW-118	496.90	–	–	13.31	483.59
10/21/2011	MW-124	497.12	–	–	13.37	483.75
10/21/2011	MW-125	497.15	–	–	13.56	483.59
10/21/2011	MW-126	495.55	–	–	12.05	483.50
10/21/2011	MW-127	496.36	–	–	13.06	483.30
10/21/2011	MW-129	496.06	–	–	12.32	483.74
10/21/2011	MW-130	496.87	–	–	13.02	483.85
10/21/2011	MW-131	495.69	–	–	12.59	483.10
10/21/2011	MW-132	499.44	–	–	14.99	484.45
10/21/2011	MW-133	498.36	–	–	13.88	484.48
10/21/2011	MW-134	497.79	–	–	12.71	485.08
10/21/2011	MW-135	496.93	–	–	13.24	483.69
10/21/2011	MW-137	497.45	–	–	13.36	484.09
10/21/2011	MW-138	496.34	0.93	11.14	12.07	485.04
12/7/2011**	MW-138	496.34	N/A	N/A	N/A	N/A
10/21/2011	MW-139	497.18	–	–	13.80	483.38
10/21/2011	MW-140	494.85	–	–	11.60	483.25
10/21/2011	MW-141	492.39	–	–	9.41	482.98
10/21/2011	MW-142	496.08	–	–	12.85	483.23
10/21/2011	MW-143	495.23	–	–	12.05	483.18
10/21/2011	MW-144A	495.25	–	–	11.68	483.57
10/21/2011	MW-144BR	494.99	–	–	11.40	483.59
10/21/2011	MW-145	495.61	–	–	11.90	483.71
10/21/2011	MW-146A	495.07	–	–	11.97	483.10
10/21/2011	MW-146B	494.95	–	–	11.85	483.10
10/21/2011	MW-147A	491.90	–	–	9.07	482.83
10/21/2011	MW-147B	492.57	–	–	9.76	482.81
10/21/2011	MW-148A	492.99	–	–	10.48	482.51
10/21/2011	MW-148B	493.25	–	–	10.91	482.34
10/21/2011	MW-149A	493.65	–	–	11.36	482.29
10/21/2011	MW-149B	493.34	–	–	11.01	482.33
10/21/2011	MW-150A	487.03	–	–	6.14	480.89
10/21/2011	MW-150B	487.20	–	–	6.32	480.88
10/21/2011	MW-151A	487.09	–	–	5.81	481.28
10/21/2011	MW-151B	487.07	–	–	5.83	481.24
10/21/2011	MW-151C	491.02	–	–	9.67	481.35

Table 25
Groundwater Elevation and LNAPL Thickness, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Location	Riser Elevation (ft MSL)	Apparent LNAPL Thickness (ft)	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft) MSL)
10/21/2011	MW-152A	488.40	–	–	7.04	481.36
10/21/2011	MW-152B	488.00	–	–	6.70	481.30
10/21/2011	MW-153A	490.17	–	–	7.91	482.26
10/21/2011	MW-153B	489.73	–	–	7.45	482.28
10/21/2011	MW-154A	497.99	–	–	14.63	483.36
10/21/2011	MW-154B	497.68	–	–	14.35	483.33
10/21/2011	MW-155A	488.16	–	–	7.89	480.27
10/21/2011	MW-155B	488.21	–	–	7.90	480.31
10/21/2011	MW-156A	485.83	–	–	7.07	478.76
10/21/2011	MW-156B	489.29	–	–	10.47	478.82
10/21/2011	MW-157	485.00	–	–	6.95	478.05
10/22/2011	MW-158A	487.83	–	–	7.63	480.20
10/22/2011	MW-158B	487.38	–	–	7.16	480.22
10/22/2011	MW-159	488.42	–	–	8.06	480.36
10/21/2011	MW-160B	485.53	–	–	7.22	478.31
10/21/2011	MW-161A	479.42	–	–	6.95	472.47
10/21/2011	MW-161B	479.58	–	–	7.10	472.48
10/21/2011	MW-162A	483.94	–	–	8.43	475.51
10/21/2011	MW-162B	484.12	–	–	8.67	475.45
10/22/2011	MW-163A	485.05	–	–	9.61	475.44
10/22/2011	MW-163B	485.16	–	–	9.73	475.43
10/21/2011	MW-164A	480.01	–	–	7.36	472.65
10/21/2011	MW-164B	479.35	–	–	6.64	472.71
10/21/2011	MW-164C	479.50	–	–	6.78	472.72
10/21/2011	MW-165A	475.07	–	–	7.08	467.99
10/21/2011	MW-165B	474.78	–	–	6.69	468.09
10/21/2011	MW-166A	474.92	–	–	8.69	466.23
10/21/2011	MW-166B	475.11	–	–	8.89	466.22
10/21/2011	MW-167A	475.68	–	–	9.60	466.08
10/21/2011	MW-167B	475.82	–	–	9.73	466.09
10/21/2011	MW-168	478.27	–	–	9.29	468.98
10/21/2011	MW-169A	486.13	–	–	10.09	476.04
10/21/2011	MW-169B	485.95	–	–	9.87	476.08
10/22/2011	MW-169C	482.57	–	–	6.45	476.12
10/21/2011	MW-170A	490.82	–	–	9.34	481.48
10/21/2011	MW-170B	490.72	–	–	9.19	481.53
10/21/2011	MW-170C	490.85	–	–	9.30	481.55
10/21/2011	MW-170D	490.39	–	–	8.86	481.53
10/21/2011	MW-171A	484.68	–	–	8.98	475.70
10/21/2011	MW-171B	484.69	–	–	9.90	474.79
10/21/2011	MW-172A	475.72	–	–	7.01	468.71
10/21/2011	MW-172B	476.05	–	–	7.31	468.74
10/21/2011	MW-173A	496.16	–	–	12.54	483.62
10/21/2011	MW-173B	496.40	–	–	12.72	483.68
10/21/2011	MW-174A	494.16	–	–	9.94	484.22
10/21/2011	MW-174B	493.28	–	–	9.23	484.05
10/21/2011	MW-175	496.80	–	–	12.89	483.91

Table 25
Groundwater Elevation and LNAPL Thickness, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Location	Riser Elevation (ft MSL)	Apparent LNAPL Thickness (ft)	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft) MSL)
10/21/2011	MW-176A	496.99	3.72	11.69	15.41	484.71
10/21/2011	MW-176B	496.92	sheen	sheen	12.25	484.67
10/21/2011	MW-176C	496.84	–	–	12.13	484.71
10/21/2011	MW-177	497.90	–	–	11.99	485.91
10/21/2011	MW-178A	496.48	–	–	11.77	484.71
10/21/2011	MW-178B	496.09	–	–	11.36	484.73
10/21/2011	MW-178C	497.26	–	–	12.57	484.69
10/21/2011	MW-179A	496.94	–	–	12.17	484.77
10/21/2011	MW-179B	496.74	–	–	11.94	484.80
10/21/2011	MW-179C	497.25	–	–	12.49	484.76
10/21/2011	MW-180A	497.40	–	–	12.36	485.04
10/21/2011	MW-180B	496.86	–	–	11.86	485.00
10/21/2011	MW-180C	497.05	–	–	12.02	485.03
10/21/2011	MW-183A	478.06	–	–	7.27	470.79
10/21/2011	MW-183B	478.05	–	–	7.31	470.74
10/21/2011	MW-186A	495.95	0.39	12.28	12.67	483.60
12/2/2011	MW-186A	495.95	0.69	11.95	12.64	483.87
10/21/2011	MW-186B	495.77	–	–	12.10	483.67
10/21/2011	MW-186C	495.72	–	–	11.99	483.73
10/21/2011	MW-187	485.48	–	–	13.23	472.25
10/21/2011	MW-188	461.39	–	–	4.88	456.51
10/21/2011	MW-189A	470.20	–	–	4.89	465.31
10/21/2011	MW-189B	470.24	–	–	4.93	465.31
10/21/2011	MW-190A	481.49	–	–	8.30	473.19
10/21/2011	MW-190B	481.30	–	–	8.13	473.17
10/21/2011	MW-191A	475.61	–	–	6.53	469.08
10/21/2011	MW-191B	475.50	–	–	6.44	469.06
10/21/2011	MW-192A	495.86	–	–	10.46	485.40
10/21/2011	MW-192B	495.42	–	–	9.99	485.43
10/21/2011	MW-193A	487.61	–	–	9.21	478.40
10/21/2011	MW-193B	487.31	–	–	8.93	478.38
10/21/2011	MW-194A	475.49	–	–	8.19	467.30
10/21/2011	MW-194B	475.72	–	–	8.39	467.33
10/21/2011	O-1	497.15	–	–	12.37	484.78
12/2/2011	O-1	497.15	–	–	12.05	485.10
10/21/2011	O-2	496.84	0.62	14.25	14.87	482.47
12/7/2011	O-2	496.84	0.31	13.52	13.83	483.26
10/21/2011	O-3	497.67	–	–	14.09	483.58
12/7/2011	O-3	497.67	–	–	13.74	483.93
10/21/2011	O-4	496.47	–	–	12.95	483.52
12/2/2011	O-4	496.47	–	–	12.63	483.84
10/21/2011	O-5	496.05	–	–	12.41	483.64
12/2/2011	O-5	496.05	–	–	12.11	483.94
10/21/2011	O-6	494.52	–	–	10.64	483.88
12/2/2011	O-6	494.52	–	–	10.34	484.18
10/21/2011	O-7	495.95	0.47	11.67	12.14	484.18

Table 25
Groundwater Elevation and LNAPL Thickness, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Location	Riser Elevation (ft MSL)	Apparent LNAPL Thickness (ft)	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft) MSL)
12/7/2011	O-7	495.95	0.96	11.18	12.14	484.57
10/21/2011	O-8	496.71	–	–	11.96	484.75
12/2/2011	O-8	496.71	–	–	11.67	485.04
10/21/2011	O-9	496.89	1.34	12.10	13.44	484.55
12/7/2011**	O-9	496.89	N/A	N/A	N/A	N/A
10/21/2011	O-10	496.21	0.38	11.56	11.94	484.58
12/7/2011	O-10	496.21	0.97	11.05	12.02	484.99
10/21/2011	O-11	497.86	0.62	14.25	14.87	483.50
12/7/2011	O-11	497.86	0.82	13.89	14.71	483.83
10/21/2011	O-12	496.12	–	–	12.59	483.53
12/2/2011	O-12	496.12	–	–	12.34	483.78
10/21/2011	O-13	495.35	0.34	11.57	11.91	483.72
12/2/2011	O-13	495.35	1.40	11.30	12.70	483.81
10/21/2011	O-14	494.89	–	–	9.85	485.04
12/7/2011**	O-14	494.89	N/A	N/A	N/A	N/A
10/21/2011	O-15	498.62	–	–	13.18	485.44
12/2/2011	O-15	498.62	–	–	13.88	484.74
10/21/2011	O-16	Not surveyed	–	–	8.28	N/A
12/7/2011**	O-16	Not surveyed	N/A	N/A	N/A	N/A
10/21/2011	O-17	493.23	–	–	9.05	484.18
12/2/2011	O-17	493.23	–	–	8.74	484.49
10/21/2011	O-18	492.66	–	–	8.26	484.40
12/2/2011	O-18	492.66	–	–	7.99	484.67
10/21/2011	O-19	496.44	2.13	12.15	14.28	483.89
12/7/2011	O-19	496.44	1.56	11.85	13.41	484.29
10/21/2011	O-20	497.42	–	–	12.49	484.93
12/2/2011	O-20	497.42	–	–	12.16	485.26
10/21/2011	O-21	493.12	–	–	8.00	485.12
12/7/2011**	O-21	493.12	N/A	N/A	N/A	N/A
12/2/2011	O-22	496.73	–	–	12.29	484.44
12/2/2011	O-24	496.86	–	–	13.05	483.81
12/2/2011	O-25	497.74	–	–	14.03	483.71
12/2/2011	O-26	496.79	–	–	13.10	483.69
12/2/2011	O-27	496.84	–	–	13.04	483.80
12/2/2011	O-28	494.62	–	–	9.37	485.25
12/2/2011	O-29	498.59	–	–	13.93	484.66
10/21/2011	R-3	493.98	dry			–
10/21/2011	R-4	494.93	dry			–
10/21/2011	R-5	495.29	0.16	10.15	10.31	485.11
10/21/2011	R-14	493.99	dry			–
10/21/2011	R-14A	494.12	0.50	10.44	10.94	483.59
12/2/2011	R-14A	494.12	0.48	11.50	11.98	482.53
10/21/2011	R-18	499.67	0.77	15.40	16.17	484.11
10/21/2011	R-20R	498.77	0.01	14.29	14.30	484.48

Table 25
Groundwater Elevation and LNAPL Thickness, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Location	Riser Elevation (ft MSL)	Apparent LNAPL Thickness (ft)	Depth to LNAPL (ft)	Depth to Water (ft)	Groundwater Elevation (ft) MSL)
10/21/2011	R-21	495.53	1.88	13.28	15.16	481.90
12/2/2011	R-21	495.53	2.34	12.44	14.78	482.66
10/21/2011	R-32	494.28	1.40	9.64	11.04	484.38
10/21/2011	R-33	495.77	0.12	10.91	11.03	484.84
10/21/2011	R-34	495.15	1.51	10.63	12.14	484.24
10/21/2011	R-35R	494.74	3.53	14.12	17.65	479.87
12/7/2011**	R-35R	494.74	N/A	N/A	N/A	N/A
10/21/2011	R-38	498.65	–	–	11.01	487.64
10/21/2011	R-39	495.27	1.68	15.86	17.54	479.02
12/7/2011	R-39	495.27	0.80	16.11	16.91	478.97
10/21/2011	R-40	494.53	5.00	15.05	20.05	478.59
12/7/2011	R-40	494.53	0.02	16.51	16.53	478.02
10/21/2011	S-9	495.11	–	–	11.73	483.38
10/21/2011	S-21	497.16	1.47	12.90	14.37	483.99
12/7/2011	S–21	497.16	–	–	13.58	483.58
10/21/2011	S-22	496.70	1.94	11.94	13.88	484.41
12/7/2011**	S-22	496.70	N/A	N/A	N/A	N/A
10/21/2011	S-32	495.69	sheen	sheen	11.90	483.79
12/7/2011**	S-32	495.69	N/A	N/A	N/A	N/A
10/21/2011	S-39	497.11	0.01	12.90	12.91	484.21
12/7/2011	S-39	497.11	0.35	14.71	15.06	482.33
10/21/2011	S-43	496.13	sheen	sheen	12.29	483.84
12/7/2011	S-43	496.13	–	–	11.43	484.70
10/21/2011	S-44	495.69	2.06	11.59	13.65	483.66
12/7/2011	S-44	495.69	1.35	11.35	12.70	484.05
10/21/2011	S-50	496.67	2.33	12.42	14.75	483.88
12/2/2011	S-50	496.67	1.44	12.30	13.74	484.14
10/21/2011	S-51	495.90	2.16	11.75	13.91	483.77
12/7/2011	S-51	495.90	1.63	11.85	13.48	483.76
10/21/2011	S-54	496.98	–	–	13.87	483.11

Notes:
Measurements collected in early December 2011; November 2011 measurements not collected due to outside temperatures.

–	no visual detection of product
sheen	LNAPL not detected with air/product/water interface probe, product was detected visually
N/A	not applicable; well not surveyed at this time
ft	feet
MSL	mean sea level
**	Access unavilable for MW-138, O-14, O-16, and O-21, per NPR operator; O-9 and S-22 unable to open; S-32 sampler unable to locate; R-35R unable to measure due to active product recovery.

Table 26
2010 Soil Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

				Method	SW8270D	AK101	AK102	SW8021B					VOCs SW8260B					
				Parameter	Sulfolane	GRO	DRO	Benzene	Toluene	Ethyl-benzene	o-Xylene	p- & m-Xylenes	Benzene	Toluene	Ethyl-benzene	n-Butyl-benzene	1,3,5-Tri-methyl-benzene	4-Isopropyl-toluene
Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Cleanup Level	NCL	300	250	25	6500	6900	63000 (total)		25	6500	6900	15000	23000	NCL
				units	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
MW-144B	90-91.5	*MW-144B(90-91.5)*	9/24/10		<0.562	<2.66	<22.4	<13.3	<53.2	<53.2	<53.2	<53.2	<13.3	<53.2	<26.6	<26.6	<26.6	<26.6
MW-151C	15-16.5	*1489-021810-1511*	2/18/10		<0.587	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	25-26.5	*1489-021810-1512*	2/18/10		<0.573	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-1513*	2/18/10		<0.603	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-2513**	2/18/10		<0.614	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-154B	90-91.5	*1489-022010-1542*	2/20/10		<0.561	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-156B	20-21.5	*1489-021710-1561*	2/17/10		<0.562	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-156B	35-36.5	*1489-021710-1562*	2/17/10		<0.564	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-160B	90-91.5	*1489-021910-1605*	2/19/10		<0.559	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	10-11.5	*1489-021610-1621*	2/16/10		<0.623	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	30-31.5	*1489-021610-1622*	2/16/10		<0.582	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	55-56.5	*1489-021610-1623*	2/16/10		<0.581	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	65-66.5	*1489-021610-1624*	2/16/10		<0.589	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-174A	50-51.5	*MW-174A (50-51.5)*	9/16/10		<0.617	<4.19	<24.7	<21.0	<83.8	<83.8	<83.8	<83.8	<21.0	<83.8	<41.9	<41.9	<41.9	<41.9
MW-174B	90-91.5	*MW-174B(90-91.5)*	9/15/10		<0.605	<3.00	<24.1	<15.0	<60.0	<60.0	<60.0	<60.0	<15.0	<60.0	<30.0	<30.0	<30.0	<30.0
MW-175	7.5-9	*MW-175(7.5-9)*	9/29/10		<0.548	**2360 J**	**1520**	**10500 J**	**28500 J**	**41600 J**	**35000 J**	**102000 J**	**2880**	**14400**	**20800**	3930	5780	2830
MW-175	7.5-9	*MW-175D**	9/29/10		<0.604	**3930 J**	**1520**	**15800 J**	**42500 J**	**59900 J**	**43500 J**	**145000 J**	**3900**	**23700**	**34200**	6140	10100	3760
MW-175	90-91.5	*MW-175(90-91.5)*	9/29/10		<0.509	<2.10	<20.4	<10.5	<42.1	<42.1	<42.1	<42.1	<10.5	<42.1	<21.0	<21.0	<21.0	<21.0
MW-176A	15-16.5	*MW-176A(15-16.5)*	10/4/10		<0.573	<2.66	<23.1	15.7	<53.2	<53.2	<53.2	61.4	<13.3	<53.2	<26.6	<26.6	<26.6	<26.6
MW-176B	30-32	*MW-176B(30-32)*	10/4/10		<0.534	4.98	<21.8	15.2	<44.1	<44.1	<44.1	117	<11.0	<44.1	22.5	24.7	26.5	28.0
MW-176B	50-51.5	*MW-176B(50-51.5)*	10/4/10		<0.539	<1.70	<21.4	<8.52	<34.1	<34.1	<34.1	<34.1	<8.52	<34.1	<17.0	<17.0	<17.0	<17.0
MW-176C	5-6.5	*MW-176C(5-6.5)*	10/1/10		<0.506	**362 JH**	**6260 J**	**708 JH**	1520 JH	580 JH	6910 JH	14300 JH	**239**	1110	<199	<199	3250	708
MW-176C	5-6.5	*MW-176D**	10/1/10		<5.09	**647 JH**	**6080 J**	**1500**	3490	1750	7120	23200	**455**	2150	<303	<303	4790	1260
MW-176C	90-91.5	*MW-176C(90-91.5)*	10/1/10		<0.767	<1.91	<31.3	10.9	<38.1	<38.1	<38.1	<38.1	<9.53	<38.1	<19.1	<19.1	25.5	<19.1
MW-177	90-91.5	*MW-177(90-91.5)*	9/22/10		<0.605	<3.66	<24.5	<18.3	<73.2	<73.2	<73.2	<73.2	<18.3	<73.2	<36.6	<36.6	<36.6	<36.6
MW-178A	15-16.5	*MW-178A (15-16.5)*	9/18/10		<0.580	<3.29	<23.3	<16.4	<65.8	<65.8	<65.8	<65.8	<16.4	<65.8	<32.9	<32.9	<32.9	<32.9
MW-178B	50-51.5	*MW-178B (50-51.5)*	9/18/10		<0.569	<3.13	<22.8	<15.7	<62.7	<62.7	<62.7	<62.7	<15.7	<62.7	<31.3	<31.3	<31.3	<31.3
MW-178C	10-12	*MW-178C (10-12)*	9/17/10		<5.40	97.7 JH	**873**	**<117**	1560	3340	5580	11900	**69.1**	1340	2960	1010	3590	655
MW-178C	90-91.5	*MW-178C (90-91.5)*	9/17/10		<0.587	<3.51	<23.5	<17.5	<70.2	<70.2	<70.2	<70.2	<17.5	<70.2	<35.1	<35.1	<35.1	<35.1
MW-179A	15-16.5	*MW-179A(15-16.5)*	9/21/10		<0.555	<2.35	<22.7	<11.8	<47.1	<47.1	<47.1	<47.1	<11.8	<47.1	<23.5	<23.5	<23.5	<23.5
MW-179B	50-51.5	*MW-179B(50-51.5)*	9/21/10		<0.579	<3.05	<23.5	<15.2	<60.9	<60.9	<60.9	<60.9	<15.2	<60.9	<30.5	<30.5	<30.5	<30.5
MW-179C	90-91.5	*MW-179C(90-91.5)*	9/20/10		<0.548	<2.52	<21.8	<12.6	<50.4	<50.4	<50.4	<50.4	<12.6	<50.4	<25.2	<25.2	<25.2	<25.2
MW-180A	15-16.5	*MW-180A(15-16.5)*	9/27/10		<0.553	<2.44	<22.0	<12.2	<48.9	<48.9	<48.9	<48.9	12.7	<48.9	<24.4	<24.4	<24.4	<24.4
MW-180B	50-51.5	*MW-180B(50-51.5)*	9/27/10		<0.565	3.80	<22.7	<13.3	<53.4	65.9	88.3	229	<13.3	<53.4	51.0	39.5	78.7	<26.7
MW-180C	7.5-9	*MW-180C(7.5-9)*	9/25/10		<0.538	127 JH	110	**1650**	4380	3550	6860	14200	**1500**	4100	2880	2360	4250	859
MW-180C	90-91.5	*MW-180C(90-91.5)*	9/25/10		<0.594	<3.25	<24.1	<16.2	<64.9	<64.9	<64.9	<64.9	21.1	79.2	42.9	42.2	56.5	<32.5
MW-186A	15-16.5	*MW-186A (15-16.5)*	10/19/10		<0.619	—	—	—	—	—	—	—	<14.1	<56.6	65.6	47.0	73.3	<28.3
MW-186C	7.5-9	*MW-186C (7.5-9)*	10/15/10		<0.850	—	—	—	—	—	—	—	**353**	<903	**8450**	3590	6730	1440
MW-186C	7.5-9	*MW-186D**	10/15/10		<0.861	—	—	—	—	—	—	—	**553**	<840	**9050**	3680	7000	1440
MW-186C	100-101.5	*MW-186C (100-101.5)*	10/15/10		<0.613	—	—	—	—	—	—	—	<10.3	<41.2	<20.6	<20.6	<20.6	<20.6
O-1	2.5-4	*0-1 (2.5-4)*	10/19/10		<0.510	—	—	—	—	—	—	—	<11.3	<45.1	<22.6	<22.6	<22.6	<22.6
O-1	5-6.5	*0-1 (5-6.5)*	10/19/10		<0.513	—	—	—	—	—	—	—	<8.20	<32.8	<16.4	<16.4	<16.4	<16.4
O-1	10-11.5	*0-1 (10-11.5)*	10/19/10		<0.554	—	—	—	—	—	—	—	10.7	<39.0	<19.5	<19.5	<19.5	<19.5
O-1	12.5-14	*0-1 (12.5-14)*	10/19/10		0.887	—	—	—	—	—	—	—	<10.5	<41.9	<20.9	<20.9	<20.9	<20.9
O-1	15-16.5	*0-1(15-16.5)*	9/23/10		1.74	<3.40	<23.0	<17.0	<67.9	<67.9	<67.9	<67.9	18.3	<67.9	<34.0	<34.0	<34.0	<34.0

Table 26
2010 Soil Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

				Method	VOCs SW8260B								SVOCs SW8270D					
				Parameter	n-Propyl-benzene	sec-Butyl-benzene	P & M - Xylene	Naph-thalene	o-Xylene	Xylenes (total)	1,2,4-Tri-methyl-benzene	tert-Butyl-benzene	Isopropyl-benzene (Cumene)	Naph-thalene	2-Methyl-naph-thalene	Dibenzo-furan	Fluorene	Phen-anthrene
Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Cleanup Level	15000	12000	63000	20000	63000	63000	23000	12000	51000	20	6.1	11	220	3000
				units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MW-144B	90-91.5	*MW-144B(90-91.5)*	9/24/10		<26.6	<26.6	<53.2	<53.2	<53.2	<106	<53.2	<26.6	<26.6	<0.285	<0.285	<0.285	<0.285	<0.285
MW-151C	15-16.5	*1489-021810-1511*	2/18/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	25-26.5	*1489-021810-1512*	2/18/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-1513*	2/18/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-151C	40-41.5	*1489-021810-2513**	2/18/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-154B	90-91.5	*1489-022010-1542*	2/20/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-156B	20-21.5	*1489-021710-1561*	2/17/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-156B	35-36.5	*1489-021710-1562*	2/17/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-160B	90-91.5	*1489-021910-1605*	2/19/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	10-11.5	*1489-021610-1621*	2/16/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	30-31.5	*1489-021610-1622*	2/16/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	55-56.5	*1489-021610-1623*	2/16/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-162B	65-66.5	*1489-021610-1624*	2/16/10		—	—	—	—	—	—	—	—	—	—	—	—	—	—
MW-174A	50-51.5	*MW-174A (50-51.5)*	9/16/10		<41.9	<41.9	<83.8	<83.8	<83.8	<168	<83.8	<41.9	<41.9	<0.306	<0.306	<0.306	<0.306	<0.306
MW-174B	90-91.5	*MW-174B(90-91.5)*	9/15/10		<30.0	<30.0	<60.0	<60.0	<60.0	<120	<60.0	<30.0	<30.0	<0.305	<0.305	<0.305	<0.305	<0.305
MW-175	7.5-9	*MW-175(7.5-9)*	9/29/10		5330	<2500	**64000**	7210	17000	**81000**	14000	<2500	4410	4.39	**11.8**	0.347	0.296	<0.274
MW-175	7.5-9	*MW-175D**	9/29/10		9260	3700	**96100**	12700	30200	**126000**	22200	<3390	6780	3.52	**10.4**	0.386	0.299	<0.299
MW-175	90-91.5	*MW-175(90-91.5)*	9/29/10		<21.0	<21.0	<42.1	<42.1	<42.1	<84.1	<42.1	<21.0	<21.0	<0.252	<0.252	<0.252	<0.252	<0.252
MW-176A	15-16.5	*MW-176A(15-16.5)*	10/4/10		<26.6	<26.6	70.0	<53.2	<53.2	<106	<53.2	<26.6	<26.6	<0.425	<0.425	<0.425	<0.425	<0.425
MW-176B	30-32	*MW-176B(30-32)*	10/4/10		<22.0	<22.0	90.4	54.9	<44.1	118	47.2	<22.0	26.2	<0.320	<0.320	<0.320	<0.320	<0.320
MW-176B	50-51.5	*MW-176B(50-51.5)*	10/4/10		<17.0	<17.0	<34.1	<34.1	<34.1	<68.1	<34.1	<17.0	<17.0	<0.262	<0.262	<0.262	<0.262	<0.262
MW-176C	5-6.5	*MW-176C(5-6.5)*	10/1/10		<199	231	10800	7910	3750	14600	7440	205	223	8.98	**27.1**	0.886	2.07	5.39
MW-176C	5-6.5	*MW-176D**	10/1/10		<303	425	18300	11600	6310	24600	10800	306	<303	10.3 JH	**27.6 JH**	<2.53	2.56 JH	5.60 JH
MW-176C	90-91.5	*MW-176C(90-91.5)*	10/1/10		<19.1	<19.1	121	45.0	43.1	164	48.8	<19.1	<19.1	<0.381	<0.381	<0.381	<0.381	<0.381
MW-177	90-91.5	*MW-177(90-91.5)*	9/22/10		<36.6	<36.6	<73.2	<73.2	<73.2	<146	<73.2	<36.6	<36.6	<0.306	<0.306	<0.306	<0.306	<0.306
MW-178A	15-16.5	*MW-178A (15-16.5)*	9/18/10		<32.9	<32.9	<65.8	<65.8	<65.8	<132	<65.8	<32.9	<32.9	<0.292	<0.292	<0.292	<0.292	<0.292
MW-178B	50-51.5	*MW-178B (50-51.5)*	9/18/10		<31.3	<31.3	<62.7	<62.7	<62.7	<125	<62.7	<31.3	<31.3	<0.282	<0.282	<0.282	<0.282	<0.282
MW-178C	10-12	*MW-178C (10-12)*	9/17/10		2960	740	11100	3920	5540	16700	9840	61.4	1050	0.771	2.67	<0.268	0.328	0.926
MW-178C	90-91.5	*MW-178C (90-91.5)*	9/17/10		<35.1	<35.1	<70.2	<70.2	<70.2	<140	<70.2	<35.1	<35.1	<0.296	<0.296	<0.296	<0.296	<0.296
MW-179A	15-16.5	*MW-179A(15-16.5)*	9/21/10		<23.5	<23.5	<47.1	<47.1	<47.1	<94.1	<47.1	<23.5	<23.5	<0.280	<0.280	<0.280	<0.280	<0.280
MW-179B	50-51.5	*MW-179B(50-51.5)*	9/21/10		<30.5	<30.5	<60.9	<60.9	<60.9	<122	<60.9	<30.5	<30.5	<0.284	<0.284	<0.284	<0.284	<0.284
MW-179C	90-91.5	*MW-179C(90-91.5)*	9/20/10		<25.2	<25.2	<50.4	<50.4	<50.4	<101	<50.4	<25.2	<25.2	<0.274	<0.274	<0.274	<0.274	<0.274
MW-180A	15-16.5	*MW-180A(15-16.5)*	9/27/10		<24.4	<24.4	<48.9	<48.9	<48.9	<97.8	<48.9	<24.4	<24.4	<0.272	<0.272	<0.272	<0.272	<0.272
MW-180B	50-51.5	*MW-180B(50-51.5)*	9/27/10		47.8	<26.7	178	<53.4	71.0	249	184	<26.7	<26.7	<0.283	<0.283	<0.283	<0.283	<0.283
MW-180C	7.5-9	*MW-180C(7.5-9)*	9/25/10		2940	1310	12900	1410	6320	19200	12400	<22.8	1700	0.304	0.793	<0.269	<0.269	<0.269
MW-180C	90-91.5	*MW-180C(90-91.5)*	9/25/10		<32.5	<32.5	182	231	89.0	271	180	<32.5	<32.5	<0.297	<0.297	<0.297	<0.297	<0.297
MW-186A	15-16.5	*MW-186A (15-16.5)*	10/19/10		65.6	38.2	297	136	<56.6	331	190	<28.3	41.6	<0.310	<0.310	<0.310	<0.310	<0.310
MW-186C	7.5-9	*MW-186C (7.5-9)*	10/15/10		5970	2190	30400	8560	6360	36800	17800	110	3110	5.08 JH	**15.0 JH**	<0.843	<0.843	<0.843
MW-186C	7.5-9	*MW-186D**	10/15/10		6160	2250	31700	7610	6150	37800	18000	115	3300	<0.853	2.52	<0.853	<0.853	<0.853
MW-186C	100-101.5	*MW-186C (100-101.5)*	10/15/10		<20.6	<20.6	<41.2	<41.2	<41.2	<82.5	<41.2	<20.6	<20.6	<0.560	<0.560	<0.560	<0.560	<0.560
O-1	2.5-4	*0-1 (2.5-4)*	10/19/10		<22.6	<22.6	<45.1	<45.1	<45.1	<90.2	<45.1	<22.6	<22.6	<0.254	<0.254	<0.254	<0.254	<0.254
O-1	5-6.5	*0-1 (5-6.5)*	10/19/10		<16.4	<16.4	<32.8	<32.8	<32.8	<65.6	<32.8	<16.4	<16.4	<0.257	<0.257	<0.257	<0.257	<0.257
O-1	10-11.5	*0-1 (10-11.5)*	10/19/10		<19.5	<19.5	<39.0	<39.0	<39.0	<77.9	<39.0	<19.5	<19.5	<0.273	<0.273	<0.273	<0.273	<0.273
O-1	12.5-14	*0-1 (12.5-14)*	10/19/10		<20.9	<20.9	<41.9	<41.9	<41.9	<83.8	<41.9	<20.9	<20.9	<0.282	<0.282	<0.282	<0.282	<0.282
O-1	15-16.5	*0-1(15-16.5)*	9/23/10		<34.0	<34.0	<67.9	<67.9	<67.9	<136	<67.9	<34.0	<34.0	<0.288	<0.288	<0.288	<0.288	<0.288

Table 26
2010 Soil Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Method	SW8270D	AK101	AK102	SW8021B					VOCs SW8260B					
				Parameter	Sulfolane	GRO	DRO	Benzene	Toluene	Ethyl-benzene	o-Xylene	p- & m-Xylenes	Benzene	Toluene	Ethyl-benzene	n-Butyl-benzene	1,3,5-Tri-methyl-benzene	4-Isopropyl-toluene
				Cleanup Level	NCL	300	250	25	6500	6900	63000 (total)		25	6500	6900	15000	23000	NCL
				units	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
O-2	2.5-4	*0-2 (2.5-4)*	10/20/10		<0.560	—	—	—	—	—	—	—	<12.4	<49.8	<24.9	<24.9	<24.9	<24.9
O-2	5-6.5	*0-2 (5-6.5)*	10/20/10		<0.557	—	—	—	—	—	—	—	<17.5	<70.0	<35.0	<35.0	<35.0	<35.0
O-2	5-6.5	*0-2 D**	10/20/10		<0.535	—	—	—	—	—	—	—	<13.2	<52.8	<26.4	<26.4	<26.4	<26.4
O-2	7.5-9	*0-2(7.5-9)*	9/23/10		<5.65	**1440 JH**	**6760**	**1720**	2390	**27300**	**31700**	**89700**	**369**	<2850	**21100**	10700	19400	4510
O-2	10-11.5	*0-2 (10-11.5)*	10/20/10		<11.5	—	—	—	—	—	—	—	**3580**	<5680	**111000**	**34300**	**81100**	20200
O-2	10-11.5	*0-2 DD**	10/20/10		<15.5	—	—	—	—	—	—	—	**1670**	<5370	**59300**	**24200**	**53700**	14400
O-2	12.5-14	*0-2 (12.5-14)*	10/20/10		<0.561	—	—	—	—	—	—	—	<10.1	<40.4	325	278	481	97.1
O-2	15-16.5	*0-2(15-16.5)*	9/23/10		<0.563	78.6 JH	89.2	**102**	179	983	482	2500	<10.9	<43.5	416	431	641	180
O-3	2.5-4	*0-3 (2.5-4)*	10/20/10		<0.517	—	—	—	—	—	—	—	<9.44	<37.8	<18.9	<18.9	<18.9	<18.9
O-3	5-6.5	*0-3 (5-6.5)*	10/20/10		<0.622	—	—	—	—	—	—	—	<18.6	<74.5	<37.2	<37.2	<37.2	<37.2
O-3	10-11.5	*0-3 (10-11.5)*	10/20/10		<0.644	—	—	—	—	—	—	—	<19.2	<76.8	<38.4	<38.4	<38.4	<38.4
O-3	12.5-14	*0-3 (12.5-14)*	10/20/10		<0.658	—	—	—	—	—	—	—	<17.1	<68.3	<34.1	<34.1	<34.1	<34.1
O-3	15-16.5	*0-3(15-16.5)*	9/23/10		<0.647	<4.24	<25.5	<21.2	<84.7	<84.7	<84.7	<84.7	<21.2	<84.7	<42.4	<42.4	<42.4	<42.4
O-4	2.5-4	*0-4 (2.5-4)*	10/20/10		<0.648	—	—	—	—	—	—	—	<22.5	<90.1	105	61.3	110	<45.1
O-4	5-6.5	*0-4 (5-6.5)*	10/20/10		<0.543	—	—	—	—	—	—	—	<14.8	<59.4	29.7	<29.7	36.8	<29.7
O-4	10-11.5	*0-4 (10-11.5)*	10/20/10		<0.549	—	—	—	—	—	—	—	<10.8	<43.0	<21.5	<21.5	<21.5	<21.5
O-4	12.5-14	*0-4 (12.5-14)*	10/20/10		<0.539	—	—	—	—	—	—	—	<8.11	<32.4	<16.2	<16.2	<16.2	<16.2
O-4	15-16.5	*0-4(15-16.5)*	9/16/10		<0.603	<3.38	<24.3	<16.9	<67.7	<67.7	<67.7	<67.7	<16.9	<67.7	<33.8	<33.8	<33.8	<33.8

GRO Gasoline Range Organics
DRO Diesel Range Organics
< Analytical result less than Limit of Quantitation given
Bold Result or detection limit exceeds ADEC Soil Cleanup Level
— Analysis not performed, or cleanup level not established
J Result is estimated
JH Result is estimated, biased high
JL Result is estimated, biased low
* Duplicate of previous sample
NCL No ADEC Soil Cleanup Level

Table 26
2010 Soil Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

				Method	VOCs SW8260B								SVOCs SW8270D					
				Parameter	n-Propyl-benzene	sec-Butyl-benzene	P & M - Xylene	Naph-thalene	o-Xylene	Xylenes (total)	1,2,4-Tri-methyl-benzene	tert-Butyl-benzene	Isopropyl-benzene (Cumene)	Naph-thalene	2-Methyl-naph-thalene	Dibenzo-furan	Fluorene	Phen-anthrene
Sample Location	Sample Depth (ft)	Sample ID	Sample Date	Cleanup Level	15000	12000	63000	20000	63000	63000	23000	12000	51000	20	6.1	11	220	3000
				units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
O-2	2.5-4	*0-2 (2.5-4)*	10/20/10		<24.9	<24.9	<49.8	<49.8	<49.8	<99.6	<49.8	<24.9	<24.9	<0.279	<0.279	<0.279	<0.279	<0.279
O-2	5-6.5	*0-2 (5-6.5)*	10/20/10		<35.0	<35.0	<70.0	<70.0	<70.0	<140	<70.0	<35.0	<35.0	<0.277	<0.277	<0.277	<0.277	<0.277
O-2	5-6.5	*0-2 D**	10/20/10		<26.4	<26.4	<52.8	<52.8	<52.8	<106	<52.8	<26.4	<26.4	<0.266	<0.266	<0.266	<0.266	<0.266
O-2	7.5-9	*0-2(7.5-9)*	9/23/10		**15800**	5780	**74500**	**22400**	24100	**98600**	**48700**	377	8460	19.8 JH	**51.0 JH**	1.31 JH	1.34 JH	0.927 JH
O-2	10-11.5	*0-2 (10-11.5)*	10/20/10		**72700**	**25300**	**407000**	**125000**	**92500**	**500000**	**205000**	<2840	41600	**62.0 J**	**155 J**	**<14.4**	<14.4	<14.4
O-2	10-11.5	*0-2 DD**	10/20/10		**45400**	**16800**	**246000**	**68500**	53900	**300000**	**138000**	<2690	25400	**96.4 J**	**240 J**	<8.10	<8.10	<8.10
O-2	12.5-14	*0-2 (12.5-14)*	10/20/10		338	162	1460	472	321	1780	1190	<20.2	174	<0.278	0.711	<0.278	<0.278	<0.278
O-2	15-16.5	*0-2(15-16.5)*	9/23/10		499	237	1800	724	326	2130	1740	<21.7	278	<0.283	<0.283	<0.283	<0.283	<0.283
O-3	2.5-4	*0-3 (2.5-4)*	10/20/10		<18.9	<18.9	<37.8	<37.8	<37.8	<75.5	<37.8	<18.9	<18.9	<0.260	<0.260	<0.260	<0.260	<0.260
O-3	5-6.5	*0-3 (5-6.5)*	10/20/10		<37.2	<37.2	<74.5	<74.5	<74.5	<149	<74.5	<37.2	<37.2	<0.314	<0.314	<0.314	<0.314	<0.314
O-3	10-11.5	*0-3 (10-11.5)*	10/20/10		<38.4	<38.4	<76.8	<76.8	<76.8	<154	<76.8	<38.4	<38.4	<0.318	<0.318	<0.318	<0.318	<0.318
O-3	12.5-14	*0-3 (12.5-14)*	10/20/10		<34.1	<34.1	<68.3	<68.3	<68.3	<137	<68.3	<34.1	<34.1	<0.324	<0.324	<0.324	<0.324	<0.324
O-3	15-16.5	*0-3(15-16.5)*	9/23/10		<42.4	<42.4	<84.7	<84.7	<84.7	<169	<84.7	<42.4	<42.4	<0.325	<0.325	<0.325	<0.325	<0.325
O-4	2.5-4	*0-4 (2.5-4)*	10/20/10		81.6	<45.1	427	119	97.3	525	283	<45.1	<45.1	<0.321	<0.321	<0.321	<0.321	<0.321
O-4	5-6.5	*0-4 (5-6.5)*	10/20/10		<29.7	<29.7	123	<59.4	<59.4	152	101	<29.7	<29.7	<0.272	<0.272	<0.272	<0.272	<0.272
O-4	10-11.5	*0-4 (10-11.5)*	10/20/10		<21.5	<21.5	<43.0	<43.0	<43.0	<86.1	<43.0	<21.5	<21.5	<0.275	<0.275	<0.275	<0.275	<0.275
O-4	12.5-14	*0-4 (12.5-14)*	10/20/10		<16.2	<16.2	<32.4	<32.4	<32.4	<64.9	<32.4	<16.2	<16.2	<0.272	<0.272	<0.272	<0.272	<0.272
O-4	15-16.5	*0-4(15-16.5)*	9/16/10		<33.8	<33.8	<67.7	<67.7	<67.7	<135	<67.7	<33.8	<33.8	<0.305	<0.305	<0.305	<0.305	<0.305

GRO Gasoline Range Organics
DRO Diesel Range Organics
< Analytical result less than Limit of Quantitation given
Bold Result or detection limit exceeds ADEC Soil Cleanup Level
— Analysis not performed, or cleanup level not established
J Result is estimated
JH Result is estimated, biased high
JL Result is estimated, biased low
* Duplicate of previous sample
NCL No ADEC Soil Cleanup Level

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
MW-144B (0.0 - 2.0)		09/21/2011 09:45	MW-144B	0	2	<0.0143	<0.0278	<0.0278	<0.0536
MW-144B (6.0 - 8.0)		09/21/2011 10:33	MW-144B	6	8	<0.00764	<0.0149	<0.0149	<0.0536
MW-144B (90.0 - 92.0)		09/21/2011 18:44	MW-144B	90	92	<0.00622	<0.0121	<0.0121	<0.0536
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.00720	<0.0278	<0.0144	<0.0574
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.00602	<0.0232	<0.0120	<0.0478
MW-195 (0.0 - 2.0)		10/11/2011 13:37	MW-195	0	2	0.00623J	0.24	1.33	1.99
MW-195 (2.0 - 4.0)		10/11/2011 13:57	MW-195	2	4	0.00891J	0.124	0.94	1.76
MW-195 (6.0 - 8.0)		10/11/2011 14:33	MW-195	6	8	<0.00706	<0.0138	0.0201J	0.00861
MW-195 (14.0 - 16.0)		10/11/2011 15:21	MW-195	14	16	<0.0111	<0.0347 B*	<0.0216	ND
MW-196 (0.0 - 2.0)		10/11/2011 09:21	MW-196	0	2	<0.00678	<0.0212 B*	<0.0132	ND
MW-196 (6.0 - 8.0)		10/11/2011 10:02	MW-196	6	8	<0.00664	<0.0208 B*	<0.0130	ND
MW-196 (14.0 - 16.0)		10/11/2011 10:42	MW-196	14	16	<0.0100	<0.0196	<0.0196	ND
MW-197B (15)		10/16/2011 09:25	MW-197B	15	15	**2.27**	**18**	**8.32**	30.1
MW-197B (50-52)		10/16/2011 10:03	MW-197B	50	52	**0.39**	5.62	3.49	13.2
MW-307 (8-8.5)		12/03/2011 11:30	MW-307	8	8.5	0.00332J	<0.0144 B*	<0.00900	ND
O-5 (0.0 - 2.0)		09/13/2011 13:48	O-5	0	2	<0.0104	<0.0202	<0.0202	<0.0388
O-5 (6.0 - 8.0)		09/13/2011 14:23	O-5	6	8	<0.00732	<0.0143	<0.0143	<0.0388
O-5 (14.0 - 16.0)		09/13/2011 15:09	O-5	14	16	0.00363J	<0.0136	<0.0136	<0.0388
O-6 (0.0 - 2.0)		09/14/2011 09:14	O-6	0	2	<0.0100	<0.0196	0.0111J	<0.0476
O-6 (4.0 - 6.0)		09/14/2011 09:40	O-6	4	6	<0.0127	<0.0248	<0.0248	<0.0476
O-6 (14.0 - 16.0)		09/14/2011 10:43	O-6	14	16	<0.00708	<0.0138	<0.0138	<0.0476
O-7 (0.0 - 2.0)		09/14/2011 13:43	O-7	0	2	<0.00588	<0.0115	<0.0115	<0.0376
O-7 (6.0 - 8.0)		09/14/2011 14:34	O-7	6	8	**0.0938 J***	0.212 J*	0.174 J*	3.39
DO-7 (6.0 - 8.0)	Dup	09/14/2011 14:15	O-7	6	8	**0.809 J***	2.07 J*	5.18 J*	35.1
O-7 (14.0 - 16.0)		09/14/2011 15:40	O-7	14	16	0.00421J	0.00659J	0.0119J	0.137
O-8 (0.0 - 2.0)		09/15/2011 10:01	O-8	0	2	<0.00726	<0.0142	<0.0142	<0.0248
O-8 (6.0 - 8.0)		09/15/2011 10:36	O-8	6	8	<0.00604	<0.0118	<0.0118	<0.0248
O-8 (14.0 - 16.0)		09/15/2011 11:38	O-8	14	16	<0.00662	<0.0129	<0.0129	<0.0248
O-9 (0.0 - 2.0)		09/15/2011 14:34	O-9	0	2	<0.00960 J*	<0.0187 J*	<0.0187 J*	<0.0256
O-9 (6.0 - 8.0)		09/15/2011 15:15	O-9	6	8	**0.813**	2.53	**14**	**64.1**
O-9 (16.0 - 18.0)		09/15/2011 16:41	O-9	16	18	0.00379J	<0.0133	<0.0133	<0.0256
O-10 (0.0 - 2.0)		09/16/2011 10:47	O-10	0	2	<0.00642	<0.0125	<0.0125	0.606
O-10 (6.0 - 8.0)		09/16/2011 11:26	O-10	6	8	**0.679**	0.248	**10.7**	41.2
O-10 (8.0 - 10.0)		09/16/2011 11:39	O-10	8	10	**0.807 J***	0.451	**30.2 J***	**168**
DO-10 (8.0 - 10.0)	Dup	09/16/2011 11:45	O-10	8	10	**0.468 J***	0.179J	**17.8 J***	**90.4**
O-10 (16.0 - 18.0)		09/16/2011 13:01	O-10	16	18	0.00533J	<0.0138	0.036	0.133

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
O-11 (0.0 - 2.0)		09/20/2011 10:16	O-11	0	2	<0.00826	0.0217J	<0.0161	<0.0310
O-11 (8.0 - 10.0)		09/20/2011 11:01	O-11	8	10	**1.58**	1.44	**28.7**	**188**
O-11 (10.0 - 12.0)		09/20/2011 11:11	O-11	10	12	**1.06**	1.37	**17.8**	**97.8**
O-11 (25.0 - 27.0)		09/20/2011 12:33	O-11	25	27	<0.00740	<0.0144	0.0227J	0.0611
O-12 (0.0 - 2.0)		09/21/2011 12:55	O-12	0	2	0.00555J	<0.0204	<0.0204	<0.0584
O-12 (7.5 - 9.2)		09/21/2011 11:50	O-12	7.5	9.2	<0.0156	<0.0304	<0.0304	<0.0584
O-12 (14.0 - 16.0)		09/21/2011 12:30	O-12	14	16	<0.0129	<0.0250	<0.0250	<0.0584
O-13 (0.0 - 1.4)		09/21/2011 14:35	O-13	0	1.4	0.00460J	<0.0179	0.0141J	0.0572
O-13 (4.0 - 6.0)		09/21/2011 15:15	O-13	4	6	<0.0116	<0.0226	<0.0226	0.0272
O-13 (8.0 - 9.1)		09/21/2011 15:45	O-13	8	9.1	**0.688 J***	<0.150	2.76 J*	12.1
DO-13 (8.0 - 9.1)	Dup	09/21/2011 16:00	O-13	8	9.1	**0.101 J***	0.0106J	0.568 J*	2.56
O-13 (14.5 - 15.2)		09/21/2011 17:05	O-13	14.5	15.2	**0.167**	0.0173J	0.0794	0.473
O-14 (0.0 - 2.0)		10/01/2011 09:40	O-14	0	2	0.0161 JL*	0.131 JL*	0.140 JL*	0.593
O-14 (2.0 - 4.0)		10/01/2011 10:35	O-14	2	4	0.0192	0.0874	0.0785	0.318
O-14 (6.0 - 7.8)		10/01/2011 10:30	O-14	6	7.8	<0.00694	0.0115J	<0.0136	0.0132
O-14 (14.0 - 16.0)		10/01/2011 11:25	O-14	14	16	<0.00650	0.00710J	<0.0127	<0.0244
O-15 (0.0 - 2.0)		10/06/2011 14:20	O-15	0	2	<0.00652 J*	<0.0127 J*	<0.0127 J*	<0.0252
O-15 (8.0 - 10.0)		10/06/2011 15:41	O-15	8	10	<0.00582 J*	<0.0113 J*	<0.0113 J*	<0.0252
O-15 (14.0 - 16.0)		10/06/2011 16:39	O-15	14	16	<0.00672 J*	<0.0131 J*	<0.0131 J*	<0.0252
O-16 (0.0 - 2.0)		10/07/2011 13:00	O-16	0	2	<0.00704	<0.0137	<0.0137	<0.0264
O-16 (6.0 - 8.0)		10/07/2011 14:00	O-16	6	8	<0.00572	<0.0111	<0.0111	<0.0264
O-16 (14.0 - 16.0)		10/07/2011 15:09	O-16	14	16	<0.00642	<0.0125	<0.0125	<0.0264
O-17 (0.0 - 2.0)		10/13/2011 10:16	O-17	0	2	<0.00762	0.0171J	<0.0149	ND
O-17 (6.0 - 8.0)		10/13/2011 11:17	O-17	6	8	<0.00746	<0.0145	<0.0145	ND
O-17 (14.0 - 16.0)		10/13/2011 12:30	O-17	14	16	<0.00672	<0.0131	<0.0131	ND
O-18 (0.0 - 2.0)		10/12/2011 10:48	O-18	0	2	<0.0163	<0.0316	<0.0316	ND
O-18 (6.0 - 8.0)		10/12/2011 11:37	O-18	6	8	<0.0127	0.0266J	<0.0248	0.0444
O-18 (14.0 - 15.0)		10/12/2011 13:30	O-18	14	15	<0.00622	<0.0121	<0.0121	0.0119
O-19 (0.0 - 2.0)		10/15/2011 09:50	O-19	0	2	<0.0151	<0.0472 B*	0.0250J	ND
DO-19 (0.0 - 2.0)	Dup	10/15/2011 09:45	O-19	0	2	0.00565J	<0.0333 B*	<0.0208	0.0206
O-19 (4.0 - 6.0)		10/15/2011 10:35	O-19	4	6	0.0221	<0.0416 B*	0.173	0.721
O-19 (6.0 - 8.0)		10/15/2011 10:40	O-19	6	8	**0.773**	2.96	**9.81**	42.7
DO-19 (6.0 - 8.0)	Dup	10/15/2011 10:38	O-19	6	8	**0.892**	3.46	**9.79**	42.6
O-19 (14.0 - 16.0)		10/15/2011 11:44	O-19	14	16	0.0138J	<0.0345 B*	0.0290J	0.138
O-20 (0.0 - 2.0)		10/13/2011 15:43	O-20	0	2	<0.00726	<0.0141	<0.0141	ND
O-20 (6.0 - 8.0)		10/13/2011 16:33	O-20	6	8	<0.00918	<0.0179	<0.0179	ND

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
DO-20 (6.0 - 8.0)	Dup	10/13/2011 16:30	O-20	6	8	<0.00798	<0.0156	<0.0156	ND
O-20 (14.0 - 16.0)		10/13/2011 17:47	O-20	14	16	**0.194**	<0.0151	0.0276	0.388
O-21 (0.0-2.0)		10/14/2011 12:43	O-21	0	2	**0.0319**	<0.0456 B*	<0.0284	0.094
DO-21 (0.0-2.0)	Dup	10/14/2011 12:40	O-21	0	2	0.022	<0.0440 B*	<0.0274	0.125
O-21 (4.0-6.0)		10/14/2011 13:12	O-21	4	6	**0.429**	0.114	0.305	8.91
O-21 (6.0-8.0)		10/14/2011 13:35	O-21	6	8	**26.6**	**7.84**	**98.3**	**475**
DO-21 (6.0-8.0)	Dup	10/14/2011 13:30	O-21	6	8	**18.9**	5.03	**73.7**	**386**
O-21 (14.0-16.0)		10/14/2011 14:48	O-21	14	16	**0.0916**	<0.0335 B*	0.0426	0.253
DO-21 (14.0-16.0)	Dup	10/14/2011 14:40	O-21	14	16	**0.0971**	<0.0208	0.0412	0.261
O-22 (8-10)		11/14/2011 17:30	O-22	8	10	<0.00388	<0.00758	<0.00758	ND
O-22D (8-10)	Dup	11/14/2011 17:35	O-22	8	10	<0.00364	<0.00710	<0.00710	ND
O-22 (11.3-12.2)		11/14/2011 17:50	O-22	11.3	12.2	<0.00520	<0.0101	<0.0101	ND
O-23 (6-8)		12/05/2011 11:30	O-23	6	8	<0.0135	<0.0264	<0.0264	ND
O-23D (6-8)	Dup	12/05/2011 11:15	O-23	6	8	<0.0148	<0.0288	<0.0288	ND
O-23 (10.6-13.0)		12/05/2011 12:00	O-23	10.6	13	<0.0114	<0.0222	<0.0222	ND
O-25 (8-9)		11/10/2011 11:45	O-25	8	9	<0.00676	<0.0211 B*	<0.0132	ND
O-25 (9.7-10.3)		11/09/2011 11:30	O-25	9.7	10.3	0.00558J	<0.0279 B*	<0.0174	ND
O-26 (6.1-6.8)		11/09/2011 17:02	O-26	6.1	6.8	<0.00808	<0.0252 B*	<0.0157	ND
O-26 (8.4-9.2)		11/09/2011 13:06	O-26	8.4	9.2	<0.00944	<0.0184	<0.0184	ND
O-27 (9-9.5)		11/09/2011 17:25	O-27	9	9.5	**0.445**	0.855	**9.04**	40.6
O-27 (10.3-11)		11/09/2011 17:25	O-27	10.3	11	**0.0277**	<0.0166 B*	0.199	0.908
O-28 (8-9)		11/14/2011 18:30	O-28	8	9	<0.0119	<0.0232	0.0119J	ND
O-29 (9.5-10)		11/12/2011 12:50	O-29	9.5	10	<0.00428	<0.00836	<0.00836	ND
O-29 (11-11.5)		11/12/2011 13:10	O-29	11	11.5	**1.06 JH***	1.08 JH*	0.566 JH*	0.373
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.0154	<0.0308	<0.0308	<0.122
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.0144	<0.0288	<0.0288	<0.114
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.0141	<0.0282	<0.0282	<0.112
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.00674	<0.0135	<0.0135	<0.0536
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.0136	<0.0272	<0.0272	<0.108
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.00828	<0.0166	<0.0166	<0.0658
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.0158	<0.0316	<0.0316	<0.126
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.00756	<0.0151	<0.0151	<0.0600
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.0117	<0.0234	<0.0234	<0.0928
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.00864 J*	<0.0173 J*	<0.0173 J*	<0.0688 J*
SB-106 (0.0 - 2.0)		09/16/2011 11:10	SB-106	0	2	<0.0107	<0.0210	<0.0210	<0.0624
SD-106 (0.0 - 2.0)	Dup	09/16/2011 11:25	SB-106	0	2	<0.00960	<0.0187	<0.0187	<0.0624

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-106 (3.5 - 5.2)		09/16/2011 11:40	SB-106	3.5	5.2	<0.0167	<0.0324	<0.0324	<0.0624
SB-107 (0.0 - 2.0)		09/16/2011 09:50	SB-107	0	2	<0.00734	<0.0143	<0.0143	<0.0224
SB-107 (5.0 - 6.6)		09/16/2011 10:15	SB-107	5	6.6	<0.00600	<0.0117	<0.0117	<0.0224
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	<0.0105	<0.0210	<0.0210	<0.0834
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.00930	<0.0186	<0.0186	<0.0738
SB-109 (0.0 - 2.0)		09/17/2011 10:30	SB-109	0	2	<0.00690	<0.0135	<0.0135	<0.0258
SD-109 (0.0 - 2.0)	Dup	09/17/2011 10:50	SB-109	0	2	<0.00696	<0.0136	<0.0136	<0.0258
SB-109 (4.0 - 5.9)		09/17/2011 10:45	SB-109	4	5.9	<0.0120	<0.0234	<0.0234	<0.0258
SB-109 (7.5 - 8.5)		09/17/2011 11:20	SB-109	7.5	8.5	**1.26**	1.01	**20.2**	**74.9**
SB-109 (16.5 - 17.5)		09/17/2011 11:50	SB-109	16.5	17.5	<0.00792	<0.0154	0.0378	0.0853
SB-110 (0.0 - 2.0)		09/16/2011 16:00	SB-110	0	2	<0.00668	<0.0130	<0.0130	<0.0294
SB-110 (5.0 - 6.9)		09/16/2011 16:30	SB-110	5	6.9	0.0934	0.0768	1.09	2.69
SB-110 (7.0 - 8.5)		09/16/2011 17:00	SB-110	7	8.5	**2.23**	**10**	**12.2**	59.3
SB-110 (11.0 - 12.0)		09/16/2011 17:10	SB-110	11	12	<0.00786	<0.0153	<0.0153	<0.0294
SB-111 (0.0 - 2.0)		09/17/2011 09:15	SB-111	0	2	<0.00598	<0.0116	0.00746J	0.0296
SB-111 (4.0 - 6.0)		09/17/2011 09:40	SB-111	4	6	0.0126	0.0592	0.158	0.583
SB-111 (8.0 - 9.2)		09/17/2011 09:50	SB-111	8	9.2	**0.502**	0.736	0.403	1.8
SB-112 (0.0 - 2.0)		10/04/2011 11:20	SB-112	0	2	<0.00960	<0.0187	<0.0187	0.0249
SB-112 (5.5 - 7.3)		10/04/2011 11:40	SB-112	5.5	7.3	**0.207**	0.723	2.59	33.4
SB-112 (10.0 - 12.0)		10/04/2011 13:00	SB-112	10	12	<0.0279 B*	<0.0314 B*	0.0398	0.276
SB-113 (0.0 - 2.0)		09/23/2011 14:25	SB-113	0	2	<0.00912	<0.0178	<0.0178	<0.0342
SB-113 (5.0 - 7.0)		09/23/2011 14:45	SB-113	5	7	**0.0764**	0.105	1.39	5.23
SB-113 (11.0 - 12.3)		09/23/2011 15:15	SB-113	11	12.3	<0.00704	<0.0137	0.0176J	0.0161
SB-114 (0.0 - 2.0)		10/03/2011 17:00	SB-114	0	2	**0.231 JH***	0.534 JH*	1.76 JH*	5.37
SB-114 (5.0 - 6.8)		10/03/2011 17:20	SB-114	5	6.8	**9.33**	**46.3**	**31.4**	**148**
SB-114 (7.0 - 8.6)		10/03/2011 17:40	SB-114	7	8.6	**8.68**	**58**	**32.9**	**172**
SD-114 (7.0 - 8.6)	Dup	10/03/2011 17:50	SB-114	7	8.6	**7.45**	**49.4**	**29.2**	**149**
SB-114 (16.0 - 18.0)		10/03/2011 18:35	SB-114	16	18	<0.0373 B*	<0.0254 B*	0.0180J	0.137
SB-115 (0.0 - 2.0)		09/24/2011 09:15	SB-115	0	2	<0.0111	<0.0216	<0.0216	2.42
SB-115 (6.0 - 7.3)		09/24/2011 10:00	SB-115	6	7.3	**10.1**	**100**	**56.2**	**185**
SB-115 (15.0 - 17.0)		09/24/2011 10:50	SB-115	15	17	**0.127**	0.615	0.465	1.46
SB-116 (0.0 - 2.0)		09/24/2011 11:45	SB-116	0	2	<0.00522	<0.0102	<0.0102	<0.0196
SB-116 (5.5 - 7.1)		09/24/2011 12:00	SB-116	5.5	7.1	<0.00532	<0.0104	<0.0104	<0.0196
SB-117 (0.0 - 2.0)		09/29/2011 14:15	SB-117	0	2	0.00468J	0.0107J	<0.0139	0.0218
SB-117 (5.0 - 7.0)		09/29/2011 14:30	SB-117	5	7	**0.368 J***	2.17 J*	1.30 J*	6.36
SD-117 (5.0 - 7.0)	Dup	09/29/2011 14:45	SB-117	5	7	**3.01 J***	**19.1 J***	**12.4 J***	57.8

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-117 (11.0 - 12.0)		09/29/2011 14:55	SB-117	11	12	**0.339**	0.0138J	0.0331	0.28
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<0.00824	<0.0165	<0.0165	<0.0654
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.0140	<0.0280	<0.0280	<0.111
SB-119 (0.0 - 2.0)		09/15/2011 13:40	SB-119	0	2	<0.0127	<0.0248	<0.0248	<0.0476
SB-119 (5.0 - 6.4)		09/15/2011 14:10	SB-119	5	6.4	<0.0107 J*	<0.0210 J*	<0.0210 J*	<0.0476
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.0105	<0.0210	<0.0210	<0.0834
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	0.0165 J*	0.0972 J*	5.02	11.2 J*
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	**0.0285 J***	0.223 J*	4.42	19.7 J*
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	<0.00820 J*	0.0108 JL*	0.0334 JL*	0.190 JL*
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.00682	<0.0136	<0.0136	<0.0542
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.0107	<0.0214	<0.0214	<0.0852
SB-122 (0.0 - 2.0)		09/20/2011 09:20	SB-122	0	2	0.00869J	0.0255J	0.0135J	0.018
SB-122 (5.0 - 6.2)		09/20/2011 09:45	SB-122	5	6.2	**1.56**	1.27	**16.2**	**64.3**
SB-122 (6.5 - 7.5)		09/20/2011 10:10	SB-122	6.5	7.5	**2.02**	0.543	**25.7**	**105**
SB-122 (11.5 - 12.5)		09/20/2011 10:20	SB-122	11.5	12.5	<0.0101	<0.0196	<0.0196	0.0360J
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.00980	<0.0196	<0.0196	<0.0780
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.0111	<0.0222	<0.0222	<0.0882
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.0106	<0.0212	<0.0212	<0.0844
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	**2.34 JH***	**12.4 JH***	**23.2 JH***	**124 JH***
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	0.00616 JH*	<0.0192 B*	0.0342 JH*	0.136 JH*
SB-124 (0.0 - 2.0)		09/15/2011 09:50	SB-124	0	2	0.00758J	0.0186J	0.128	0.358
SD-124 (0.0 - 2.0)	Dup	09/15/2011 10:10	SB-124	0	2	0.00530J	0.0200J	0.112	0.329
SB-124 (5.0 - 6.3)		09/15/2011 10:40	SB-124	5	6.3	<0.00954 J*	0.0179 JL*	0.0462 JL*	0.131
SB-124 (10.0 - 11.0)		09/15/2011 11:55	SB-124	10	11	**0.0544**	0.0387	0.141	0.42
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.0155	<0.0310	<0.0310	<0.123
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.00822	<0.0164	<0.0164	<0.0654
SB-126 (0.0 - 2.0)		09/28/2011 13:30	SB-126	0	2	<0.00778	<0.0243 B*	<0.0152	0.0342
SB-126 (6.0 - 7.5)		09/28/2011 13:45	SB-126	6	7.5	**15.7**	**171**	**78.3**	**457**
SB-126 (13.0 - 14.0)		09/28/2011 14:15	SB-126	13	14	**0.101**	0.161	0.098	0.602
SB-127 (0.0 - 2.0)		09/28/2011 15:20	SB-127	0	2	<0.00982	<0.0191	<0.0191	<0.0220
SB-127 (5.0 - 7.0)		09/28/2011 15:40	SB-127	5	7	<0.00586	<0.0183 B*	<0.0114	<0.0220
SB-128 (0.0 - 2.0)		09/22/2011 17:20	SB-128	0	2	**0.597**	<0.0302	0.409	0.908
SB-128 (5.0 - 6.6)		09/22/2011 17:40	SB-128	5	6.6	**5.43 JH***	**10.1 JH***	**23.7 JH***	**95.5**
SB-128 (11.5 - 13.0)		09/22/2011 18:00	SB-128	11.5	13	0.00829J	<0.0162	0.0148J	0.0275
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.00724	<0.0145	<0.0145	<0.0576
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.00674	<0.0135	<0.0135	<0.0536

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.00486	<0.00974	<0.00974	<0.0386
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.00696	<0.0139	<0.0139	<0.0554
SB-130 (0.0 - 2.0)		09/20/2011 11:30	SB-130	0	2	<0.0132	<0.0258	<0.0258	0.0344
SB-130 (4.0 - 5.6)		09/20/2011 11:50	SB-130	4	5.6	<0.00600	<0.0117	0.0214	0.0391
SB-130 (7.0 - 8.4)		09/20/2011 12:15	SB-130	7	8.4	**4.12**	**17**	5.49	17.2
SB-130 (11.5 - 12.5)		09/20/2011 12:30	SB-130	11.5	12.5	**0.0922**	0.0167J	0.0495	0.161
SD-130 (11.5 - 12.5)	Dup	09/20/2011 12:45	SB-130	11.5	12.5	**0.0852**	<0.0350 B*	0.0577	0.163
SB-131 (0.0 - 2.0)		09/17/2011 13:50	SB-131	0	2	<0.0117	<0.0228	<0.0228	<0.0440
SB-131 (9.5 - 11.2)		09/17/2011 14:20	SB-131	9.5	11.2	<0.00792	<0.0154	<0.0154	<0.0440
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.0122	<0.0244	<0.0244	<0.0970
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.0133	<0.0266	<0.0266	<0.106
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.0142	<0.0284	<0.0284	<0.113
SB-133 (0.0 - 2.0)		09/19/2011 13:35	SB-133	0	2	<0.00844	<0.0165	<0.0165	<0.0352
SD-133 (0.0 - 2.0)	Dup	09/19/2011 13:45	SB-133	0	2	<0.00826	<0.0161	<0.0161	<0.0352
SB-133 (4.0 - 5.8)		09/19/2011 13:55	SB-133	4	5.8	<0.00936	<0.0183	<0.0183	<0.0352
SB-134 (0.0 - 2.0)		10/04/2011 09:35	SB-134	0	2	<0.00860	<0.0269 B*	0.0102J	1
SB-134 (5.0 - 6.8)		10/04/2011 09:55	SB-134	5	6.8	**4.05 JH***	0.981 JH*	**30.0 JH***	**255**
SB-134 (11.0 - 12.0)		10/04/2011 10:35	SB-134	11	12	**0.116**	<0.0158	0.045	0.4
SB-135 (0.0 - 2.0)		10/06/2011 13:50	SB-135	0	2	<0.00908	<0.0177	<0.0177	<0.0340
SB-135 (3.0 - 4.0)		10/06/2011 14:00	SB-135	3	4	<0.0103	<0.0200	<0.0200	<0.0340
SB-136 (0.0 - 2.0)		10/09/2011 10:50	SB-136	0	2	0.00890J	<0.0207 B*	<0.0129	ND
SB-136 (4.0 - 6.0)		10/09/2011 11:00	SB-136	4	6	0.00362J	<0.0201 B*	<0.0125	ND
SB-137 (0.0 - 2.0)		10/06/2011 10:55	SB-137	0	2	<0.00756	<0.0147	<0.0147	<0.0284
SB-137 (3.5 - 5.2)		10/06/2011 11:15	SB-137	3.5	5.2	<0.00898	<0.0175	0.0101J	0.0297
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.00766	<0.0153	<0.0153	<0.0608
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.0104	<0.0208	<0.0208	<0.0826
SB-139 (0.0 - 2.0)		09/19/2011 16:30	SB-139	0	2	<0.00712	<0.0222 B*	<0.0139	<0.0266
SB-139 (3.0 - 5.0)		09/19/2011 16:35	SB-139	3	5	<0.0132	<0.0258	<0.0258	<0.0266
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.00740	<0.0148	<0.0148	<0.0588
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.0132	<0.0264	<0.0264	<0.105
SB-141 (0.0 - 2.0)		09/19/2011 12:05	SB-141	0	2	<0.00616	<0.0120	<0.0120	<0.0538
SB-141 (3.0 - 5.0)		09/19/2011 12:15	SB-141	3	5	<0.0144	<0.0280	<0.0280	<0.0538
SB-142 (0.0 - 2.0)		09/19/2011 14:25	SB-142	0	2	<0.00994	<0.0194	<0.0194	<0.0454
SB-142 (3.0 - 5.0)		09/19/2011 14:35	SB-142	3	5	<0.0121	<0.0236	<0.0236	<0.0454
SB-143 (0.0 - 2.0)		09/17/2011 15:20	SB-143	0	2	**0.0387**	0.0724	0.954	0.835
SB-143 (3.0 - 5.0)		09/17/2011 15:35	SB-143	3	5	**0.0288**	0.0351J	<0.0280	<0.0540

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-144 (0.0 - 2.0)		10/06/2011 13:00	SB-144	0	2	<0.00940	<0.0183	0.0126J	<0.0438
SB-144 (5.0 - 6.5)		10/06/2011 13:12	SB-144	5	6.5	<0.0117	<0.0228	<0.0228	<0.0438
SB-145 (0.0 - 2.0)		10/09/2011 11:40	SB-145	0	2	0.00801J	<0.0261 B*	<0.0132	ND
SB-145 (3.5 - 5.6)		10/09/2011 11:55	SB-145	3.5	5.6	<0.0117	<0.0367 B*	<0.0230	0.0422
SB-146 (0.0 - 2.0)		10/09/2011 14:10	SB-146	0	2	**0.237**	0.105	0.183	0.544
SB-146 (5.0 - 6.4)		10/09/2011 14:50	SB-146	5	6.4	**30.9**	**140**	**49.7**	**226**
SD-146 (5.0 - 6.4)	Dup	10/09/2011 15:00	SB-146	5	6.4	**34**	**171**	**67.5**	**281**
SB-146 (16.0 - 17.0)		10/09/2011 16:20	SB-146	16	17	**1.55**	0.0753	0.118	3.36
SB-147 (0.0 - 2.0)		09/19/2011 10:50	SB-147	0	2	<0.00814	<0.0159	<0.0159	<0.0306
SB-147 (3.0 - 5.0)		09/19/2011 11:05	SB-147	3	5	<0.0157	<0.0306	<0.0306	<0.0306
SB-148 (0.0 - 2.0)		10/04/2011 16:20	SB-148	0	2	<0.0130 B*	<0.0260 B*	<0.0162	<0.0318
SB-148 (3.5 - 5.1)		10/04/2011 16:35	SB-148	3.5	5.1	<0.00848	<0.0165	<0.0165	<0.0318
SB-148 (6.8 - 7.4)		10/04/2011 16:50	SB-148	6.8	7.4	<0.00694	<0.0217 B*	<0.0135	<0.0318
SB-149 (0.0 - 2.0)		10/05/2011 09:20	SB-149	0	2	<0.00644	0.00663J	<0.0125	<0.0242
SB-149 (3.5 - 5.2)		10/05/2011 09:30	SB-149	3.5	5.2	0.00555 J*	0.0430 J*	0.443 J*	0.839
SD-149 (3.5 - 5.2)	Dup	10/05/2011 09:45	SB-149	3.5	5.2	0.0160 J*	0.117 J*	1.01 J*	1.8
SB-150 (0.0 - 2.0)		10/08/2011 17:05	SB-150	0	2	<0.0161 B*	<0.0199 B*	0.0131J	0.0332
SB-150 (5.0 - 6.1)		10/08/2011 17:20	SB-150	5	6.1	**1**	2.31	**8.5**	61.6
SB-150 (6.5 - 8.0)		10/08/2011 17:50	SB-150	6.5	8	**6.88**	**32.7**	**14.2**	57.1
SB-150 (10.5 - 12.0)		10/08/2011 18:00	SB-150	10.5	12	**0.0817**	<0.0799 B*	0.0377	0.266
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.00596	<0.0119 J*	<0.0119 J*	<0.0474
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	**4.35**	**30.4 J***	**12**	47.2
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	**4.17**	**18.0 J***	**8.34**	30.8
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	**25.6**	**126**	**26.8**	**136**
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	**0.104**	0.194	0.0331	0.134
SB-152 (0.0 - 2.0)		09/17/2011 16:35	SB-152	0	2	<0.0152	<0.0296	<0.0296	<0.0568
SB-152 (3.0 - 4.9)		09/17/2011 16:50	SB-152	3	4.9	<0.00724	<0.0141	<0.0141	<0.0568
SB-153A (0.0 - 2.0)		09/29/2011 13:05	SB-153A	0	2	<0.00752	0.00775J	<0.0146	0.00821
SB-153A (5.0 - 6.8)		09/29/2011 13:20	SB-153A	5	6.8	<0.0103	<0.0202	<0.0202	<0.0388
SB-154 (0.0 - 2.0)		09/29/2011 11:00	SB-154	0	2	<0.00676	<0.0132	<0.0132	0.0112
SB-154 (4.0 - 6.0)		09/29/2011 11:20	SB-154	4	6	<0.00874	0.00955J	0.00928J	0.0169
SB-155 (0.0 - 2.0)		09/29/2011 09:25	SB-155	0	2	0.00434J	0.0132J	0.0124J	0.876
SB-155 (5.0 - 6.3)		09/29/2011 09:40	SB-155	5	6.3	**1.48**	**8.87**	**15.8**	56.8
SB-155 (12.0 - 13.0)		09/29/2011 10:20	SB-155	12	13	<0.00746	0.0231J	0.0149J	0.0524
SB-156 (0.0 - 2.0)		10/05/2011 10:35	SB-156	0	2	0.00243J	0.0137J	0.00544J	0.0116
SB-156 (3.0 - 4.5)		10/05/2011 10:50	SB-156	3	4.5	<0.00694	0.00910J	<0.0135	0.031

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-156 (6.0 - 8.0)		10/05/2011 11:15	SB-156	6	8	**10.1**	**140**	**62**	**237**
SB-156 (11.0 - 12.5)		10/05/2011 11:20	SB-156	11	12.5	**0.232**	1.17	0.433	1.77
SB-156 (15.5 - 17.0)		10/05/2011 12:05	SB-156	15.5	17.5	**0.148**	0.253	0.176	0.675
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.00582	<0.0117	<0.0117	<0.0464
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.00672	<0.0134	<0.0134	<0.0534
SB-158 (0.0 - 2.0)		09/22/2011 15:20	SB-158	0	2	**0.0541**	0.161	2.36	10.3
SB-158 (7.0 - 8.4)		09/22/2011 15:40	SB-158	7	8.4	**0.619**	0.508	**30.2**	**143**
SB-158 (16.0 - 17.4)		09/22/2011 16:40	SB-158	16	17.4	<0.00780	<0.0152	0.00781J	0.0249
SB-159 (0.0 - 2.0)		09/23/2011 10:30	SB-159	0	2	<0.00848	<0.0165	<0.0165	<0.0318
SB-159 (6.0 - 7.9)		09/23/2011 10:45	SB-159	6	7.9	<0.0145	<0.0282	<0.0282	<0.0318
SD-159 (6.0 - 7.9)	Dup	09/23/2011 11:00	SB-159	6	7.9	<0.0115	<0.0224	<0.0224	<0.0318
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	**0.0579**	0.0112J	<0.0129	0.0374J
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	**3.91**	2.09	6.73	**80**
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	**2.72**	2.09	5.05	57.8
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	**22.1**	2.35	**26.8**	**189**
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	0.0159	<0.0126	0.0165J	0.14
SB-161 (0.0 - 2.0)		10/10/2011 09:20	SB-161	0	2	<0.0138 B*	<0.0180 B*	<0.0112	<0.0224
SD-161 (0.0 - 2.0)	Dup	10/10/2011 09:30	SB-161	0	2	<0.00522	<0.0163 B*	<0.0102	<0.0224
SB-161 (6.0 - 7.4)		10/10/2011 09:40	SB-161	6	7.4	<0.0135 B*	<0.0165 B*	<0.0103	<0.0224
SD-161 (6.0 - 7.4)	Dup	10/10/2011 09:50	SB-161	6	7.4	<0.00596	<0.0116	<0.0116	<0.0224
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.00508	<0.0101	<0.0101	<0.0404
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.00508	<0.0102	<0.0102	<0.0404
SB-163 (0.0 - 2.0)		10/03/2011 10:50	SB-163	0	2	<0.0141 B*	<0.0251 B*	<0.0119	<0.0228
SB-163 (5.0 - 6.8)		10/03/2011 11:05	SB-163	5	6.8	<0.0102 B*	<0.0205 B*	<0.0128	<0.0228
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.00630	<0.0126	<0.0126	<0.0500
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.0102	<0.0204	<0.0204	<0.0814
SB-165 (0.0 - 2.0)		10/05/2011 16:20	SB-165	0	2	0.00357J	<0.0111	<0.0111	0.0189
SB-165 (5.0 - 6.4)		10/05/2011 16:30	SB-165	5	6.4	**0.432**	1.89	0.822	**142**
SD-165 (5.0 - 6.4)	Dup	10/05/2011 16:40	SB-165	5	6.4	**0.481**	1.82	0.776	**73.8**
SB-165 (6.5 - 8.3)		10/05/2011 16:50	SB-165	6.5	8.3	**0.222**	0.305	0.925	37.1
SB-165 (12.0 - 13.6)		10/05/2011 17:05	SB-165	12	13.6	**0.0447**	<0.0131	<0.0131	0.215
SB-166 (0.0 - 2.0)		10/07/2011 09:45	SB-166	0	2	0.00319J	0.0111J	0.00825J	0.024
SB-166 (5.5 - 7.2)		10/07/2011 10:15	SB-166	5.5	7.2	0.00737J	<0.0105	<0.0105	0.0224J
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.00604	<0.0194 B*	<0.0121	<0.0480
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	0.0113	<0.0114	0.00676J	0.0409 JH*
SB-168 (0.0 - 2.0)		10/03/2011 11:55	SB-168	0	2	<0.00876 B*	<0.0175 B*	<0.0109	0.0530J

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-168 (3.5 - 5.1)		10/03/2011 12:10	SB-168	3.5	5.1	<0.0207 B*	<0.0414 B*	<0.0258	0.0530J
SD-168 (3.5 - 5.1)	Dup	10/03/2011 12:25	SB-168	3.5	5.1	<0.0220 B*	<0.0520 B*	<0.0276	0.0282
SB-168 (6.0 - 8.0)		10/03/2011 12:35	SB-168	6	8	**0.401**	5.29	3.33	23.6
SB-168 (11.0 - 12.0)		10/03/2011 12:45	SB-168	11	12	<0.0112 B*	<0.0290 B*	<0.0140	0.0496
SB-169 (0.0 - 2.0)		10/06/2011 17:20	SB-169	0	2	<0.00664	<0.0130	<0.0130	<0.0460
SB-169 (3.5 - 5.4)		10/06/2011 17:35	SB-169	3.5	5.4	<0.0122	<0.0238	<0.0238	<0.0460
SB-170 (0.0 - 2.0)		10/03/2011 09:30	SB-170	0	2	<0.0143 B*	<0.0268 B*	<0.0162	0.0276
SB-170 (6.0 - 7.6)		10/03/2011 09:45	SB-170	6	7.6	<0.0196 B*	<0.0280 B*	<0.0142	<0.0274
SB-171 (0.0 - 2.0)		10/06/2011 15:00	SB-171	0	2	<0.00624	<0.0122	<0.0122	<0.0216
SB-171 (3.5 - 5.6)		10/06/2011 15:10	SB-171	3.5	5.6	<0.00576	<0.0112	<0.0112	<0.0216
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.00620	<0.0124	<0.0124	<0.0494
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.00712	<0.0142	<0.0142	<0.0566
SB-173 (0.0 - 2.0)		10/07/2011 15:55	SB-173	0	2	0.0123	<0.0111	<0.0111	0.035
SB-173 (3.0 - 4.5)		10/07/2011 16:15	SB-173	3	4.5	**0.574**	0.585	2.23	30
SB-173 (5.0 - 6.0)		10/07/2011 16:35	SB-173	5	6	**3.89**	0.973	**17.8**	**80.4**
SB-173 (7.5 - 8.5)		10/07/2011 16:25	SB-173	7.5	8.5	**0.505**	<0.0173	0.157	1.07
SB-174 (0.0 - 2.0)		10/03/2011 14:10	SB-174	0	2	**0.309**	1.04	0.0906	1.81
SB-174 (5.5 - 7.2)		10/03/2011 14:25	SB-174	5.5	7.2	**23.3**	**300**	**77.1**	**689**
SB-174 (7.5 - 9.5)		10/03/2011 14:55	SB-174	7.5	9.5	**36.3**	**229**	**48.3**	**385**
SB-174 (12.0 - 13.3)		10/03/2011 15:10	SB-174	12	13.3	<0.0180 B*	<0.117 B*	0.0696	0.532
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.00819 B*	<0.0164 B*	<0.0102	<0.0406
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	<0.0215 B*	0.213	0.063	0.638
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	**2.48**	**28.9**	6.61	58.2
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.0124 B*	<0.0249 B*	<0.0155	<0.0616
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.00632	<0.0126	<0.0126	<0.0502
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.00948	<0.0190	<0.0190	<0.0754
SB-177 (0.0 - 2.0)		10/05/2011 13:50	SB-177	0	2	<0.00584	<0.0114	<0.0114	<0.0218
SB-177 (5.0 - 6.3)		10/05/2011 14:00	SB-177	5	6.3	<0.0103	<0.0200	<0.0200	<0.0218
SB-178 (0.0 - 2.0)		10/05/2011 14:55	SB-178	0	2	<0.00482	<0.00940	<0.00940	<0.0256
SB-178 (6.0 - 7.3)		10/05/2011 15:10	SB-178	6	7.3	<0.00680	<0.0133	<0.0133	<0.0256
SB-179 (0.0 - 2.0)		09/22/2011 14:10	SB-179	0	2	<0.00676	<0.0132	<0.0132	<0.0202
SB-179 (6.0 - 7.2)		09/22/2011 14:20	SB-179	6	7.2	<0.00860	<0.0168	0.00860J	<0.0202
SB-179 (8.0 - 9.2)		09/22/2011 14:30	SB-179	8	9.2	<0.00538	<0.0105	<0.0105	<0.0202
SB-180 (0.0 - 2.0)		10/07/2011 11:20	SB-180	0	2	**0.0367**	0.0407	<0.0115	0.0637
SB-180 (5.5 - 7.2)		10/07/2011 13:25	SB-180	5.5	7.2	**36**	**291**	**41.7**	**706**
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	**21.5**	**132**	**21.3**	**357**

Table 27
2011 Soil Analytical Results - BTEX
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Benzene	Toluene	Ethylbenzene	Xylenes (total)
ADEC MTG Soil Cleanup Level (mg/kg)						**0.025**	**6.5**	**6.9**	**63**
SB-180 (16.0 - 17.5)		10/07/2011 14:55	SB-180	16	17.5	**1.24**	0.0219J	0.0406	0.73
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.0122	<0.0244	<0.0244	<0.0970
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.00800	<0.0160	<0.0160	<0.0636
SB-182 (0.0 - 2.0)		09/23/2011 12:30	SB-182	0	2	<0.0106	<0.0206	<0.0206	<0.0436
SB-182 (2.0 - 3.3)		09/23/2011 12:40	SB-182	2	3.3	<0.0116	<0.0226	<0.0226	<0.0436
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	0.00983J	<0.0125	<0.0125	<0.0498
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	0.0207	<0.00862	<0.00862	<0.0342
Number of Exceedances						**79**	**22**	**35**	**27**
Minimum Exceedance						**0.0277**	**7.84**	**8.32**	**64.1**
Maximum Exceedance						**36.3**	**300**	**98.3**	**706**

Notes:

	Bolded values exceed the MTG soil cleanup level
	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
MW-144B (0.0 - 2.0)		09/21/2011 09:45	MW-144B	0	2	<0.00664
MW-144B (6.0 - 8.0)		09/21/2011 10:33	MW-144B	6	8	<0.00688
MW-144B (90.0 - 92.0)		09/21/2011 18:44	MW-144B	90	92	<0.00676
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.00756 J*
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.00696 J*
MW-195 (0.0 - 2.0)		10/11/2011 13:37	MW-195	0	2	R*
MW-195 (2.0 - 4.0)		10/11/2011 13:57	MW-195	2	4	R*
MW-195 (6.0 - 8.0)		10/11/2011 14:33	MW-195	6	8	0.0170 JH*
MW-195 (14.0 - 16.0)		10/11/2011 15:21	MW-195	14	16	0.0319 JH*
MW-196 (0.0 - 2.0)		10/11/2011 09:21	MW-196	0	2	<0.00646
MW-196 (6.0 - 8.0)		10/11/2011 10:02	MW-196	6	8	<0.00666
MW-196 (14.0 - 16.0)		10/11/2011 10:42	MW-196	14	16	<0.00770
MW-197B (15)		10/16/2011 09:25	MW-197B	15	15	R*
MW-197B (50-52)		10/16/2011 10:03	MW-197B	50	52	R*
O-5 (0.0 - 2.0)		09/13/2011 13:48	O-5	0	2	<0.00698
O-5 (6.0 - 8.0)		09/13/2011 14:23	O-5	6	8	<0.00654
O-5 (14.0 - 16.0)		09/13/2011 15:09	O-5	14	16	0.0180
O-6 (0.0 - 2.0)		09/14/2011 09:14	O-6	0	2	0.0377
O-6 (4.0 - 6.0)		09/14/2011 09:40	O-6	4	6	**1.73**
O-6 (14.0 - 16.0)		09/14/2011 10:43	O-6	14	16	0.00518J
O-7 (0.0 - 2.0)		09/14/2011 13:43	O-7	0	2	<0.00632
O-7 (6.0 - 8.0)		09/14/2011 14:34	O-7	6	8	R*
DO-7 (6.0 - 8.0)	Dup	09/14/2011 14:15	O-7	6	8	R*
O-7 (14.0 - 16.0)		09/14/2011 15:40	O-7	14	16	<0.00688
O-8 (0.0 - 2.0)		09/15/2011 10:01	O-8	0	2	<0.00640
O-8 (6.0 - 8.0)		09/15/2011 10:36	O-8	6	8	<0.00658
O-8 (14.0 - 16.0)		09/15/2011 11:38	O-8	14	16	<0.00686
O-9 (0.0 - 2.0)		09/15/2011 14:34	O-9	0	2	<0.00652
O-9 (6.0 - 8.0)		09/15/2011 15:15	O-9	6	8	R*
O-9 (16.0 - 18.0)		09/15/2011 16:41	O-9	16	18	<0.00674
O-10 (0.0 - 2.0)		09/16/2011 10:47	O-10	0	2	<0.00640
O-10 (6.0 - 8.0)		09/16/2011 11:26	O-10	6	8	0.0254 J*
O-10 (8.0 - 10.0)		09/16/2011 11:39	O-10	8	10	R*
DO-10 (8.0 - 10.0)	Dup	09/16/2011 11:45	O-10	8	10	R*
O-10 (16.0 - 18.0)		09/16/2011 13:01	O-10	16	18	<0.00698
O-11 (0.0 - 2.0)		09/20/2011 10:16	O-11	0	2	<0.00650

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
O-11 (8.0 - 10.0)		09/20/2011 11:01	O-11	8	10	0.0513 J*
O-11 (10.0 - 12.0)		09/20/2011 11:11	O-11	10	12	0.00555 J*
O-11 (25.0 - 27.0)		09/20/2011 12:33	O-11	25	27	0.0715
O-12 (0.0 - 2.0)		09/21/2011 12:55	O-12	0	2	<0.0199
O-12 (7.5 - 9.2)		09/21/2011 11:50	O-12	7.5	9.2	<0.00762
O-12 (14.0 - 16.0)		09/21/2011 12:30	O-12	14	16	0.0425
O-13 (0.0 - 1.4)		09/21/2011 14:35	O-13	0	1.4	<0.0512
O-13 (4.0 - 6.0)		09/21/2011 15:15	O-13	4	6	<0.00666
O-13 (8.0 - 9.1)		09/21/2011 15:45	O-13	8	9.1	0.00558 J*
DO-13 (8.0 - 9.1)	Dup	09/21/2011 16:00	O-13	8	9.1	R*
O-13 (14.5 - 15.2)		09/21/2011 17:05	O-13	14.5	15.2	0.0515
O-14 (0.0 - 2.0)		10/01/2011 09:40	O-14	0	2	<0.00638
O-14 (2.0 - 4.0)		10/01/2011 10:35	O-14	2	4	<0.00644
O-14 (6.0 - 7.8)		10/01/2011 10:30	O-14	6	7.8	<0.00654
O-14 (14.0 - 16.0)		10/01/2011 11:25	O-14	14	16	<0.00664
O-15 (0.0 - 2.0)		10/06/2011 14:20	O-15	0	2	<0.00646 J*
O-15 (8.0 - 10.0)		10/06/2011 15:41	O-15	8	10	<0.00664 J*
O-15 (14.0 - 16.0)		10/06/2011 16:39	O-15	14	16	<0.00704 J*
O-16 (0.0 - 2.0)		10/07/2011 13:00	O-16	0	2	<0.00648
O-16 (6.0 - 8.0)		10/07/2011 14:00	O-16	6	8	<0.00672
O-16 (14.0 - 16.0)		10/07/2011 15:09	O-16	14	16	<0.00710
O-17 (0.0 - 2.0)		10/13/2011 10:16	O-17	0	2	<0.00648
O-17 (6.0 - 8.0)		10/13/2011 11:17	O-17	6	8	<0.00632
O-17 (14.0 - 16.0)		10/13/2011 12:30	O-17	14	16	0.0266
O-18 (0.0 - 2.0)		10/12/2011 10:48	O-18	0	2	<0.00768
O-18 (6.0 - 8.0)		10/12/2011 11:37	O-18	6	8	<0.00968
O-18 (14.0 - 15.0)		10/12/2011 13:30	O-18	14	15	<0.0129
O-19 (0.0 - 2.0)		10/15/2011 09:50	O-19	0	2	<0.0224
DO-19 (0.0 - 2.0)	Dup	10/15/2011 09:45	O-19	0	2	<0.0165
O-19 (4.0 - 6.0)		10/15/2011 10:35	O-19	4	6	R*
DO-19 (6.0 - 8.0)	Dup	10/15/2011 10:38	O-19	6	8	R*
O-19 (6.0 - 8.0)		10/15/2011 10:40	O-19	6	8	R*
O-19 (14.0 - 16.0)		10/15/2011 11:44	O-19	14	16	**0.151 JH***
O-20 (0.0 - 2.0)		10/13/2011 15:43	O-20	0	2	<0.00634
O-20 (6.0 - 8.0)		10/13/2011 16:33	O-20	6	8	<0.00636
DO-20 (6.0 - 8.0)	Dup	10/13/2011 16:30	O-20	6	8	<0.00628

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
O-20 (14.0 - 16.0)		10/13/2011 17:47	O-20	14	16	**0.112**
O-21 (0.0-2.0)		10/14/2011 12:43	O-21	0	2	R*
DO-21 (0.0-2.0)	Dup	10/14/2011 12:40	O-21	0	2	0.00515 J*
O-21 (4.0-6.0)		10/14/2011 13:12	O-21	4	6	R*
O-21 (6.0-8.0)		10/14/2011 13:35	O-21	6	8	0.0577 J*
DO-21 (6.0-8.0)	Dup	10/14/2011 13:30	O-21	6	8	R*
O-21 (14.0-16.0)		10/14/2011 14:48	O-21	14	16	<0.00712
DO-21 (14.0-16.0)	Dup	10/14/2011 14:40	O-21	14	16	<0.00724
O-22 (8-10)		11/14/2011 17:30	O-22	8	10	<0.00636
O-22D (8-10)	Dup	11/14/2011 17:35	O-22	8	10	<0.00644
O-22 (11.3-12.2)		11/14/2011 17:50	O-22	11.3	12.2	<0.00672
O-23 (6-8)		12/05/2011 11:30	O-23	6	8	<0.00754
O-23D (6-8)	Dup	12/05/2011 11:15	O-23	6	8	<0.00784
O-23 (10.6-13.0)		12/05/2011 12:00	O-23	10.6	13	<0.00704
O-25 (8-9)		11/10/2011 11:45	O-25	8	9	<0.00704
O-25 (9.7-10.3)		11/09/2011 11:30	O-25	9.7	10.3	0.0169
O-26 (6.1-6.8)		11/09/2011 17:02	O-26	6.1	6.8	<0.00750
O-26 (8.4-9.2)		11/09/2011 13:06	O-26	8.4	9.2	<0.00770
O-27 (9-9.5)		11/09/2011 17:25	O-27	9	9.5	R*
O-27 (10.3-11)		11/09/2011 17:25	O-27	10.3	11	0.0389 J*
O-28 (8-9)		11/14/2011 18:30	O-28	8	9	**0.309 J***
O-29 (9.5-10)		11/12/2011 12:50	O-29	9.5	10	<0.00644
O-29 (11-11.5)		11/12/2011 13:10	O-29	11	11.5	R*
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.00816
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.00816
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.00784
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.00642
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.00764
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.00634
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.0100
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.00886
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.00708
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.00638
SB-106 (0.0 - 2.0)		09/16/2011 11:10	SB-106	0	2	<0.0522
SD-106 (0.0 - 2.0)	Dup	09/16/2011 11:25	SB-106	0	2	<0.0256
SB-106 (3.5 - 5.2)		09/16/2011 11:40	SB-106	3.5	5.2	<0.00790

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-107 (0.0 - 2.0)		09/16/2011 09:50	SB-107	0	2	<0.00654
SB-107 (5.0 - 6.6)		09/16/2011 10:15	SB-107	5	6.6	<0.00636
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	R*
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.00776
SB-109 (0.0 - 2.0)		09/17/2011 10:30	SB-109	0	2	<0.00638
SD-109 (0.0 - 2.0)	Dup	09/17/2011 10:50	SB-109	0	2	<0.00640
SB-109 (4.0 - 5.9)		09/17/2011 10:45	SB-109	4	5.9	<0.00736
SB-109 (7.5 - 8.5)		09/17/2011 11:20	SB-109	7.5	8.5	R*
SB-109 (16.5 - 17.5)		09/17/2011 11:50	SB-109	16.5	17.5	**0.106**
SB-110 (0.0 - 2.0)		09/16/2011 16:00	SB-110	0	2	<0.00642
SB-110 (5.0 - 6.9)		09/16/2011 16:30	SB-110	5	6.9	R*
SB-110 (7.0 - 8.5)		09/16/2011 17:00	SB-110	7	8.5	0.0364 J*
SB-110 (11.0 - 12.0)		09/16/2011 17:10	SB-110	11	12	0.0486
SB-111 (0.0 - 2.0)		09/17/2011 09:15	SB-111	0	2	<0.00640
SB-111 (4.0 - 6.0)		09/17/2011 09:40	SB-111	4	6	R*
SB-111 (8.0 - 9.2)		09/17/2011 09:50	SB-111	8	9.2	<0.00796
SB-112 (0.0 - 2.0)		10/04/2011 11:20	SB-112	0	2	<0.00692
SB-112 (5.5 - 7.3)		10/04/2011 11:40	SB-112	5.5	7.3	R*
SB-112 (10.0 - 12.0)		10/04/2011 13:00	SB-112	10	12	**0.0901**
SB-113 (0.0 - 2.0)		09/23/2011 14:25	SB-113	0	2	<0.00670
SB-113 (5.0 - 7.0)		09/23/2011 14:45	SB-113	5	7	R*
SB-113 (11.0 - 12.3)		09/23/2011 15:15	SB-113	11	12.3	**0.109 JH***
SB-114 (0.0 - 2.0)		10/03/2011 17:00	SB-114	0	2	<0.00634
SB-114 (5.0 - 6.8)		10/03/2011 17:20	SB-114	5	6.8	0.00557 J*
SB-114 (7.0 - 8.6)		10/03/2011 17:40	SB-114	7	8.6	0.0543 J*
SD-114 (7.0 - 8.6)	Dup	10/03/2011 17:50	SB-114	7	8.6	0.0534 J*
SB-114 (16.0 - 18.0)		10/03/2011 18:35	SB-114	16	18	**0.103**
SB-115 (0.0 - 2.0)		09/24/2011 09:15	SB-115	0	2	<0.00714
SB-115 (6.0 - 7.3)		09/24/2011 10:00	SB-115	6	7.3	**0.197 JH***
SB-115 (15.0 - 17.0)		09/24/2011 10:50	SB-115	15	17	0.0161 JH*
SB-116 (0.0 - 2.0)		09/24/2011 11:45	SB-116	0	2	<0.00634
SB-116 (5.5 - 7.1)		09/24/2011 12:00	SB-116	5.5	7.1	<0.00644
SB-117 (0.0 - 2.0)		09/29/2011 14:15	SB-117	0	2	<0.00658
SB-117 (5.0 - 7.0)		09/29/2011 14:30	SB-117	5	7	R*
SD-117 (5.0 - 7.0)	Dup	09/29/2011 14:45	SB-117	5	7	R*
SB-117 (11.0 - 12.0)		09/29/2011 14:55	SB-117	11	12	**0.199**

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<0.00656
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	**0.191 J***
SB-119 (0.0 - 2.0)		09/15/2011 13:40	SB-119	0	2	<0.00728
SB-119 (5.0 - 6.4)		09/15/2011 14:10	SB-119	5	6.4	<0.00674
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.00672
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	0.0113 J*
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	0.0131 J*
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	**0.0759**
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.00644
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.00722
SB-122 (0.0 - 2.0)		09/20/2011 09:20	SB-122	0	2	<0.00682
SB-122 (5.0 - 6.2)		09/20/2011 09:45	SB-122	5	6.2	R*
SB-122 (6.5 - 7.5)		09/20/2011 10:10	SB-122	6.5	7.5	0.0506 J*
SB-122 (11.5 - 12.5)		09/20/2011 10:20	SB-122	11.5	12.5	**0.129**
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.00672
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.00694
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.00692
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	0.0284 J*
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	0.0577
SB-124 (0.0 - 2.0)		09/15/2011 09:50	SB-124	0	2	R*
SD-124 (0.0 - 2.0)	Dup	09/15/2011 10:10	SB-124	0	2	R*
SB-124 (5.0 - 6.3)		09/15/2011 10:40	SB-124	5	6.3	R*
SB-124 (10.0 - 11.0)		09/15/2011 11:55	SB-124	10	11	0.0187 J*
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.00672
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.00636
SB-126 (0.0 - 2.0)		09/28/2011 13:30	SB-126	0	2	<0.00644
SB-126 (6.0 - 7.5)		09/28/2011 13:45	SB-126	6	7.5	0.00823 J*
SB-126 (13.0 - 14.0)		09/28/2011 14:15	SB-126	13	14	<0.00718
SB-127 (0.0 - 2.0)		09/28/2011 15:20	SB-127	0	2	<0.00694
SB-127 (5.0 - 7.0)		09/28/2011 15:40	SB-127	5	7	<0.00626
SB-128 (0.0 - 2.0)		09/22/2011 17:20	SB-128	0	2	<0.0156
SB-128 (5.0 - 6.6)		09/22/2011 17:40	SB-128	5	6.6	R*
SB-128 (11.5 - 13.0)		09/22/2011 18:00	SB-128	11.5	13	<0.00708
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.00632
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.00634
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.00660

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.00684
SB-130 (0.0 - 2.0)		09/20/2011 11:30	SB-130	0	2	<0.00752
SB-130 (4.0 - 5.6)		09/20/2011 11:50	SB-130	4	5.6	R*
SB-130 (7.0 - 8.4)		09/20/2011 12:15	SB-130	7	8.4	0.00434 J*
SB-130 (11.5 - 12.5)		09/20/2011 12:30	SB-130	11.5	12.5	<0.00694
SD-130 (11.5 - 12.5)	Dup	09/20/2011 12:45	SB-130	11.5	12.5	<0.00692
SB-131 (0.0 - 2.0)		09/17/2011 13:50	SB-131	0	2	<0.00700
SB-131 (9.5 - 11.2)		09/17/2011 14:20	SB-131	9.5	11.2	**0.0770**
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.00692
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	0.0108J
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	0.0126
SB-133 (0.0 - 2.0)		09/19/2011 13:35	SB-133	0	2	<0.00638
SD-133 (0.0 - 2.0)	Dup	09/19/2011 13:45	SB-133	0	2	<0.00662
SB-133 (4.0 - 5.8)		09/19/2011 13:55	SB-133	4	5.8	<0.00684
SB-134 (0.0 - 2.0)		10/04/2011 09:35	SB-134	0	2	<0.00652
SB-134 (5.0 - 6.8)		10/04/2011 09:55	SB-134	5	6.8	0.0575 J*
SB-134 (11.0 - 12.0)		10/04/2011 10:35	SB-134	11	12	**0.266**
SB-135 (0.0 - 2.0)		10/06/2011 13:50	SB-135	0	2	<0.00714
SB-135 (3.0 - 4.0)		10/06/2011 14:00	SB-135	3	4	<0.00722
SB-136 (0.0 - 2.0)		10/09/2011 10:50	SB-136	0	2	<0.00636
SB-136 (4.0 - 6.0)		10/09/2011 11:00	SB-136	4	6	0.00613 JH*
SB-137 (0.0 - 2.0)		10/06/2011 10:55	SB-137	0	2	<0.00656
SB-137 (3.5 - 5.2)		10/06/2011 11:15	SB-137	3.5	5.2	0.0342
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.00634
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.00708
SB-139 (0.0 - 2.0)		09/19/2011 16:30	SB-139	0	2	<0.00638
SB-139 (3.0 - 5.0)		09/19/2011 16:35	SB-139	3	5	<0.00764
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.00646
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.00800
SB-141 (0.0 - 2.0)		09/19/2011 12:05	SB-141	0	2	<0.00636
SB-141 (3.0 - 5.0)		09/19/2011 12:15	SB-141	3	5	**0.0772**
SB-142 (0.0 - 2.0)		09/19/2011 14:25	SB-142	0	2	<0.00676
SB-142 (3.0 - 5.0)		09/19/2011 14:35	SB-142	3	5	0.0147
SB-143 (0.0 - 2.0)		09/17/2011 15:20	SB-143	0	2	R*
SB-143 (3.0 - 5.0)		09/17/2011 15:35	SB-143	3	5	**18.4**
SB-144 (0.0 - 2.0)		10/06/2011 13:00	SB-144	0	2	<0.00692

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-144 (5.0 - 6.5)		10/06/2011 13:12	SB-144	5	6.5	**0.253**
SB-145 (0.0 - 2.0)		10/09/2011 11:40	SB-145	0	2	<0.00652
SB-145 (3.5 - 5.6)		10/09/2011 11:55	SB-145	3.5	5.6	<0.00748
SB-146 (0.0 - 2.0)		10/09/2011 14:10	SB-146	0	2	<0.0149
SB-146 (5.0 - 6.4)		10/09/2011 14:50	SB-146	5	6.4	0.0721 J*
SD-146 (5.0 - 6.4)	Dup	10/09/2011 15:00	SB-146	5	6.4	0.0673 J*
SB-146 (16.0 - 17.0)		10/09/2011 16:20	SB-146	16	17	**0.145 JH***
SB-147 (0.0 - 2.0)		09/19/2011 10:50	SB-147	0	2	<0.00644
SB-147 (3.0 - 5.0)		09/19/2011 11:05	SB-147	3	5	0.00506 J*
SB-148 (0.0 - 2.0)		10/04/2011 16:20	SB-148	0	2	<0.00688
SB-148 (3.5 - 5.1)		10/04/2011 16:35	SB-148	3.5	5.1	0.00721 J*
SB-148 (6.8 - 7.4)		10/04/2011 16:50	SB-148	6.8	7.4	<0.00690
SB-149 (0.0 - 2.0)		10/05/2011 09:20	SB-149	0	2	<0.00646
SB-149 (3.5 - 5.2)		10/05/2011 09:30	SB-149	3.5	5.2	R*
SD-149 (3.5 - 5.2)	Dup	10/05/2011 09:45	SB-149	3.5	5.2	R*
SB-150 (0.0 - 2.0)		10/08/2011 17:05	SB-150	0	2	<0.00636
SB-150 (5.0 - 6.1)		10/08/2011 17:20	SB-150	5	6.1	0.0146 J*
SB-150 (6.5 - 8.0)		10/08/2011 17:50	SB-150	6.5	8	0.00641 J*
SB-150 (10.5 - 12.0)		10/08/2011 18:00	SB-150	10.5	12	<0.00676
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.00632
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	0.0105 J*
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	R*
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	R*
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.00700
SB-152 (0.0 - 2.0)		09/17/2011 16:35	SB-152	0	2	<0.00768
SB-152 (3.0 - 4.9)		09/17/2011 16:50	SB-152	3	4.9	<0.00644
SB-153A (0.0 - 2.0)		09/29/2011 13:05	SB-153A	0	2	<0.00636 J*
SB-153A (5.0 - 6.8)		09/29/2011 13:20	SB-153A	5	6.8	<0.00656
SB-154 (0.0 - 2.0)		09/29/2011 11:00	SB-154	0	2	<0.00646
SB-154 (4.0 - 6.0)		09/29/2011 11:20	SB-154	4	6	<0.00688
SB-155 (0.0 - 2.0)		09/29/2011 09:25	SB-155	0	2	<0.00630
SB-155 (5.0 - 6.3)		09/29/2011 09:40	SB-155	5	6.3	R*
SB-155 (12.0 - 13.0)		09/29/2011 10:20	SB-155	12	13	<0.00686
SB-156 (0.0 - 2.0)		10/05/2011 10:35	SB-156	0	2	<0.0132
SB-156 (3.0 - 4.5)		10/05/2011 10:50	SB-156	3	4.5	<0.00638
SB-156 (6.0 - 8.0)		10/05/2011 11:15	SB-156	6	8	R*

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-156 (11.0 - 12.5)		10/05/2011 11:20	SB-156	11	12.5	<0.00728
SB-156 (15.5 - 17.0)		10/05/2011 12:05	SB-156	15.5	17.5	<0.00700
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.00634
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.00646
SB-158 (0.0 - 2.0)		09/22/2011 15:20	SB-158	0	2	0.0135 J*
SB-158 (7.0 - 8.4)		09/22/2011 15:40	SB-158	7	8.4	**0.441 J***
SB-158 (16.0 - 17.4)		09/22/2011 16:40	SB-158	16	17.4	**0.217**
SB-159 (0.0 - 2.0)		09/23/2011 10:30	SB-159	0	2	<0.00642
SB-159 (6.0 - 7.9)		09/23/2011 10:45	SB-159	6	7.9	<0.00732
SD-159 (6.0 - 7.9)	Dup	09/23/2011 11:00	SB-159	6	7.9	<0.00722
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	<0.00668
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	**0.549 J***
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	**0.590 J***
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	**0.120 J***
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	<0.00688
SB-161 (0.0 - 2.0)		10/10/2011 09:20	SB-161	0	2	<0.00626
SD-161 (0.0 - 2.0)	Dup	10/10/2011 09:30	SB-161	0	2	<0.00630
SB-161 (6.0 - 7.4)		10/10/2011 09:40	SB-161	6	7.4	<0.00628
SD-161 (6.0 - 7.4)	Dup	10/10/2011 09:50	SB-161	6	7.4	<0.00628
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.00632
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.00634
SB-163 (0.0 - 2.0)		10/03/2011 10:50	SB-163	0	2	<0.00636
SB-163 (5.0 - 6.8)		10/03/2011 11:05	SB-163	5	6.8	<0.00632
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.00646
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	0.0207
SB-165 (0.0 - 2.0)		10/05/2011 16:20	SB-165	0	2	<0.00634
SB-165 (5.0 - 6.4)		10/05/2011 16:30	SB-165	5	6.4	R*
SD-165 (5.0 - 6.4)	Dup	10/05/2011 16:40	SB-165	5	6.4	R*
SB-165 (6.5 - 8.3)		10/05/2011 16:50	SB-165	6.5	8.3	0.0204 J*
SB-165 (12.0 - 13.6)		10/05/2011 17:05	SB-165	12	13.6	<0.00680
SB-166 (0.0 - 2.0)		10/07/2011 09:45	SB-166	0	2	<0.00630
SB-166 (5.5 - 7.2)		10/07/2011 10:15	SB-166	5.5	7.2	<0.00842
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.00640
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.00636
SB-168 (0.0 - 2.0)		10/03/2011 11:55	SB-168	0	2	<0.00640
SB-168 (3.5 - 5.1)		10/03/2011 12:10	SB-168	3.5	5.1	<0.00816

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SD-168 (3.5 - 5.1)	Dup	10/03/2011 12:25	SB-168	3.5	5.1	<0.00800
SB-168 (6.0 - 8.0)		10/03/2011 12:35	SB-168	6	8	<0.00672
SB-168 (11.0 - 12.0)		10/03/2011 12:45	SB-168	11	12	<0.00682
SB-169 (0.0 - 2.0)		10/06/2011 17:20	SB-169	0	2	<0.00632
SB-169 (3.5 - 5.4)		10/06/2011 17:35	SB-169	3.5	5.4	<0.00804
SB-170 (0.0 - 2.0)		10/03/2011 09:30	SB-170	0	2	<0.00650
SB-170 (6.0 - 7.6)		10/03/2011 09:45	SB-170	6	7.6	<0.00648
SB-171 (0.0 - 2.0)		10/06/2011 15:00	SB-171	0	2	<0.00636
SB-171 (3.5 - 5.6)		10/06/2011 15:10	SB-171	3.5	5.6	<0.00654
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.00652
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.00648
SB-173 (0.0 - 2.0)		10/07/2011 15:55	SB-173	0	2	<0.00852
SB-173 (3.0 - 4.5)		10/07/2011 16:15	SB-173	3	4.5	R*
SB-173 (5.0 - 6.0)		10/07/2011 16:35	SB-173	5	6	R*
SB-173 (7.5 - 8.5)		10/07/2011 16:25	SB-173	7.5	8.5	**0.0777**
SB-174 (0.0 - 2.0)		10/03/2011 14:10	SB-174	0	2	<0.00636
SB-174 (5.5 - 7.2)		10/03/2011 14:25	SB-174	5.5	7.2	**0.117 J***
SB-174 (7.5 - 9.5)		10/03/2011 14:55	SB-174	7.5	9.5	**0.0751 J***
SB-174 (12.0 - 13.3)		10/03/2011 15:10	SB-174	12	13.3	0.0336
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.00638
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	**1.17**
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	**1.43 J***
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	0.0137
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.00652
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.00694
SB-177 (0.0 - 2.0)		10/05/2011 13:50	SB-177	0	2	<0.0210
SB-177 (5.0 - 6.3)		10/05/2011 14:00	SB-177	5	6.3	<0.00730
SB-178 (0.0 - 2.0)		10/05/2011 14:55	SB-178	0	2	<0.00636
SB-178 (6.0 - 7.3)		10/05/2011 15:10	SB-178	6	7.3	<0.00646
SB-179 (0.0 - 2.0)		09/22/2011 14:10	SB-179	0	2	<0.00636
SB-179 (6.0 - 7.2)		09/22/2011 14:20	SB-179	6	7.2	<0.00658
SB-179 (8.0 - 9.2)		09/22/2011 14:30	SB-179	8	9.2	<0.00672
SB-180 (0.0 - 2.0)		10/07/2011 11:20	SB-180	0	2	<0.0149
SB-180 (5.5 - 7.2)		10/07/2011 13:25	SB-180	5.5	7.2	0.0571 J*
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	**0.305 J***
SB-180 (16.0 - 17.5)		10/07/2011 14:55	SB-180	16	17.5	**2.75**

Table 28
2011 Soil Analytical Results - Sulfolane
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Sulfolane
Estimated ADEC MTG Soil Cleanup Level (mg/kg)						**0.073**
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.00756
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.00698
SB-182 (0.0 - 2.0)		09/23/2011 12:30	SB-182	0	2	<0.00728
SB-182 (2.0 - 3.3)		09/23/2011 12:40	SB-182	2	3.3	<0.00754
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.00656
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.00634

Number of Exceedances	**30**
Minimum Exceedance	**0.0751J**
Maximum Exceedance	**18.4**

Notes:

	Bolded values exceed the MTG soil cleanup level
	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 29
2011 Soil Analytical Results - Metals
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Antimony	Arsenic	Chromium (Total)	Copper	Iron	Cyanide	Nickel	Selenium	Zinc
ADEC MTG Soil Cleanup Level (mg/kg)						**3.6**	**3.9**	**25**	**460**	**640**	**27**	**8.6**	**3.4**	**4,100**
Estimated Alaska Mean (mg/kg)[1]						**--**	**17.3**	**114**	**--**	**--**	**--**	**--**	**--**	**--**
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	0.185	1.62	13.6	28.7	**7,840**	<0.060	**10.8**	0.455J	25.6
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	0.162	3.6	11.6	16.8	**10,400**	<0.060	**17.8**	<0.338	23.4
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	0.227	**17.6**	23.9	33.3	**29,000**	0.15	**27.7**	0.522J	59.1
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	0.202	**12.6**	21.8	36.9	**23,500**	<0.058	**27.5**	0.330J	62.5
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	0.168	**10.4**	24.0	37.1	**25,900**	0.13	**28.5**	0.396J	63.8
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	0.137	2.98	15.5	12.1	**9,390**	<0.060	**11.8**	<0.304	34.8
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	0.174	**11.9**	21.7	29.5	**23,800**	0.086J	**23.0**	0.448J	55.6
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	0.0881J	3.48	**31.9**	13.5	**10,400**	<0.060	**13.7**	<0.304	24.6
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	0.172	**10.5**	21.9	37.2	**23,400**	0.050J	**28.0**	0.269J	60.7
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	0.0840J	3.11	8.33	22.8	**9,020**	<0.060	**12.2**	0.160J	23.5
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	0.129 J*	**7.93**	16.9	26.3 J*	**17,400**	0.049J	**21.9**	0.409J	47.3
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	0.0700J	3.39	9.66	16.8	**9,410**	<0.058	**12.3**	<0.290	24
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	0.165	**5.39**	13.7	25.5	**12,600**	0.054J	**19.8**	0.184J	47
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	0.178	**5.78**	16.9	29.1	**19,500**	<0.060	**25.0**	0.326J	46.5
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	0.0556J	**4.18**	13.0	18.5	**10,900**	<0.060	**16.2**	<0.316	35.1
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	0.126	**10.7**	**31.0**	46.8	**27,000**	0.037J	**38.0**	0.415J	79.2
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	0.112	**7.15**	16.5	25	**16,100**	<0.060	**20.1**	0.162J	47
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	0.0363J	2.84	8.83	10	**8,530**	<0.060	**10.5**	<0.302	25.3
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	0.0560J	3.06	10.6	13.6	**8,780**	<0.060	**12.9**	<0.308	24.3
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	0.0474J	2.71	8.24	9.77	**8,260**	<0.060	**9.91**	<0.316	21.2
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	0.0711J	**3.99**	13.3	15.4	**11,700**	<0.060	**14.2**	<0.294	32
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	0.0691J	**6.52**	17.0	22.3	**14,200**	0.055J	**17.7**	<0.332	39.9
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	0.113 J*	**6.4**	14.4	22.2	**14,800**	<0.060	**18.9**	<0.298	37.3
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	0.166	**6.63**	13.9	23.5	**14,300**	<0.060	**19.2**	<0.310	39.2
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	0.142	**6.04**	16.5	25.5	**14,600**	<0.060	**20.7**	0.180J	42.7
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	0.101J	3.27	10.7	15.9	**10,900**	<0.060	**14.8**	<0.328	29.4
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	0.0861J	2.45	10.9	13.4	**8,760**	<0.060	**12.2**	<0.312	22.1
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	0.0927J	**7.64**	15.6	18.3	**16,600**	0.080J	**19.0**	0.324J	37.7
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	0.0749J	**4.78**	11.8	15.3	**11,200**	<0.060	**14.4**	<0.310	29.5
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	0.0843J	2.45	9.31	11.4	**7,790**	<0.060	**11.2**	<0.300	20.9
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	0.0399J	2.34	7.69	17.1	**8,410**	<0.060	**8.88**	<0.302	23.1
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	0.0523J	**4.55**	9.83	10.9	**8,700**	<0.060	**12.5**	<0.316	22
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	0.0568J	3.27	10.1	11.6	**7,670**	<0.060	**9.87**	<0.328	19.6
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	0.134	**8.58**	18.2	28.3	**17,700**	0.067J	**23.0**	0.309J	50.9
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	0.123	**7.13**	14.0	21.6	**15,400**	<0.060	**20.5**	0.213J	41.1
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	0.133	**8.14**	14.7	25.5	**16,600**	<0.060	**21.7**	0.230J	43.8
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	0.0698J	**4.54**	11.9	17.5	**12,500**	<0.060	**13.9**	<0.302	32
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	0.0796J	**8.22**	19.3	19.3	**18,200**	0.0600 JH*	**24.9**	0.285J	44.2
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	0.0775J	3.63	13.8	17.5	**12,800**	0.037J	**19.3**	0.187J	35.6
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	0.19	**16.7**	**31.0**	52.4	**28,900**	0.058J	**37.0**	0.635	83.7
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	0.0684J	3.62	11.9	14.1	**10,000**	<0.060	**13.8**	0.178J	28.3
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	0.0994J	**4.73**	18.6	29.1	**17,300**	<0.060	**22.2**	0.256J	48.5
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	0.119J	**6.56**	16.8	29.1	**17,300**	<0.058	**23.8**	0.240J	46.3

Table 29
2011 Soil Analytical Results - Metals
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	Antimony	Arsenic	Chromium (Total)	Copper	Iron	Cyanide	Nickel	Selenium	Zinc
ADEC MTG Soil Cleanup Level (mg/kg)						**3.6**	**3.9**	**25**	**460**	**640**	**27**	**8.6**	**3.4**	**4,100**
Estimated Alaska Mean (mg/kg)[1]						**--**	**17.3**	**114**	**--**	**--**	**--**	**--**	**--**	**--**
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	0.0430J	2.34	10.1	13.9	**9,400**	<0.060	**12.1**	<0.336	27.3
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	0.0472J	2.32	10.0	9.88	**6,930**	<0.060	8.44	<0.336	17.9
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	0.0524J	3.54	**50.9**	15.2	**13,000**	<0.060	**17.1**	<0.308	29.8
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	0.0671J	**4.65**	9.2	14	**10,100**	<0.060	**12.6**	<0.298	25.4
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	0.105	**6.3**	19.2	25.6	**14,100**	0.0580 JH*	**19.3**	0.263J	44.9
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	0.0673J	3.05	15.0	16.5	**10,200**	<0.060	**16.0**	0.185J	30.1
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	0.107	**4.02**	14.0	18.5	**11,200**	<0.060	**16.6**	0.229J	32.6
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	0.0911J	2.16	10.1	14.2	**10,400**	<0.060	**13.4**	0.325J	27.4
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	0.0558J	2.52	8.74	9.69	**8,980**	<0.060	**10.5**	0.330J	21.6
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	0.0694J	3.13	16.4	17.5	**9,820**	<0.060	**13.9**	0.209J	27.7
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	0.0557J	3.09	13.3	12.9	**8,800**	<0.060	**11.1**	<0.292	21.9
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	0.0988	3.8	12.0	17.7	**10,600**	<0.060	**15.1**	<0.294	30.8
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	0.151	**14.1**	24.5	43.5	**26,300**	0.0440 JH*	**29.4**	0.347J	69.1
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	0.0870J	3.57	12.4	19.6	**10,900**	<0.060	**15.7**	<0.276	33.3
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	0.100 J*	3.47	15.1	22.5	**9,940**	<0.060	**15.6**	0.229J	25.7
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	0.0702J	**4.8**	13.8	18.4	**11,800**	<0.060	**15.2**	<0.302	36
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	0.0599J	3.56	13.2	16	**11,000**	<0.060	**14.2**	<0.298	25.1
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	0.154	3.63	8.83	20.8	**10,500**	<0.060	**11.8**	0.625	32.2
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	0.0473J	**4.1**	22.7	16.4	**10,900**	<0.058	**15.7**	<0.296	28.3
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	0.0309J	2.97	12.2	14.8	**8,830**	<0.060	**10.4**	<0.296	22.6
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.0656	2.45	7.82	11.3	**7,330**	<0.060	**9.90**	<0.318	18.9
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	0.0865J	**4.54**	12.9	17.9	**12,200**	<0.060	**16.0**	0.204J	32.5
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	0.106J	**6.56**	14.7	22.9	**15,800**	<0.060	**19.8**	<0.320	38.3
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	0.118J	**10.3**	19.9	29.6	**21,400**	0.067J	**24.6**	0.272J	55
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	0.0792J	**7.67**	13.6	24.6	**14,800**	<0.060	**18.9**	<0.326	40
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	0.0807J	**6.53**	15.4	19.6	**14,800**	0.0420 JH*	**17.2**	0.212J	37.6
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	0.0499J	**4.34**	13.9	17.4	**9,960**	<0.060	**13.4**	<0.288	25.8
Number of Exceedances							**36/1[2]**	**4/0**		**65**		**64**		
Minimum Exceedance							**3.99/17.6**	**31**		**6,930**		**8.9**		
Maximum Exceedance							**17.6**	**50.9**		**29,000**		**38.0**		

Notes:

	Bolded values exceed the MTG soil cleanup level
	Shaded values exceed the estimated Alaska mean
	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
1	The estimated Alaska mean for arsenic was reported in the USACE 1994 background metals study at Fort Wainwright, AK.
2	The first number represents exceedances above the MTG soil cleanup level. The second number respresents exceedances above the estimated Alaska mean.
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 30
2011 Soil Analytical Results - Petroleum Hydrocarbons
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	GRO	DRO	RRO
ADEC MTG Soil Cleanup Level (mg/kg)						**300**	**250**	**11000**
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<1.39	<15.0	<24.1 B*
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<1.16	<13.9	<13.9
MW-197B (15)		10/16/2011 09:25	MW-197B	15	15	**456 JH***	**252**	--
MW-197B (50-52)		10/16/2011 10:03	MW-197B	50	52	69.5 JH*	25.1	--
MW-307 (8-8.5)		12/03/2011 11:30	MW-307	8	8.5	<0.866	<12.7	--
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<2.96	68.8	417
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<2.76	<16.2	34
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<2.70	<15.7	51.4
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<1.30	<12.9	23.8
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<2.60	9.01J	76.5
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<1.59	<12.7	<20.5 B*
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<3.04	<15.1	32.5
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<1.45	<13.1	<21.2 B*
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<2.24	7.98J	79.1
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<1.66 J*	<12.8	22.7
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	5.35 JH*	**869 JH***	8450 J*
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	0.899 JH*	13.0J	111
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<1.58	115	1070
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<2.68	11.8J	98.3
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<3.36 B*	18.5J	56.1
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	<2.63 B*	<13.1	<13.1
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	254 JH*	**451**	38.3
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	**408 JH***	**551**	43
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<1.31	25.9	242
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<2.06	<14.4	22.8J
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<3.14 B*	86.2	85.6
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	<2.69 B*	<13.6	<13.6
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<3.55 B*	<13.7	<13.7
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<3.40 B*	83.4	397
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	**1110 JH***	**4880**	33.1
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<2.98	<13.5	37.7
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<1.58	<12.5	19.7J

Table 30
2011 Soil Analytical Results - Petroleum Hydrocarbons
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	GRO	DRO	RRO
ADEC MTG Soil Cleanup Level (mg/kg)						**300**	**250**	**11000**
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<1.39	14.5J	19.9J
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	1.90J	13.3J	9.04J
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<1.30	12.4J	13.2J
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	127 JH*	208	9.71J
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<2.34	28.1	123
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<2.56	<14.3	8.57J
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<2.74	<14.8	8.76J
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<1.47	8.21J	39
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<2.00	9.45J	48.2
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<1.42	<12.9	35.1
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<2.54	<16.1	38.9
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<1.15	28.3	40.3
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	1.72J	<14.1	8.70J
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	**409 JH***	**1740 J***	132 J*
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	269 JH*	209 J*	42.9 J*
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	**1520 JH***	**5640**	284
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<1.12	<12.7	<20.5 B*
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<1.29	<12.9	<20.9 B*
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	2.16	204	116
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	2.75	92.1	7.14J
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	**734 JH***	**6070**	337
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	10.3 J*	**6280**	346
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	**939 JH***	**18800**	1270
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.976	<12.7	<12.7
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.976	89.8	26.3
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<1.21	<13.0	20.3J
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<1.97	<15.5	16.4J
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<1.16	7.65J	19.6J
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<1.10	<12.8	<12.8
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	0.604J	74.2 JH*	358
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<1.37	<13.0	29.5
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.982	8.07J	108

Table 30
2011 Soil Analytical Results - Petroleum Hydrocarbons
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	GRO	DRO	RRO
ADEC MTG Soil Cleanup Level (mg/kg)						**300**	**250**	**11000**
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	1.03J	<14.1	14.0J
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	2.98	95.7	684
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	**314 JH***	**518**	34.9
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<1.21	<13.1	<13.1
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<1.82	<13.9	<13.9
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<2.34	10.3J	65.5
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<1.54	<13.8	<22.3 B*
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	0.751J	<13.0	<13.0
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	0.642J	<12.8	<12.8
Number of Exceedances						**8**	**9**	**0**
Minimum Exceedance						**314JH**	**252**	
Maximum Exceedance						**1,520JH**	**18,800**	

Notes:

	Bolded values exceed the MTG soil cleanup level
	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 31
2011 Soil Analytical Results - VOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	1,1-Dichloro-ethylene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	4-Isopropyl-toluene (p-cymene)	Chloro-benzene	cis-1,2-Dichloro-ethylene	Cyclo-hexane	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Methylene chloride	n-Butyl-benzene	n-Hexane	n-Propyl-benzene	tert-Butyl-benzene
ADEC MTG Soil Cleanup Level (mg/kg)						**0.03**	**23**	**23**	**NA**	**0.63**	**0.24**	**13**	**51**	**1.3**	**0.016**	**15**	**6.2**	**15**	**12**
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.0144	<0.0278	<0.0144	<0.0144	<0.0144	<0.0144	<0.0144	<0.0144	<0.0574	<0.0574	<0.0144	<0.0144	<0.0144	<0.0144
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.0120	<0.0232	<0.0120	<0.0120	<0.0120	<0.0120	<0.0120	<0.0120	<0.0478	<0.0478	<0.0120	<0.0120	<0.0120	<0.0120
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.0308	<0.0592	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.122	<0.122	<0.0308	<0.0308	<0.0308	<0.0308
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.0288	<0.0554	<0.0288	<0.0288	<0.0288	<0.0288	<0.0288	<0.0288	<0.114	<0.114	<0.0288	<0.0288	<0.0288	<0.0288
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.0282	<0.0542	<0.0282	<0.0282	<0.0282	<0.0282	<0.0282	<0.0282	<0.112	<0.112	<0.0282	0.0167J	<0.0282	<0.0282
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.0135	<0.0260	<0.0135	<0.0135	<0.0135	<0.0135	<0.0135	<0.0135	<0.0536	<0.0536	<0.0135	<0.0135	<0.0135	<0.0135
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.0272	<0.0522	<0.0272	<0.0272	<0.0272	<0.0272	<0.0272	<0.0272	<0.108	<0.108	<0.0272	<0.0272	<0.0272	<0.0272
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.0166	<0.0318	<0.0166	<0.0166	<0.0166	<0.0166	<0.0166	<0.0166	<0.0658	<0.0658	<0.0166	<0.0166	<0.0166	<0.0166
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.0316	<0.0608	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316	<0.126	<0.126	<0.0316	<0.0316	<0.0316	<0.0316
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.0151	<0.0290	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0600	<0.0600	<0.0151	<0.0151	<0.0151	<0.0151
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.0234	<0.0448	<0.0234	<0.0234	<0.0234	<0.0234	<0.0234	<0.0234	<0.0928	<0.0928	<0.0234	0.116	<0.0234	<0.0234
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.0173 J*	<0.0332 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*	<0.0688 J*	<0.0688 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*	<0.0173 J*
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	<0.0210	<0.0404	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0834	<0.0834	<0.0210	0.0131 JH*	<0.0210	<0.0210
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.0186	<0.0358	<0.0186	<0.0186	<0.0186	<0.0186	<0.0186	0.0295 JH*	<0.0738	<0.0738	<0.0186	<0.0186	<0.0186	<0.0186
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<0.0165	<0.0316	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165	<0.0654	**0.0541J**	<0.0165	<0.0165	<0.0165	<0.0165
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.0280	<0.0538	<0.0280	<0.0280	<0.0280	<0.0280	<0.0280	<0.0280	<0.111	<0.111	<0.0280	<0.0280	<0.0280	<0.0280
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.0210	<0.0404	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0834	<0.0834	<0.0210	<0.0210	<0.0210	<0.0210
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	<0.0124	11.5	4.57	0.789	<0.0124	<0.0124	1.24	0.790	<0.0492	<0.0492	3.00	0.582	3.97	0.0562
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	<0.0131	10.9	4.34	0.775	<0.0131	<0.0131	1.10	0.989	<0.0520	<0.0520	2.25	0.815	3.37	0.0739
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	<0.0164 J*	0.0720 JL*	<0.0263 B*	<0.0164 J*	<0.0164 J*	<0.0164 J*	0.0142 JL*	0.0102 JL*	<0.0652 J*	**0.0551 JL***	0.00998 JL*	0.0126 JL*	0.0197 JL*	<0.0164 J*
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.0136	<0.0262	<0.0136	<0.0136	<0.0136	<0.0136	<0.0136	<0.0136	<0.0542	**0.0286J**	<0.0136	<0.0136	<0.0136	<0.0136
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.0214	<0.0412	<0.0214	<0.0214	<0.0214	<0.0214	<0.0214	<0.0214	<0.0852	<0.0852	<0.0214	<0.0214	<0.0214	<0.0214
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.0196	<0.0629 B*	0.0223 JH*	0.0182 JH*	<0.0196	<0.0196	<0.0196	<0.0196	<0.0780	**0.0604 JH***	<0.0196	<0.0196	<0.0196	<0.0196
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.0222	<0.0711 B*	0.0259 JH*	<0.0222	<0.0222	<0.0222	<0.0222	<0.0222	<0.0882	**0.188 JH***	<0.0222	<0.0222	<0.0355 B*	<0.0222
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.0212	<0.0681 B*	0.0245 JH*	<0.0212	<0.0212	<0.0212	<0.0212	<0.0212	<0.0844	<0.0844	<0.0212	<0.0212	<0.0340 B*	<0.0212
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	<0.158	**38.2 JH***	15.3 JH*	10.1 JH*	<0.158	<0.158	**17.2 JH***	8.12 JH*	<0.628	<0.628	7.76 JH*	**13.0 JH***	14.2 JH*	<0.158
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	<0.0120	<0.0762 B*	0.0362 JH*	0.0179 JH*	<0.0120	<0.0120	0.0346 JH*	0.0169 JH*	<0.0478	<0.0478	0.0302 JH*	0.0385 JH*	<0.0327 B*	<0.0120
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.0310	<0.0596	<0.0310	<0.0310	<0.0310	<0.0310	<0.0310	<0.0310	<0.123	<0.123	<0.0310	<0.0310	<0.0310	<0.0310
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.0164	<0.0316	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0654	<0.0654	<0.0164	<0.0164	<0.0164	<0.0164
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.0145	<0.0278	<0.0145	<0.0145	<0.0145	<0.0145	<0.0145	<0.0145	<0.0576	<0.0576	<0.0145	<0.0145	<0.0145	<0.0145
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.0135	<0.0260	<0.0135	<0.0135	<0.0135	<0.0135	<0.0135	<0.0135	<0.0536	**0.0356J**	<0.0135	<0.0135	<0.0135	<0.0135
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.00974	0.0571	0.239	0.115	<0.00974	<0.00974	2.19	0.0998	<0.0386	**0.0282J**	0.268	1.37	0.248	0.0112J
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.0139	<0.0268	<0.0139	<0.0139	<0.0139	<0.0139	<0.0139	<0.0139	<0.0554	<0.0554	<0.0139	<0.0139	<0.0139	<0.0139
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.0244	<0.0470	<0.0391 B*	<0.0244	<0.0244	<0.0244	<0.0244	<0.0244	<0.0970	<0.0970	<0.0244	<0.0244	<0.0244	<0.0244
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.0266	<0.0512	<0.0266	<0.0266	<0.0266	<0.0266	<0.0266	<0.0266	<0.106	<0.106	<0.0266	<0.0266	<0.0266	<0.0266
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.0284	<0.0546	<0.0284	<0.0284	<0.0284	<0.0284	<0.0284	<0.0284	<0.113	<0.113	<0.0284	<0.0284	<0.0284	<0.0284
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.0153	<0.0294	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0608	<0.0608	<0.0153	<0.0153	<0.0153	<0.0153
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.0208	<0.0400	<0.0208	<0.0208	<0.0208	<0.0208	<0.0208	<0.0208	<0.0826	<0.0826	<0.0208	<0.0208	<0.0208	<0.0208
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.0148	<0.0284	<0.0148	<0.0148	<0.0148	<0.0148	<0.0148	<0.0148	<0.0588	<0.0588	<0.0148	<0.0148	<0.0148	<0.0148
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.0264	<0.0508	<0.0264	<0.0264	<0.0264	<0.0264	<0.0264	<0.0264	<0.105	<0.105	<0.0264	<0.0264	<0.0264	<0.0264
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.0119	<0.0230	<0.0119	<0.0119	<0.0119 J*	<0.0119	0.00955J	<0.0119 J*	<0.0474	<0.0474	<0.0119	<0.0119	<0.0119	<0.0119
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	<0.214	6.74 J*	2.64 J*	0.696 J*	<2.14	<0.214	11.3	1.27J	<0.850	<0.850	<0.214	5.07	2.55 J*	<0.214
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	<0.222	3.16 J*	1.34 J*	0.403 J*	<0.222	<0.222	7.24	0.849	<0.884	<0.884	<0.222	3.29	1.34 J*	0.203J
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	<1.36	17.3	6.87	2.44	<1.36	<1.36	**21.2**	4.00	<5.40	<5.40	3.89	**12.4**	5.96	0.979J
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.0138	0.0188J	0.0104J	<0.0138	<0.0138	<0.0138	0.0490	0.00949J	<0.0548	<0.0548	<0.0138	0.0283	0.0166J	<0.0138
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.0117	<0.0224	<0.0117	<0.0117	<0.0117	<0.0117	<0.0117	<0.0117	<0.0464	<0.0464	<0.0117	<0.0117	<0.0117	<0.0117
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.0134	<0.0258	<0.0134	<0.0134	<0.0134	<0.0134	<0.0134	<0.0134	<0.0534	<0.0534	<0.0134	<0.0134	<0.0134	<0.0134
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	<0.0129	<0.0250	0.0141J	<0.0129	<0.0129	<0.0129	0.100	<0.0129	<0.0514	<0.0514	<0.0129	0.0670	<0.0129	<0.0129
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	<0.112	**24.2**	7.44	1.25	<0.112	<0.112	8.57	1.61	<0.448	<0.448	<0.112	4.56	3.00	0.216
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	<0.112	19.5	6.43	1.39	<0.112	<0.112	6.43	1.20	<0.444	<0.444	<0.112	3.49	2.29	0.203
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	<0.124	**61.3**	**25.6**	3.27	<0.124	<0.124	**44.9**	3.83	<0.492	<0.492	<0.124	**11.6**	6.65	<0.124

Table 31
2011 Soil Analytical Results - VOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	1,1-Dichloro-ethylene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	4-Isopropyl-toluene (p-cymene)	Chloro-benzene	cis-1,2-Dichloro-ethylene	Cyclo-hexane	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Methylene chloride	n-Butyl-benzene	n-Hexane	n-Propyl-benzene	tert-Butyl-benzene
ADEC MTG Soil Cleanup Level (mg/kg)						**0.03**	**23**	**23**	**NA**	**0.63**	**0.24**	**13**	**51**	**1.3**	**0.016**	**15**	**6.2**	**15**	**12**
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	<0.0126	0.0686	0.0343	0.0165J	<0.0126	<0.0126	0.0375	0.0198J	<0.0500	<0.0500	<0.0126	0.0200J	0.0232	<0.0126
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.0101	<0.0195	<0.0101	<0.0101	<0.0101	<0.0101	<0.0101	<0.0163 B*	<0.0404	<0.0404	<0.0101	<0.0101	<0.0163 B*	<0.0101
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.0102	<0.0195	<0.0102	<0.0102	<0.0102	<0.0102	<0.0102	<0.0102	<0.0404	<0.0404	<0.0102	<0.0102	<0.0102	<0.0102
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.0126	<0.0242	<0.0126	<0.0126	<0.0126	<0.0126	<0.0126	<0.0126	<0.0500	<0.0500	<0.0126	<0.0126	<0.0126	<0.0126
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.0204	<0.0394	<0.0204	<0.0204	<0.0204	<0.0204	0.0187J	<0.0204	<0.0814	<0.0814	<0.0204	<0.0204	<0.0204	<0.0204
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.0121	<0.0388 B*	<0.0194 B*	0.0118J	<0.0121	<0.0121	0.00949J	<0.0121	<0.0480	<0.0480	<0.0194 B*	<0.0121	<0.0194 B*	<0.0121
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.0114	<0.0366 B*	<0.0203 B*	0.0139J	<0.0114	<0.0114	0.0124J	<0.0114	<0.0454	<0.0454	<0.0114	<0.0114	<0.0183 B*	<0.0114
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.0124	<0.0238	<0.0124	<0.0124	<0.0124	<0.0124	0.0129J	<0.0124	<0.0494	<0.0494	<0.0124	<0.0124	<0.0124	<0.0124
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.0142	<0.0274	<0.0142	<0.0142	<0.0142	<0.0142	0.0135J	<0.0142	<0.0566	<0.0566	<0.0142	<0.0142	<0.0142	<0.0142
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.0102	<0.0197	<0.0102	<0.0102	<0.0102	<0.0102	0.0210	<0.0102	<0.0406	<0.0406	<0.0102	<0.0102	<0.0102	<0.0102
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	<0.0124	0.153	<0.0670 B*	<0.0199 B*	<0.0124	<0.0124	0.0431	<0.0265 B*	<0.0494	<0.0494	<0.0124	0.0179J	<0.0393 B*	<0.0199 B*
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	<0.0888	15.5	4.80	1.07	<0.0888	<0.0888	6.36	1.99	<0.354	<0.354	<0.0888	2.24	2.98	0.152
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.0155	<0.0298	<0.0155	<0.0155	<0.0155	<0.0155	0.0129J	<0.0249 B*	<0.0616	<0.0616	<0.0155	<0.0155	<0.0249 B*	<0.0155
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.0126	<0.0242	<0.0126	<0.0126	<0.0126	<0.0126	<0.0126	<0.0126	<0.0502	<0.0502	<0.0126	<0.0126	<0.0126	<0.0126
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.0190	<0.0364	<0.0190	<0.0190	<0.0190	<0.0190	<0.0304 B*	<0.0190	<0.0754	<0.0754	<0.0190	<0.0190	<0.0190	<0.0190
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	<0.120	**43.4**		2.65	<0.120	<0.120		5.75	<0.478	<0.478	4.66		8.14	0.307
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.0244	<0.0468	<0.0244	<0.0244	<0.0244	<0.0244	<0.0244	<0.0244	<0.0970	<0.0970	<0.0244	<0.0244	<0.0244	<0.0244
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.0160	<0.0308	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0636	<0.0636	<0.0160	<0.0160	<0.0160	<0.0160
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.0125	<0.0240	<0.0125	<0.0125	<0.0125	<0.0125	<0.0125	<0.0125	<0.0498	<0.0498	<0.0125	<0.0125	<0.0125	<0.0125
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.00862	<0.0166	<0.00862	<0.00862	<0.00862	<0.00862	<0.0422 B*	<0.00862	<0.0342	<0.0342	<0.00862	0.0538	<0.00862	<0.00862
Number of Exceedances						**0**	**4**	**1**	**0**	**0**	**0**	**3**	**0**	**0**	**7**	**0**	**3**	**0**	**0**
Minimum Exceedance							**24.2**	**25.6**				**17.2JH**		**0.0282J**			**11.6**		
Maximum Exceedance							**61.3**	**25.6**				**44.9**		**0.188JH**			**13.0JH**		

Notes:

	Bolded values exceed the MTG soil cleanup level
	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.
NA	not available

Table 32
2011 Soil Analytical Results - SVOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	1,2-Dichloro-benzene	1,3-Dichloro-benzene	2,4,6-Trichloro-phenol	2,4-Dichloro-phenol	2,4-Dimethyl-phenol	2,4-Dinitro-phenol	2,4-Dinitro-toluene	2,6-Dinitro-toluene	2-Chloro-phenol	2-Methyl-phenol (o-cresol)	3&4-Methyl-phenol (p&m-Cresol)	3,3-Dichloro-benzidine
ADEC MTG Soil Cleanup Level (mg/kg)						**5.1**	**28**	**1.4**	**1.3**	**8.8**	**0.54**	**0.0093**	**0.0094**	**1.5**	**15**	**1.5**	**0.19**
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.190	<0.190	<0.190	<0.190	<0.190	<2.28	<0.190	<0.190	<0.190	<0.190	<0.754	<0.190
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.176	<0.176	<0.176	<0.176	<0.176	<2.12	<0.176	<0.176	<0.176	<0.176	<0.698	<0.176
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.206	<0.206	<0.206	<0.206	<0.206	<2.48	<0.206	<0.206	<0.206	<0.206	<0.816	<0.206
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.208	<0.208	<0.208	<0.208	<0.208	<2.50	<0.208	<0.208	<0.208	<0.208	<0.824	<0.208
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.197	<0.197	<0.197	<0.197	<0.197	<2.36	<0.197	<0.197	<0.197	<0.197	<0.782	<0.197
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.159	<0.159	<0.159	<0.159	<0.159	<1.92	<0.159	<0.159	<0.159	<0.159	<0.634	<0.159
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.192	<0.192	<0.192	<0.192	<0.192	<2.32	<0.192	<0.192	<0.192	<0.192	<0.764	<0.192
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.158	<0.158	<0.158	<0.158	<0.158	<1.91	<0.158	<0.158	<0.158	<0.158	<0.628	<0.158
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.187	<0.187	<0.187	<0.187	<0.187	<2.24	<0.187	<0.187	<0.187	<0.187	<0.742	<0.187
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.165	<0.165	<0.165	<0.165	<0.165	<1.99	<0.165	<0.165	<0.165	<0.165	<0.656	<0.165
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.179	<0.179	<0.179	<0.179	<0.179	<2.16	<0.179	<0.179	<0.179	<0.179	<0.712	<0.179
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.158	<0.158	<0.158	<0.158	<0.158	<1.90	<0.158	<0.158	<0.158	<0.158	<0.628	<0.158
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	<6.76	<6.76	<6.76	<6.76	<6.76	<81.4	<6.76	<6.76	<6.76	<6.76	<26.8	<6.76
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.194	<0.194	<0.194	<0.194	<0.194	<2.34	<0.194	<0.194	<0.194	<0.194	<0.772	<0.194
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<0.165	<0.165	<0.165	<0.165	<0.165	<1.99	<0.165	<0.165	<0.165	<0.165	<0.656	<0.165
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.192	<0.192	<0.192	<0.192	<0.192	<2.32	<0.192	<0.192	<0.192	<0.192	<0.762	<0.192
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.169	<0.169	<0.169	<0.169	<0.169	<2.04	<0.169	<0.169	<0.169	<0.169	<0.672	<0.169
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	<0.159	<0.159	<0.159	<0.159	<0.159	<1.91	<0.159	<0.159	<0.159	<0.159	<0.632	<0.159
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	<0.158	<0.158	<0.158	<0.158	<0.158	<1.90	<0.158	<0.158	<0.158	<0.158	<0.628	<0.158
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	<0.166	<0.166	<0.166	<0.166	<0.166	<2.00	<0.166	<0.166	<0.166	<0.166	<0.660	<0.166
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.161	<0.161	<0.161	<0.161	<0.161	<1.94	<0.161	<0.161	<0.161	<0.161	<0.640	<0.161
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.182	<0.182	<0.182	<0.182	<0.182	<2.20	<0.182	<0.182	<0.182	<0.182	<0.724	<0.182
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.168	<0.168	<0.168	<0.168	<0.168	<2.02	<0.168	<0.168	<0.168	<0.168	<0.668	<0.168
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.173	<0.173	<0.173	<0.173	<0.173	<2.08	<0.173	<0.173	<0.173	<0.173	<0.686	<0.173
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.174	<0.174	<0.174	<0.174	<0.174	<2.10	<0.174	<0.174	<0.174	<0.174	<0.690	<0.174
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	<0.172	<0.172	<0.172	<0.172	<0.172	<2.08	<0.172	<0.172	<0.172	<0.172	<0.686	<0.172
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	<0.170	<0.170	<0.170	<0.170	<0.170	<2.04	<0.170	<0.170	<0.170	<0.170	<0.676	<0.170
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.170	<0.170	<0.170	<0.170	<0.170	<2.04	<0.170	<0.170	<0.170	<0.170	<0.674	<0.170
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.160	<0.160	<0.160	<0.160	<0.160	<1.92	<0.160	<0.160	<0.160	<0.160	<0.634	<0.160
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.159	<0.159	<0.159	<0.159	<0.159	<1.92	<0.159	<0.159	<0.159	<0.159	<0.634	<0.159
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.158	<0.158	<0.158	<0.158	<0.158	<1.90	<0.158	<0.158	<0.158	<0.158	<0.626	<0.158
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.166	<0.166	<0.166	<0.166	<0.166	<2.00	<0.166	<0.166	<0.166	<0.166	<0.660	<0.166
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.172	<0.172	<0.172	<0.172	<0.172	<2.08	<0.172	<0.172	<0.172	<0.172	<0.684	<0.172
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.174	<0.174	<0.174	<0.174	<0.174	<2.10	<0.174	<0.174	<0.174	<0.174	<0.692	<0.174
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.181	<0.181	<0.181	<0.181	<0.181	<2.18	<0.181	<0.181	<0.181	<0.181	<0.720	<0.181
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.185	<0.185	<0.185	<0.185	<0.185	<2.22	<0.185	<0.185	<0.185	<0.185	<0.736	<0.185
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.162	<0.162	<0.162	<0.162	<0.162	<1.95	<0.162	<0.162	<0.162	<0.162	<0.644	<0.162
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.177	<0.177	<0.177	<0.177	<0.177	<2.14	<0.177	<0.177	<0.177	<0.177	<0.704	<0.177
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.160	<0.160	<0.160	<0.160	<0.160	<1.93	<0.160	<0.160	<0.160	<0.160	<0.638	<0.160
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.202	<0.202	<0.202	<0.202	<0.202	<2.44	<0.202	<0.202	<0.202	<0.202	<0.804	<0.202
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.158	<0.158	<0.158	<0.158	<0.158	<1.91	<0.158	<0.158	<0.158	<0.158	<0.630	<0.158
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	<0.932	<0.932	<0.932	<0.932	<0.932	<11.2	<0.932	<0.932	<0.932	<0.932	<3.70	<0.932
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	<0.191	<0.191	<0.191	<0.191	<0.191	<2.30	<0.191	<0.191	<0.191	<0.191	<0.760	<0.191
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	<0.926	<0.926	<0.926	<0.926	<0.926	<11.2	<0.926	<0.926	<0.926	<0.926	<3.68	<0.926
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.172	<0.172	<0.172	<0.172	<0.172	<2.08	<0.172	<0.172	<0.172	<0.172	<0.686	<0.172
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.161	<0.161	<0.161	<0.161	<0.161	<1.94	<0.161	<0.161	<0.161	<0.161	<0.640	<0.161
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.161	<0.161	<0.161	<0.161	<0.161	<1.94	<0.161	<0.161	<0.161	<0.161	<0.638	<0.161
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	<0.167	<0.167	<0.167	<0.167	<0.167	<2.00	<0.167	<0.167	<0.167	<0.167	<0.662	<0.167
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	<1.60	<1.60	<1.60	<1.60	<1.60	<19.2	<1.60	<1.60	<1.60	<1.60	<6.34	<1.60
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	<1.61	<1.61	<1.61	<1.61	<1.61	<19.4	<1.61	<1.61	<1.61	<1.61	<6.40	<1.61
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	<8.50	<8.50	<8.50	<8.50	<8.50	<102	<8.50	<8.50	<8.50	<8.50	<33.8	<8.50
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	<0.173	<0.173	<0.173	<0.173	<0.173	<2.08	<0.173	<0.173	<0.173	<0.173	<0.686	<0.173
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.157	<0.157	<0.157	<0.157	<0.157	<1.89	<0.157	<0.157	<0.157	<0.157	<0.624	<0.157

Table 32
2011 Soil Analytical Results - SVOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	1,2-Dichloro-benzene	1,3-Dichloro-benzene	2,4,6-Trichloro-phenol	2,4-Dichloro-phenol	2,4-Dimethyl-phenol	2,4-Dinitro-phenol	2,4-Dinitro-toluene	2,6-Dinitro-toluene	2-Chloro-phenol	2-Methyl-phenol (o-cresol)	3&4-Methyl-phenol (p&m-Cresol)	3,3-Dichloro-benzidine
ADEC MTG Soil Cleanup Level (mg/kg)						**5.1**	**28**	**1.4**	**1.3**	**8.8**	**0.54**	**0.0093**	**0.0094**	**1.5**	**15**	**1.5**	**0.19**
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.160	<0.160	<0.160	<0.160	<0.160	<1.93	<0.160	<0.160	<0.160	<0.160	<0.636	<0.160
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.163	<0.163	<0.163	<0.163	<0.163	<1.97	<0.163	<0.163	<0.163	<0.163	<0.650	<0.163
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.196	<0.196	<0.196	<0.196	<0.196	<2.36	<0.196	<0.196	<0.196	<0.196	<0.778	<0.196
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.160	<0.160	<0.160	<0.160	<0.160	<1.92	<0.160	<0.160	<0.160	<0.160	<0.634	<0.160
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.160	<0.160	<0.160	<0.160	<0.160	<1.93	<0.160	<0.160	<0.160	<0.160	<0.634	<0.160
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.163	<0.163	<0.163	<0.163	<0.163	<1.96	<0.163	<0.163	<0.163	<0.163	<0.646	<0.163
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.164	<0.164	<0.164	<0.164	<0.164	<1.97	<0.164	<0.164	<0.164	<0.164	<0.650	<0.164
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.160	<0.160	<0.160	<0.160	<0.160	<1.93	<0.160	<0.160	<0.160	<0.160	<0.638	<0.160
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	<0.159	<0.159	<0.159	<0.159	<0.159	<1.91	<0.159	<0.159	<0.159	<0.159	<0.630	<0.159
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	<0.168	<0.168	<0.168	<0.168	<0.168	<2.02	<0.168	<0.168	<0.168	<0.168	<0.668	<0.168
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.178	<0.178	<0.178	<0.178	<0.178	<2.14	<0.178	<0.178	<0.178	<0.178	<0.706	<0.178
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<1.98 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.654 J*	<0.164 J*
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.174	<0.174	<0.174	<0.174	<0.174	<2.10	<0.174	<0.174	<0.174	<0.174	<0.694	<0.174
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	<0.120	<0.120	---	---	---	---	---	---	---	---	---	---
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.189	<0.189	<0.189	<0.189	<0.189	<2.28	<0.189	<0.189	<0.189	<0.189	<0.752	<0.189
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.176	<0.176	<0.176	<0.176	<0.176	<2.12	<0.176	<0.176	<0.176	<0.176	<0.700	<0.176
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.163	<0.163	<0.163	<0.163	<0.163	<1.97	<0.163	<0.163	<0.163	<0.163	<0.648	<0.163
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.159	<0.159	<0.159	<0.159	<0.159	<1.92	<0.159	<0.159	<0.159	<0.159	<0.634	<0.159

Notes:

	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<LOD).
J	Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentration
*	Data flags applied by SWI during data validation process using Level II data packages
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 32
2011 Soil Analytical Results - SVOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	4-Chloro-aniline	Bis(2-chloroethyl)-ether	Bis(2-ethylhexyl)-phthalate	Dibenzo-furan	Hexachloro-benzene	Hexachloro-1,3-butadiene	Hexachloro-cyclo-pentadiene	Hexachloro-ethane	Isophorone	Nitro-benzene	n-Nitroso-dimethyl-amine	n-Nitroso-di-n-propylamine	n-Nitroso-diphenyl-amine	Pentachloro-phenol
ADEC MTG Soil Cleanup Level (mg/kg)						**0.057**	**0.0022**	**13**	**11**	**0.047**	**0.12**	**1.3**	**0.21**	**3.1**	**0.094**	**0.000053**	**0.0011**	**15**	**0.0047**
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.364	<0.190	<0.190	<0.190	<0.190	<0.190	<0.486	<0.190	<0.190	<0.190	<0.190	<0.190	<0.190	<1.51
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.338	<0.176	<0.176	<0.176	<0.176	<0.176	<0.450	<0.176	<0.176	<0.176	<0.176	<0.176	<0.176	<1.40
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.396	<0.206	<0.206	<0.206	<0.206	<0.206	<0.526	<0.206	<0.206	<0.206	<0.206	<0.206	<0.206	<1.63
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.398	<0.208	<0.208	<0.208	<0.208	<0.208	<0.532	<0.208	<0.208	<0.208	<0.208	<0.208	<0.208	<1.65
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.378	<0.197	<0.197	<0.197	<0.197	<0.197	<0.504	<0.197	<0.197	<0.197	<0.197	<0.197	<0.197	<1.56
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.306	<0.159	<0.159	<0.159	<0.159	<0.159	<0.408	<0.159	<0.159	<0.159	<0.159	<0.159	<0.159	<1.27
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.370	<0.192	<0.192	<0.192	<0.192	<0.192	<0.492	<0.192	<0.192	<0.192	<0.192	<0.192	<0.192	<1.53
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.304	<0.158	<0.158	<0.158	<0.158	<0.158	<0.406	<0.158	<0.158	<0.158	<0.158	<0.158	<0.158	<1.26
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.358	<0.187	<0.187	<0.187	<0.187	<0.187	<0.478	<0.187	<0.187	<0.187	<0.187	<0.187	<0.187	<1.48
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.318	<0.165	<0.165	<0.165	<0.165	<0.165	<0.424	<0.165	<0.165	<0.165	<0.165	<0.165	<0.165	<1.31
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.344	<0.179	<0.179	<0.179	<0.179	<0.179	<0.458	<0.179	<0.179	<0.179	<0.179	<0.179	<0.179	<1.42
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.304	<0.158	0.0958J	<0.158	<0.158	<0.158	<0.406	<0.158	<0.158	<0.158	<0.158	<0.158	<0.158	<1.26
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	<13.0	<6.76	<6.76	<6.76	<6.76	<6.76	<17.3	<6.76	<6.76	<6.76	<6.76	<6.76	<6.76	<53.8
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.374	<0.194	<0.194	<0.194	<0.194	<0.194	<0.498	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	<1.54
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	<0.318	<0.165	<0.165	<0.165	<0.165	<0.165	<0.422	<0.165	<0.165	<0.165	<0.165	<0.165	<0.165	<1.31
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.368	<0.192	<0.192	<0.192	<0.192	<0.192	<0.492	<0.192	<0.192	<0.192	<0.192	<0.192	<0.192	<1.52
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.326	<0.169	<0.169	<0.169	<0.169	<0.169	<0.434	<0.169	<0.169	<0.169	<0.169	<0.169	<0.169	<1.34
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	<0.306	<0.159	0.0836J	<0.159	<0.159	<0.159	<0.408	<0.159	<0.159	<0.159	<0.159	<0.159	<0.159	<1.26
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	<0.304	<0.158	<0.158	<0.158	<0.158	<0.158	<0.404	<0.158	<0.158	<0.158	<0.158	<0.158	<0.158	<1.25
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	<0.318	<0.166	<0.166	<0.166	<0.166	<0.166	<0.426	<0.166	<0.166	<0.166	<0.166	<0.166	<0.166	<1.32
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.310	<0.161	<0.161	<0.161	<0.161	<0.161	<0.412	<0.161	<0.161	<0.161	<0.161	<0.161	<0.161	<1.28
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.350	<0.182	<0.182	<0.182	<0.182	<0.182	<0.468	<0.182	<0.182	<0.182	<0.182	<0.182	<0.182	<1.45
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.322	<0.168	<0.168	<0.168	<0.168	<0.168	<0.430	<0.168	<0.168	<0.168	<0.168	<0.168	<0.168	<1.33
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.332	<0.173	<0.173	<0.173	<0.173	<0.173	<0.442	<0.173	<0.173	<0.173	<0.173	<0.173	<0.173	<1.37
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.334	<0.174	<0.174	<0.174	<0.174	<0.174	<0.446	<0.174	<0.174	<0.174	<0.174	<0.174	<0.174	<1.38
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	<0.332	<0.172	<0.172	<0.172	<0.172	<0.172	<0.442	<0.172	<0.172	<0.172	<0.172	<0.172	<0.172	<1.37
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	<0.328	<0.170	<0.170	<0.170	<0.170	<0.170	<0.436	<0.170	<0.170	<0.170	<0.170	<0.170	<0.170	<1.35
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.326	<0.170	<0.170	<0.170	<0.170	<0.170	<0.434	<0.170	<0.170	<0.170	<0.170	<0.170	<0.170	<1.35
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.306	<0.160	<0.160	<0.160	<0.160	<0.160	<0.410	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.27
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.306	<0.159	<0.159	<0.159	<0.159	<0.159	<0.408	<0.159	<0.159	<0.159	<0.159	<0.159	<0.159	<1.27
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.304	<0.158	<0.158	<0.158	<0.158	<0.158	<0.404	<0.158	<0.158	<0.158	<0.158	<0.158	<0.158	<1.25
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.320	<0.166	<0.166	<0.166	<0.166	<0.166	<0.426	<0.166	<0.166	<0.166	<0.166	<0.166	<0.166	<1.32
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.332	<0.172	<0.172	<0.172	<0.172	<0.172	<0.442	<0.172	<0.172	<0.172	<0.172	<0.172	<0.172	<1.37
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.334	<0.174	<0.174	<0.174	<0.174	<0.174	<0.446	<0.174	<0.174	<0.174	<0.174	<0.174	<0.174	<1.38
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.348	<0.181	<0.181	<0.181	<0.181	<0.181	<0.464	<0.181	<0.181	<0.181	<0.181	<0.181	<0.181	<1.44
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.356	<0.185	<0.185	<0.185	<0.185	<0.185	<0.474	<0.185	<0.185	<0.185	<0.185	<0.185	<0.185	<1.47
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.312	<0.162	<0.162	<0.162	<0.162	<0.162	<0.416	<0.162	<0.162	<0.162	<0.162	<0.162	<0.162	<1.29
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.340	<0.177	<0.177	<0.177	<0.177	<0.177	<0.454	<0.177	<0.177	<0.177	<0.177	<0.177	<0.177	<1.41
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.308	<0.160	<0.160	<0.160	<0.160	<0.160	<0.412	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.28
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.388	<0.202	<0.202	<0.202	<0.202	<0.202	<0.518	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<1.61
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.304	<0.158	<0.158	<0.158	<0.158	<0.158	<0.406	<0.158	<0.158	<0.158	<0.158	<0.158	<0.158	<1.26
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	<1.79	<0.932	<0.932	0.472J	<0.932	<0.932	<2.40	<0.932	<0.932	<0.932	<0.932	<0.932	<0.932	<7.42
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	<0.368	<0.191	<0.191	<0.191	<0.191	<0.191	<0.490	<0.191	<0.191	<0.191	<0.191	<0.191	<0.191	<1.52
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	<1.78	<0.926	<0.926	0.979J	<0.926	<0.926	<2.38	<0.926	<0.926	<0.926	<0.926	<0.926	<0.926	<7.36
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.332	<0.172	<0.172	<0.172	<0.172	<0.172	<0.442	<0.172	<0.172	<0.172	<0.172	<0.172	<0.172	<1.37
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.310	<0.161	<0.161	<0.161	<0.161	<0.161	<0.412	<0.161	<0.161	<0.161	<0.161	<0.161	<0.161	<1.28
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.308	<0.161	<0.161	<0.161	<0.161	<0.161	<0.412	<0.161	<0.161	<0.161	<0.161	<0.161	<0.161	<1.28
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	<0.320	<0.167	<0.167	<0.167	<0.167	<0.167	<0.426	<0.167	<0.167	<0.167	<0.167	<0.167	<0.167	<1.32
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	<3.06	<1.60	<1.60	<1.60	<1.60	<1.60	<4.10	<1.60	<1.60	<1.60	<1.60	<1.60	<1.60	<12.7
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	<3.10	<1.61	<1.61	<1.61	<1.61	<1.61	<4.12	<1.61	<1.61	<1.61	<1.61	<1.61	<1.61	<12.8
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	<16.3	<8.50	<8.50	<8.50	<8.50	<8.50	<21.8	<8.50	<8.50	<8.50	<8.50	<8.50	<8.50	<67.6
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	<0.332	<0.173	<0.173	<0.173	<0.173	<0.173	<0.444	<0.173	<0.173	<0.173	<0.173	<0.173	<0.173	<1.37
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.302	<0.157	<0.157	<0.157	<0.157	<0.157	<0.402	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<1.25

Table 32
2011 Soil Analytical Results - SVOCs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	Top	Bottom	4-Chloro-aniline	Bis(2-chloroethyl)-ether	Bis(2-ethylhexyl)-phthalate	Dibenzo-furan	Hexachloro-benzene	Hexachloro-1,3-butadiene	Hexachloro-cyclo-pentadiene	Hexachloro-ethane	Isophorone	Nitro-benzene	n-Nitroso-dimethyl-amine	n-Nitroso-di-n-propylamine	n-Nitroso-diphenyl-amine	Pentachloro-phenol
ADEC MTG Soil Cleanup Level (mg/kg)						**0.057**	**0.0022**	**13**	**11**	**0.047**	**0.12**	**1.3**	**0.21**	**3.1**	**0.094**	**0.000053**	**0.0011**	**15**	**0.0047**
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.308	<0.160	<0.160	<0.160	<0.160	<0.160	<0.410	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.27
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.314	<0.163	<0.163	<0.163	<0.163	<0.163	<0.418	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<1.30
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.376	<0.196	<0.196	<0.196	<0.196	<0.196	<0.502	<0.196	<0.196	<0.196	<0.196	<0.196	<0.196	<1.56
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.306	<0.160	<0.160	<0.160	<0.160	<0.160	<0.410	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.27
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.308	<0.160	<0.160	<0.160	<0.160	<0.160	<0.410	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.27
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.312	<0.163	<0.163	<0.163	<0.163	<0.163	<0.416	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<1.29
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.314	<0.164	<0.164	<0.164	<0.164	<0.164	<0.420	<0.164	<0.164	<0.164	<0.164	<0.164	<0.164	<1.30
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.308	<0.160	<0.160	<0.160	<0.160	<0.160	<0.412	<0.160	<0.160	<0.160	<0.160	<0.160	<0.160	<1.27
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	<0.304	<0.159	<0.159	<0.159	<0.159	<0.159	<0.406	<0.159	<0.159	<0.159	<0.159	<0.159	<0.159	<1.26
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	<0.324	<0.168	<0.168	<0.168	<0.168	<0.168	<0.432	<0.168	<0.168	<0.168	<0.168	<0.168	<0.168	<1.34
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.342	<0.178	<0.178	<0.178	<0.178	<0.178	<0.456	<0.178	<0.178	<0.178	<0.178	<0.178	<0.178	<1.41
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.316 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.422 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<0.164 J*	<1.31 J*
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.336	<0.174	<0.174	<0.174	<0.174	<0.174	<0.448	<0.174	<0.174	<0.174	<0.174	<0.174	<0.174	<1.39
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	---	---	---	---	---	<0.232	---	---	---	---	---	---	---	---
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.364	<0.189	<0.189	<0.189	<0.189	<0.189	<0.484	<0.189	<0.189	<0.189	<0.189	<0.189	<0.189	<1.50
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.338	<0.176	<0.176	<0.176	<0.176	<0.176	<0.452	<0.176	<0.176	<0.176	<0.176	<0.176	<0.176	<1.40
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.314	<0.163	<0.163	<0.163	<0.163	<0.163	<0.418	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<1.30
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.306	<0.159	<0.159	<0.159	<0.159	<0.159	<0.408	<0.159	<0.159	<0.159	<0.159	<0.159	<0.159	<1.27

Notes:

	Tabulated results are presented in mg/kg
	non-detect results are presented as less than the limit of detection (<L
J	Estimated result due to QC failures or detection below the limit of qua
R	Rejected result due to QC failures
JL	Estimated result; biased low due to QC failures
JH	Estimated result; biased high due to QC failures
B	Sample result reported as non-detect due to method blank concentrat
*	Data flags applied by SWI during data validation process using Level
ADEC	Alaska Department of Environmental Conservation
MTG	migration to groundwater
Dup	duplicate sample
SWI	Shannon and Wilson, Inc.

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
MW-144B (0.0 - 2.0)		09/21/2011 09:45	MW-144B	0	2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
MW-144B (6.0 - 8.0)		09/21/2011 10:33	MW-144B	6	8	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
MW-144B (90.0 - 92.0)		09/21/2011 18:44	MW-144B	90	92	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	<0.00362	<0.00362	---	---	---	<0.00362	<0.00362	<0.00362	---	<0.00362	---	<0.00362	---
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	<0.00334	<0.00334	---	---	---	<0.00334	<0.00334	<0.00334	---	<0.00334	---	<0.00334	---
MW-195 (0.0 - 2.0)		10/11/2011 13:37	MW-195	0	2	3.21	3.66	<0.0332	<0.0332	<0.0332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332
MW-195 (2.0 - 4.0)		10/11/2011 13:57	MW-195	2	4	0.395	0.477	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	0.00533J	<0.00352	0.00304J	<0.00352	<0.00352
MW-195 (6.0 - 8.0)		10/11/2011 14:33	MW-195	6	8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
MW-195 (14.0 - 16.0)		10/11/2011 15:21	MW-195	14	16	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366
MW-196 (0.0 - 2.0)		10/11/2011 09:21	MW-196	0	2	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*
MW-196 (6.0 - 8.0)		10/11/2011 10:02	MW-196	6	8	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*
MW-196 (14.0 - 16.0)		10/11/2011 10:42	MW-196	14	16	0.00692 JL*	0.00902 JL*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*	<0.00378 J*
O-5 (0.0 - 2.0)		09/13/2011 13:48	O-5	0	2	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
O-5 (6.0 - 8.0)		09/13/2011 14:23	O-5	6	8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
O-5 (14.0 - 16.0)		09/13/2011 15:09	O-5	14	16	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
O-6 (0.0 - 2.0)		09/14/2011 09:14	O-6	0	2	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
O-6 (4.0 - 6.0)		09/14/2011 09:40	O-6	4	6	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368
O-6 (14.0 - 16.0)		09/14/2011 10:43	O-6	14	16	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332
O-7 (0.0 - 2.0)		09/14/2011 13:43	O-7	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-7 (6.0 - 8.0)		09/14/2011 14:34	O-7	6	8	0.0514 J*	0.0374 J*	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
DO-7 (6.0 - 8.0)	Dup	09/14/2011 14:15	O-7	6	8	1.82 J*	2.05 J*	<0.0626	<0.0626	<0.0626	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
O-7 (14.0 - 16.0)		09/14/2011 15:40	O-7	14	16	0.00710	0.00487J	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
O-8 (0.0 - 2.0)		09/15/2011 10:01	O-8	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-8 (6.0 - 8.0)		09/15/2011 10:36	O-8	6	8	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
O-8 (14.0 - 16.0)		09/15/2011 11:38	O-8	14	16	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
O-9 (0.0 - 2.0)		09/15/2011 14:34	O-9	0	2	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
O-9 (6.0 - 8.0)		09/15/2011 15:15	O-9	6	8	**11.2**	**13.9**	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320	<0.0320
O-9 (16.0 - 18.0)		09/15/2011 16:41	O-9	16	18	0.00227J	0.00304J	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
O-10 (0.0 - 2.0)		09/16/2011 10:47	O-10	0	2	0.00290J	0.00373J	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
O-10 (6.0 - 8.0)		09/16/2011 11:26	O-10	6	8	3.68	4.47	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408	<0.00408
O-10 (8.0 - 10.0)		09/16/2011 11:39	O-10	8	10	**24.7 JH***	**31.6 JH***	<0.164	<0.164	<0.164	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
DO-10 (8.0 - 10.0)	Dup	09/16/2011 11:45	O-10	8	10	**35.3 JH***	**45.2 JH***	<0.169	<0.169	<0.169	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
O-10 (16.0 - 18.0)		09/16/2011 13:01	O-10	16	18	0.0362	0.0449	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
O-11 (0.0 - 2.0)		09/20/2011 10:16	O-11	0	2	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156
O-11 (8.0 - 10.0)		09/20/2011 11:01	O-11	8	10	**39.5 JH***	**49.6 JH***	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163	<0.163
O-11 (10.0 - 12.0)		09/20/2011 11:11	O-11	10	12	**28.5 JH***	**35.2 JH***	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157	<0.157
O-11 (25.0 - 27.0)		09/20/2011 12:33	O-11	25	27	0.00459J	0.00534J	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336
O-12 (0.0 - 2.0)		09/21/2011 12:55	O-12	0	2	<0.108	<0.108	<0.108	<0.108	<0.108	<0.108	<0.108	<0.108	0.186	<0.108	0.222	<0.108	<0.108
O-12 (7.5 - 9.2)		09/21/2011 11:50	O-12	7.5	9.2	<0.0182	<0.0182	<0.0182	<0.0182	<0.0182	<0.0182	<0.0182	<0.0182	0.0147J	<0.0182	0.0154J	<0.0182	<0.0182
O-12 (14.0 - 16.0)		09/21/2011 12:30	O-12	14	16	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376
O-13 (0.0 - 1.4)		09/21/2011 14:35	O-13	0	1.4	0.251	0.321	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	<0.120	0.558	<0.120	<0.120
O-13 (4.0 - 6.0)		09/21/2011 15:15	O-13	4	6	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
O-13 (8.0 - 9.1)		09/21/2011 15:45	O-13	8	9.1	2.46 J*	3.02 J*	<0.0165	<0.0165	0.0125J	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165	<0.0165
DO-13 (8.0 - 9.1)	Dup	09/21/2011 16:00	O-13	8	9.1	**9.89 J***	**12.8 J***	<0.0170	<0.0170	0.0262J	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170
O-13 (14.5 - 15.2)		09/21/2011 17:05	O-13	14.5	15.2	0.0208	0.0255	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332
O-14 (0.0 - 2.0)		10/01/2011 09:40	O-14	0	2	0.0500	0.0620	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618	<0.00618
O-14 (2.0 - 4.0)		10/01/2011 10:35	O-14	2	4	0.421	0.504	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
O-14 (6.0 - 7.8)		10/01/2011 10:30	O-14	6	7.8	0.0117	0.0140	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
O-14 (14.0 - 16.0)		10/01/2011 11:25	O-14	14	16	0.00405J	0.00479J	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
O-15 (0.0 - 2.0)		10/06/2011 14:20	O-15	0	2	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*
O-15 (8.0 - 10.0)		10/06/2011 15:41	O-15	8	10	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*
O-15 (14.0 - 16.0)		10/06/2011 16:39	O-15	14	16	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*
O-16 (0.0 - 2.0)		10/07/2011 13:00	O-16	0	2	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	0.00926 JL*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
O-16 (6.0 - 8.0)		10/07/2011 14:00	O-16	6	8	<0.00324 J*	0.00168 JL*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*
O-16 (14.0 - 16.0)		10/07/2011 15:09	O-16	14	16	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*
O-17 (0.0 - 2.0)		10/13/2011 10:16	O-17	0	2	0.00966 JL*	0.0162 JL*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*
O-17 (6.0 - 8.0)		10/13/2011 11:17	O-17	6	8	<0.00302 J*	0.00159 JL*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*
O-17 (14.0 - 16.0)		10/13/2011 12:30	O-17	14	16	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*
O-18 (0.0 - 2.0)		10/12/2011 10:48	O-18	0	2	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*
O-18 (6.0 - 8.0)		10/12/2011 11:37	O-18	6	8	0.0305J	0.0409J	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	0.0237J	<0.0334	0.0425J	<0.0334	<0.0334
O-18 (14.0 - 15.0)		10/12/2011 13:30	O-18	14	15	<0.0312	0.0166J	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	0.0315J	<0.0312	0.0350J	<0.0312	<0.0312
O-19 (0.0 - 2.0)		10/15/2011 09:50	O-19	0	2	<0.0710 J*	<0.0710 J*	<0.0710 J*	<0.0710 J*	<0.0710 J*	<0.0710 J*	<0.0710 J*	<0.0710 J*	0.111 JL*	<0.0710 J*	0.136 JL*	<0.0710 J*	<0.0710 J*
DO-19 (0.0 - 2.0)	Dup	10/15/2011 09:45	O-19	0	2	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*
O-19 (4.0 - 6.0)		10/15/2011 10:35	O-19	4	6	1.64 JL*	2.02 JL*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*	<0.00342 J*
O-19 (6.0 - 8.0)		10/15/2011 10:40	O-19	6	8	4.94 JL*	**6.88 JL***	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*	<0.0155 J*
DO-19 (6.0 - 8.0)	Dup	10/15/2011 10:38	O-19	6	8	5.37	**6.69**	<0.308	<0.308 J*	<0.308 J*	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
O-19 (14.0 - 16.0)		10/15/2011 11:44	O-19	14	16	0.0143 JL*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*
O-20 (0.0 - 2.0)		10/13/2011 15:43	O-20	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-20 (6.0 - 8.0)		10/13/2011 16:33	O-20	6	8	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
DO-20 (6.0 - 8.0)	Dup	10/13/2011 16:30	O-20	6	8	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
O-20 (14.0 - 16.0)		10/13/2011 17:47	O-20	14	16	0.00445J	0.00449J	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
O-21 (0.0-2.0)		10/14/2011 12:43	O-21	0	2	0.145 JL*	0.113 JL*	<0.0167 J*	<0.0167 J*	<0.0167 J*	<0.0167 J*	<0.0167 J*	<0.0167 J*	0.0491 JL*	<0.0167 J*	0.0344 JL*	<0.0167 J*	<0.0167 J*
DO-21 (0.0-2.0)	Dup	10/14/2011 12:40	O-21	0	2	0.0981	0.0776	<0.0178	<0.0178	<0.0178	<0.0178	<0.0178	<0.0178	0.0364	<0.0178	0.0262J	<0.0178	<0.0178
O-21 (4.0-6.0)		10/14/2011 13:12	O-21	4	6	**88.5**	**104**	<0.0178	<0.0178	0.0418	0.0337	0.0283J	0.0440	0.0310	<0.0178	0.0575	<0.0178	0.105
O-21 (6.0-8.0)		10/14/2011 13:35	O-21	6	8	**13.9 JL***	**18.0 JL***	<0.0166 J*	<0.0166 J*	0.0923 JL*	0.0717 JL*	0.0740 JL*	<0.830 J*	0.0699 JL*	<0.830 J*	0.126 JL*	0.0154 JL*	0.187 JL*
DO-21 (6.0-8.0)	Dup	10/14/2011 13:30	O-21	6	8	**16.2 JL***	**21.6 JL***	<0.0182 J*	<0.0182 J*	0.106 JL*	0.0988 JL*	0.0952 JL*	<0.908 J*	0.0799 JL*	<0.908 J*	0.150 JL*	0.0180 JL*	0.258 JL*
O-21 (14.0-16.0)		10/14/2011 14:48	O-21	14	16	0.00458J	0.00521J	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
DO-21 (14.0-16.0)	Dup	10/14/2011 14:40	O-21	14	16	0.00382J	0.00401J	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346
O-22 (8-10)		11/14/2011 17:30	O-22	8	10	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
O-22D (8-10)	Dup	11/14/2011 17:35	O-22	8	10	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
O-22 (11.3-12.2)		11/14/2011 17:50	O-22	11.3	12.2	0.00363J	0.00470J	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
O-23 (6-8)		12/05/2011 11:30	O-23	6	8	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362
O-23D (6-8)	Dup	12/05/2011 11:15	O-23	6	8	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378
O-23 (10.6-13.0)		12/05/2011 12:00	O-23	10.6	13	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
O-25 (8-9)		11/10/2011 11:45	O-25	8	9	0.00598	0.00761	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
O-25 (9.7-10.3)		11/09/2011 11:30	O-25	9.7	10.3	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382
O-26 (6.1-6.8)		11/09/2011 17:02	O-26	6.1	6.8	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360
O-26 (8.4-9.2)		11/09/2011 13:06	O-26	8.4	9.2	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368
O-27 (9-9.5)		11/09/2011 17:25	O-27	9	9.5	**12.4**	**15.6**	<0.0606	<0.0606	0.0527J	0.00198J	<0.00304	0.00166 JH*	<0.00304	<0.00304	0.00575	<0.00304	0.0118
O-27 (10.3-11)		11/09/2011 17:25	O-27	10.3	11	5.87	**7.47**	<0.0662	<0.0662	<0.0662	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	0.00319J	<0.00330	0.00658
O-28 (8-9)		11/14/2011 18:30	O-28	8	9	**33.5 JH***	**42.5 JH***	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808	<0.0808
O-29 (9.5-10)		11/12/2011 12:50	O-29	9.5	10	<0.00308	0.00169J	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
O-29 (11-11.5)		11/12/2011 13:10	O-29	11	11.5	0.109 JH*	0.190 JH*	<0.0322	<0.0322	<0.0322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	0.00312J	<0.00344	<0.00344	<0.00344	<0.00344
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-106 (0.0 - 2.0)		09/16/2011 11:10	SB-106	0	2	<0.0175	<0.0175	<0.0175	<0.0175	<0.0175	<0.0175	<0.0175	<0.0175	0.0299	<0.0175	0.0235J	<0.0175	<0.0175
SD-106 (0.0 - 2.0)	Dup	09/16/2011 11:25	SB-106	0	2	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	0.0241J	<0.0161	<0.0161
SB-106 (3.5 - 5.2)		09/16/2011 11:40	SB-106	3.5	5.2	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380
SB-107 (0.0 - 2.0)		09/16/2011 09:50	SB-107	0	2	<0.00632	<0.00632	<0.00632	<0.00632	<0.00632	<0.00632	<0.00632	0.00383J	<0.00632	<0.00632	<0.00632	<0.00632	0.00431J

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
SB-107 (5.0 - 6.6)		09/16/2011 10:15	SB-107	5	6.6	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	0.733	0.870	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	<0.194	0.783	<0.194	<0.194
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	0.00243J	<0.00370	<0.00370	<0.00370	<0.00370
SB-109 (0.0 - 2.0)		09/17/2011 10:30	SB-109	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SD-109 (0.0 - 2.0)	Dup	09/17/2011 10:50	SB-109	0	2	0.00288J	0.00381J	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-109 (4.0 - 5.9)		09/17/2011 10:45	SB-109	4	5.9	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358
SB-109 (7.5 - 8.5)		09/17/2011 11:20	SB-109	7.5	8.5	**21.4 JH***	**27.6 JH***	<0.0630	<0.0630	0.0355 JH*	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	0.00450J	<0.00314	<0.00314
SB-109 (16.5 - 17.5)		09/17/2011 11:50	SB-109	16.5	17.5	0.0131	0.0141	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350
SB-110 (0.0 - 2.0)		09/16/2011 16:00	SB-110	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155
SB-110 (5.0 - 6.9)		09/16/2011 16:30	SB-110	5	6.9	0.768	0.948	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-110 (7.0 - 8.5)		09/16/2011 17:00	SB-110	7	8.5	0.964	1.10	<0.00322	<0.00322	0.00537J	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
SB-110 (11.0 - 12.0)		09/16/2011 17:10	SB-110	11	12	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-111 (0.0 - 2.0)		09/17/2011 09:15	SB-111	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-111 (4.0 - 6.0)		09/17/2011 09:40	SB-111	4	6	3.44 JH*	4.15 JH*	<0.0156	<0.0156	0.0138 JH*	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156
SB-111 (8.0 - 9.2)		09/17/2011 09:50	SB-111	8	9.2	0.0100 JH*	0.0142 JH*	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380
SB-112 (0.0 - 2.0)		10/04/2011 11:20	SB-112	0	2	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336
SB-112 (5.5 - 7.3)		10/04/2011 11:40	SB-112	5.5	7.3	**7.43**	**8.70**	<0.306	<0.306	<0.306	0.0124	0.00368J	0.00761	<0.00306	0.00223J	0.0172	<0.00306	<0.306
SB-112 (10.0 - 12.0)		10/04/2011 13:00	SB-112	10	12	0.0172	0.0169	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356	<0.00356
SB-113 (0.0 - 2.0)		09/23/2011 14:25	SB-113	0	2	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161
SB-113 (5.0 - 7.0)		09/23/2011 14:45	SB-113	5	7	5.70	**6.88**	<0.157	<0.157	<0.157	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	0.00201J	<0.00314	0.00244J
SB-113 (11.0 - 12.3)		09/23/2011 15:15	SB-113	11	12.3	0.00583	0.00353J	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336
SB-114 (0.0 - 2.0)		10/03/2011 17:00	SB-114	0	2	0.377	0.193	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-114 (5.0 - 6.8)		10/03/2011 17:20	SB-114	5	6.8	**9.59**	**11.9**	<0.328	<0.328	<0.328	0.0156	0.00322J	0.00724	<0.00328	0.00308J	0.0218	<0.00328	0.106
SB-114 (7.0 - 8.6)		10/03/2011 17:40	SB-114	7	8.6	**12.8**	**16.9**	<0.0640	<0.0640	0.0550J	<0.0640	<0.0640	<0.0640	<0.0640	<0.0640	0.0366J	<0.0640	0.167
SD-114 (7.0 - 8.6)	Dup	10/03/2011 17:50	SB-114	7	8.6	**11.6**	**14.7**	<0.0646	<0.0646	0.0443J	<0.0646	<0.0646	<0.0646	<0.0646	<0.0646	<0.0646	<0.0646	0.151
SB-114 (16.0 - 18.0)		10/03/2011 18:35	SB-114	16	18	0.00410J	0.00517J	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
SB-115 (0.0 - 2.0)		09/24/2011 09:15	SB-115	0	2	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-115 (6.0 - 7.3)		09/24/2011 10:00	SB-115	6	7.3	**9.64**	**12.1**	<0.156	<0.156	<0.156	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-115 (15.0 - 17.0)		09/24/2011 10:50	SB-115	15	17	0.0115	0.0149	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360
SB-116 (0.0 - 2.0)		09/24/2011 11:45	SB-116	0	2	0.00273J	0.00309J	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-116 (5.5 - 7.1)		09/24/2011 12:00	SB-116	5.5	7.1	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-117 (0.0 - 2.0)		09/29/2011 14:15	SB-117	0	2	<0.0632	<0.0632	<0.0632	<0.0632	<0.0632	<0.0632	<0.0632	<0.0632	0.0416J	<0.0632	<0.0632	<0.0632	<0.0632
SB-117 (5.0 - 7.0)		09/29/2011 14:30	SB-117	5	7	**6.36**	**7.81**	<0.620	<0.620	<0.620	<0.00620	<0.00620	<0.00620	<0.00620	<0.00620	0.0217	<0.00620	0.0105
SD-117 (5.0 - 7.0)	Dup	09/29/2011 14:45	SB-117	5	7	5.90	**7.28**	<0.616	<0.616	<0.616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	0.0215	<0.00616	<0.00616
SB-117 (11.0 - 12.0)		09/29/2011 14:55	SB-117	11	12	<0.00577 B*	<0.00577 B*	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	0.0257J	0.0221J	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	0.0364	<0.0158	<0.0158	<0.0158	0.0111J
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374
SB-119 (0.0 - 2.0)		09/15/2011 13:40	SB-119	0	2	0.00595	0.00701	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-119 (5.0 - 6.4)		09/15/2011 14:10	SB-119	5	6.4	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	0.00201J	<0.00328	<0.00328
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	2.42	3.01	<0.155	<0.155	<0.155	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	2.74	3.40	<0.154	<0.154	<0.154	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	0.00440J	<0.00308	0.0110
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	0.0351	0.0455	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-122 (0.0 - 2.0)		09/20/2011 09:20	SB-122	0	2	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	0.0241J	0.0311	0.0397	0.0214J	0.0132J	0.0227J	<0.0164	0.0289
SB-122 (5.0 - 6.2)		09/20/2011 09:45	SB-122	5	6.2	**7.47**	**9.45**	<0.0678	<0.0678	<0.0678	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-122 (6.5 - 7.5)		09/20/2011 10:10	SB-122	6.5	7.5	**12.5**	**16.1**	<0.0632	<0.0632	<0.0632	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-122 (11.5 - 12.5)		09/20/2011 10:20	SB-122	11.5	12.5	0.00298J	0.00280J	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	0.0189J	0.0134 J*	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	0.0125J	<0.0167	<0.0167
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	**21.3**	**26.7**	<0.332	<0.332	<0.332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	0.00355J	<0.00332	0.00398J
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	0.0183	0.0223	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
SB-124 (0.0 - 2.0)		09/15/2011 09:50	SB-124	0	2	0.0475	0.0505	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SD-124 (0.0 - 2.0)	Dup	09/15/2011 10:10	SB-124	0	2	0.204	0.217	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	0.0127	<0.00314	0.0117
SB-124 (5.0 - 6.3)		09/15/2011 10:40	SB-124	5	6.3	1.32	0.863	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608	<0.0608
SB-124 (10.0 - 11.0)		09/15/2011 11:55	SB-124	10	11	0.124	0.135	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334	<0.0334
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-126 (0.0 - 2.0)		09/28/2011 13:30	SB-126	0	2	<0.00314	0.00182J	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-126 (6.0 - 7.5)		09/28/2011 13:45	SB-126	6	7.5	**7.53**	**10.0**	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154
SB-126 (13.0 - 14.0)		09/28/2011 14:15	SB-126	13	14	0.00633	0.00681	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-127 (0.0 - 2.0)		09/28/2011 15:20	SB-127	0	2	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169
SB-127 (5.0 - 7.0)		09/28/2011 15:40	SB-127	5	7	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-128 (0.0 - 2.0)		09/22/2011 17:20	SB-128	0	2	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189
SB-128 (5.0 - 6.6)		09/22/2011 17:40	SB-128	5	6.6	**10.2**	**12.9**	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308
SB-128 (11.5 - 13.0)		09/22/2011 18:00	SB-128	11.5	13	0.00833	0.00902	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	0.0102	0.0122	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332
SB-130 (0.0 - 2.0)		09/20/2011 11:30	SB-130	0	2	0.00223J	0.00289J	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364
SB-130 (4.0 - 5.6)		09/20/2011 11:50	SB-130	4	5.6	0.855	1.06	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-130 (7.0 - 8.4)		09/20/2011 12:15	SB-130	7	8.4	1.00	1.14	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
SB-130 (11.5 - 12.5)		09/20/2011 12:30	SB-130	11.5	12.5	0.00932	0.00986	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SD-130 (11.5 - 12.5)	Dup	09/20/2011 12:45	SB-130	11.5	12.5	0.0135	0.0144	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-131 (0.0 - 2.0)		09/17/2011 13:50	SB-131	0	2	<0.00338	0.00196J	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	0.00321J	<0.00338	<0.00338	<0.00338	<0.00338
SB-131 (9.5 - 11.2)		09/17/2011 14:20	SB-131	9.5	11.2	0.00159J	0.00239J	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354
SB-133 (0.0 - 2.0)		09/19/2011 13:35	SB-133	0	2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SD-133 (0.0 - 2.0)	Dup	09/19/2011 13:45	SB-133	0	2	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-133 (4.0 - 5.8)		09/19/2011 13:55	SB-133	4	5.8	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SB-134 (0.0 - 2.0)		10/04/2011 09:35	SB-134	0	2	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312
SB-134 (5.0 - 6.8)		10/04/2011 09:55	SB-134	5	6.8	**38.6**	**47.1**	<0.774	<0.774	0.431J	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	0.0357	<0.0155	<0.774 J*
SB-134 (11.0 - 12.0)		10/04/2011 10:35	SB-134	11	12	0.0782	0.0769	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
SB-135 (0.0 - 2.0)		10/06/2011 13:50	SB-135	0	2	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-135 (3.0 - 4.0)		10/06/2011 14:00	SB-135	3	4	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350
SB-136 (0.0 - 2.0)		10/09/2011 10:50	SB-136	0	2	<0.00696 B*	<0.00521 B*	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-136 (4.0 - 6.0)		10/09/2011 11:00	SB-136	4	6	<0.00308	<0.00513 B*	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-137 (0.0 - 2.0)		10/06/2011 10:55	SB-137	0	2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
SB-137 (3.5 - 5.2)		10/06/2011 11:15	SB-137	3.5	5.2	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.00310	<0.00310	<0.00310	<0.00310	0.00182J	<0.00310	<0.00310	0.00226J	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
SB-139 (0.0 - 2.0)		09/19/2011 16:30	SB-139	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-139 (3.0 - 5.0)		09/19/2011 16:35	SB-139	3	5	0.00202J	0.00286J	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.00310	<0.00310	<0.00310	<0.00310	0.00188J	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	0.00161J
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390
SB-141 (0.0 - 2.0)		09/19/2011 12:05	SB-141	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-141 (3.0 - 5.0)		09/19/2011 12:15	SB-141	3	5	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374
SB-142 (0.0 - 2.0)		09/19/2011 14:25	SB-142	0	2	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324
SB-142 (3.0 - 5.0)		09/19/2011 14:35	SB-142	3	5	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386
SB-143 (0.0 - 2.0)		09/17/2011 15:20	SB-143	0	2	0.947	1.10	<0.00340	<0.00340	0.00779	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	0.0135
SB-143 (3.0 - 5.0)		09/17/2011 15:35	SB-143	3	5	0.00427J	0.00577J	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392	0.00221J
SB-144 (0.0 - 2.0)		10/06/2011 13:00	SB-144	0	2	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-144 (5.0 - 6.5)		10/06/2011 13:12	SB-144	5	6.5	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
SB-145 (0.0 - 2.0)		10/09/2011 11:40	SB-145	0	2	<0.00310	<0.00516 B*	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	0.00300 JH*	<0.00310	<0.00310	0.00403J	<0.00310	0.0101
SB-145 (3.5 - 5.6)		10/09/2011 11:55	SB-145	3.5	5.6	<0.00610 B*	<0.00610 B*	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366
SB-146 (0.0 - 2.0)		10/09/2011 14:10	SB-146	0	2	0.0958	<0.0259 B*	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	0.00961J	<0.0155	<0.0155
SB-146 (5.0 - 6.4)		10/09/2011 14:50	SB-146	5	6.4	**23.5**	**31.2**	<1.34	<1.34	<1.34	<0.0134	<0.0134	<0.0134	<0.0134	<0.0134	0.107	<0.0134	<0.0134
SD-146 (5.0 - 6.4)	Dup	10/09/2011 15:00	SB-146	5	6.4	**18.9**	**25.2**	<1.42	<1.42	<1.42	<0.0142	<0.0142	<0.0142	<0.0142	<0.0142	0.0789	<0.0142	0.0213J
SB-146 (16.0 - 17.0)		10/09/2011 16:20	SB-146	16	17	0.210	0.220	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-147 (0.0 - 2.0)		09/19/2011 10:50	SB-147	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-147 (3.0 - 5.0)		09/19/2011 11:05	SB-147	3	5	0.590	0.132	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378	0.00326J
SB-148 (0.0 - 2.0)		10/04/2011 16:20	SB-148	0	2	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167
SB-148 (3.5 - 5.1)		10/04/2011 16:35	SB-148	3.5	5.1	0.571J	0.258J	<0.358	<0.358	<0.358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358
SB-148 (6.8 - 7.4)		10/04/2011 16:50	SB-148	6.8	7.4	0.296	0.336	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SB-149 (0.0 - 2.0)		10/05/2011 09:20	SB-149	0	2	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308
SB-149 (3.5 - 5.2)		10/05/2011 09:30	SB-149	3.5	5.2	2.52	2.98	<0.0698 J*	<0.0698 J*	0.0463J	<0.0698 J*	<0.0698 J*	<0.0698 J*	<0.0698 J*	<0.0698 J*	<0.0698	<0.0698 J*	<0.0698 J*
SD-149 (3.5 - 5.2)	Dup	10/05/2011 09:45	SB-149	3.5	5.2	3.84	4.78	<0.0692	<0.0692	0.0810J	<0.0692	<0.0692	<0.0692	<0.0692	<0.0692	0.0485J	<0.0692	<0.0692
SB-150 (0.0 - 2.0)		10/08/2011 17:05	SB-150	0	2	0.0560	0.0432	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-150 (5.0 - 6.1)		10/08/2011 17:20	SB-150	5	6.1	**7.13**	**9.28**	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156	0.0196J	<0.0156	<0.0156
SB-150 (6.5 - 8.0)		10/08/2011 17:50	SB-150	6.5	8	3.76	4.91	<0.0160	<0.0160	0.0147J	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160	0.0136J	<0.0160	<0.0160
SB-150 (10.5 - 12.0)		10/08/2011 18:00	SB-150	10.5	12	0.0198	<0.0138 B*	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	0.964	1.28	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360	0.00299J	<0.00360	<0.00360
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	0.889	1.14	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183	<0.183
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	**12.1**	**15.7**	<0.0177	<0.0177	0.0281J	<0.0177	<0.0177	<0.0177	<0.0177	<0.0177	0.0264J	<0.0177	<0.0177
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.00338	0.00180J	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-152 (0.0 - 2.0)		09/17/2011 16:35	SB-152	0	2	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374	0.00499J	<0.00374	0.00254J	<0.00374	<0.00374
SB-152 (3.0 - 4.9)		09/17/2011 16:50	SB-152	3	4.9	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-153A (0.0 - 2.0)		09/29/2011 13:05	SB-153A	0	2	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	0.00798J	<0.0153	0.00793J	<0.0153	<0.0153
SB-153A (5.0 - 6.8)		09/29/2011 13:20	SB-153A	5	6.8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-154 (0.0 - 2.0)		09/29/2011 11:00	SB-154	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	0.0256J	<0.0155	<0.0155
SB-154 (4.0 - 6.0)		09/29/2011 11:20	SB-154	4	6	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-155 (0.0 - 2.0)		09/29/2011 09:25	SB-155	0	2	<0.0255 B*	<0.0255 B*	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153	0.0165J	<0.0153	<0.0153	<0.0153	<0.0153
SB-155 (5.0 - 6.3)		09/29/2011 09:40	SB-155	5	6.3	4.84	**6.43**	<0.0151	<0.0151	0.0183J	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151
SB-155 (12.0 - 13.0)		09/29/2011 10:20	SB-155	12	13	<0.00990 B*	<0.0117 B*	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SB-156 (0.0 - 2.0)		10/05/2011 10:35	SB-156	0	2	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858
SB-156 (3.0 - 4.5)		10/05/2011 10:50	SB-156	3	4.5	0.00310J	0.00384J	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-156 (6.0 - 8.0)		10/05/2011 11:15	SB-156	6	8	**35.8**	**53.0**	<0.0630	<0.0630	<0.0630	<0.0630	<0.0630	<0.0630	<0.0630	<0.0630	0.0315J	<0.0630	<0.0630
SB-156 (11.0 - 12.5)		10/05/2011 11:20	SB-156	11	12.5	0.297	0.382	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702	<0.0702
SB-156 (15.5 - 17.0)		10/05/2011 12:05	SB-156	15.5	17.5	0.00835	0.00779	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-158 (0.0 - 2.0)		09/22/2011 15:20	SB-158	0	2	1.74	2.09	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-158 (7.0 - 8.4)		09/22/2011 15:40	SB-158	7	8.4	**32.0**	**41.0**	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318	<0.0318
SB-158 (16.0 - 17.4)		09/22/2011 16:40	SB-158	16	17.4	0.00928	0.0101	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
SB-159 (0.0 - 2.0)		09/23/2011 10:30	SB-159	0	2	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-159 (6.0 - 7.9)		09/23/2011 10:45	SB-159	6	7.9	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352
SD-159 (6.0 - 7.9)	Dup	09/23/2011 11:00	SB-159	6	7.9	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	0.0334	0.0381	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162	<0.0162
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	**12.0**	**15.1**	<0.155	<0.155	0.305	<0.155	<0.155	<0.155	<0.155	<0.155	0.0906J	<0.155	<0.155
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	**9.48**	**11.9**	<0.155	<0.155	0.302	<0.155	<0.155	<0.155	<0.155	<0.155	0.0933J	<0.155	<0.155
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	**13.6**	**17.7**	<0.163	<0.163	0.278	<0.0163	<0.0163	<0.0163	<0.0163	<0.0163	0.482	<0.0163	<0.0163
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	0.0878	0.107	<0.00326	<0.00326	0.00493J	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326	0.00216J	<0.00326	<0.00326
SB-161 (0.0 - 2.0)		10/10/2011 09:20	SB-161	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SD-161 (0.0 - 2.0)	Dup	10/10/2011 09:30	SB-161	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-161 (6.0 - 7.4)		10/10/2011 09:40	SB-161	6	7.4	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SD-161 (6.0 - 7.4)	Dup	10/10/2011 09:50	SB-161	6	7.4	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-163 (0.0 - 2.0)		10/03/2011 10:50	SB-163	0	2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-163 (5.0 - 6.8)		10/03/2011 11:05	SB-163	5	6.8	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	<0.0304	0.0212J	<0.0304	<0.0304
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372
SB-165 (0.0 - 2.0)		10/05/2011 16:20	SB-165	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-165 (5.0 - 6.4)		10/05/2011 16:30	SB-165	5	6.4	6.15	5.93	<0.316	<0.316	0.378J	0.0529	0.0697	0.101	0.0668	0.0281J	0.222	<0.0316	0.198
SD-165 (5.0 - 6.4)	Dup	10/05/2011 16:40	SB-165	5	6.4	4.16	4.83	ND	ND	ND	0.0473J	0.0570	0.0845	0.0575	0.0211J	0.184	ND	0.175
SB-165 (6.5 - 8.3)		10/05/2011 16:50	SB-165	6.5	8.3	2.37	2.48	<0.0650	<0.0650	0.0572J	<0.0650	<0.0650	<0.0650	<0.0650	<0.0650	<0.0650	<0.0650	<0.0650
SB-165 (12.0 - 13.6)		10/05/2011 17:05	SB-165	12	13.6	0.00625	0.00677	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SB-166 (0.0 - 2.0)		10/07/2011 09:45	SB-166	0	2	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	0.00897 JL*	<0.0154 J*	<0.0154 J*
SB-166 (5.5 - 7.2)		10/07/2011 10:15	SB-166	5.5	7.2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	0.00191J	0.00192J	<0.00310	<0.00310	<0.00310	0.00159J
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-168 (0.0 - 2.0)		10/03/2011 11:55	SB-168	0	2	<0.0153	<0.0153	<0.0153	0.0102J	0.0293	0.0605	0.0924	0.108	0.0820	0.0404	0.0791	0.0171J	0.119
SB-168 (3.5 - 5.1)		10/03/2011 12:10	SB-168	3.5	5.1	<0.00392	<0.00392	<0.00392	<0.00392	0.00207J	0.00249J	0.00294 JH*	0.00397J	0.00261J	<0.00392	0.00356J	<0.00392	0.00602J
SD-168 (3.5 - 5.1)	Dup	10/03/2011 12:25	SB-168	3.5	5.1	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388
SB-168 (6.0 - 8.0)		10/03/2011 12:35	SB-168	6	8	0.463	0.588	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	0.00232J
SB-168 (11.0 - 12.0)		10/03/2011 12:45	SB-168	11	12	0.00176J	0.00239J	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
SB-169 (0.0 - 2.0)		10/06/2011 17:20	SB-169	0	2	0.00652J	0.00610J	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616	<0.00616
SB-169 (3.5 - 5.4)		10/06/2011 17:35	SB-169	3.5	5.4	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388
SB-170 (0.0 - 2.0)		10/03/2011 09:30	SB-170	0	2	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	0.00244J	0.00234J	<0.00314	<0.00314	<0.00314	0.00161J
SB-170 (6.0 - 7.6)		10/03/2011 09:45	SB-170	6	7.6	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-171 (0.0 - 2.0)		10/06/2011 15:00	SB-171	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-171 (3.5 - 5.6)		10/06/2011 15:10	SB-171	3.5	5.6	<0.00316	0.00178J	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158	0.00984J	<0.0158	<0.0158	<0.0158	<0.0158
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-173 (0.0 - 2.0)		10/07/2011 15:55	SB-173	0	2	0.0251J	0.0266	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-173 (3.0 - 4.5)		10/07/2011 16:15	SB-173	3	4.5	**7.29 JH***	**8.63 J***	<0.0304	<0.0304	0.0621 JL*	0.0361 JH*	0.0272 JH*	0.0361 JH*	0.0227 JH*	0.0126	0.0479 JH*	0.00512	0.111 JH*
SB-173 (5.0 - 6.0)		10/07/2011 16:35	SB-173	5	6	**8.80**	**11.0**	<0.320	<0.320	<0.320	0.0316	0.0293	0.0340	0.0242	0.0110	0.0466	0.00476J	0.0893
SB-173 (7.5 - 8.5)		10/07/2011 16:25	SB-173	7.5	8.5	0.122	0.0914	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366	0.00210J
SB-174 (0.0 - 2.0)		10/03/2011 14:10	SB-174	0	2	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151
SB-174 (5.5 - 7.2)		10/03/2011 14:25	SB-174	5.5	7.2	5.38	**6.85**	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	<0.0618	0.0693J
SB-174 (7.5 - 9.5)		10/03/2011 14:55	SB-174	7.5	9.5	4.33	5.91	<0.322	<0.322	<0.322	0.0139	0.0116	0.0162	0.00994	0.00612	0.0173	0.00200J	0.0447
SB-174 (12.0 - 13.3)		10/03/2011 15:10	SB-174	12	13.3	0.0336	0.0246	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.0154	0.00852J	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	0.0248J	0.0304J	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308	0.0262J	<0.0308	0.0439J	<0.0308	<0.0308
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	2.52	3.28	<0.320	<0.320	<0.320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-177 (0.0 - 2.0)		10/05/2011 13:50	SB-177	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152	0.0458	<0.0152	0.161	<0.0152	<0.0152
SB-177 (5.0 - 6.3)		10/05/2011 14:00	SB-177	5	6.3	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-178 (0.0 - 2.0)		10/05/2011 14:55	SB-178	0	2	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-178 (6.0 - 7.3)		10/05/2011 15:10	SB-178	6	7.3	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-179 (0.0 - 2.0)		09/22/2011 14:10	SB-179	0	2	0.00190J	0.00252J	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	0.00173J	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-179 (6.0 - 7.2)		09/22/2011 14:20	SB-179	6	7.2	0.00240J	0.00314J	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-179 (8.0 - 9.2)		09/22/2011 14:30	SB-179	8	9.2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
SB-180 (0.0 - 2.0)		10/07/2011 11:20	SB-180	0	2	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306
SB-180 (5.5 - 7.2)		10/07/2011 13:25	SB-180	5.5	7.2	**25.2**	**34.3**	<0.768	<0.768	<0.768	<0.0154	<0.0154	0.00857J	<0.0154	<0.0154	0.0289	<0.0154	0.0484
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	4.31	5.38	<0.163	<0.163	<0.163	0.00477J	0.00451J	0.00672	0.00375J	0.00214J	0.0153	<0.00326	0.0225
SB-180 (16.0 - 17.5)		10/07/2011 14:55	SB-180	16	17.5	0.0136	0.0152	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	1-Methyl-naphthalene	2-Methyl-naphthalene	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Chrysene	Dibenzo(a,h)-anthracene	Fluoran-thene
ADEC MTG Soil Cleanup Level (mg/kg)						**6.2**	**6.1**	**180**	**180**	**2000**	**3.6**	**2.1**	**12**	**38700**	**120**	**360**	**4**	**1400**
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336
SB-182 (0.0 - 2.0)		09/23/2011 12:30	SB-182	0	2	<0.00352	<0.00352	<0.00352	<0.00352	0.00256J	<0.00352	<0.00352	0.00282J	0.00240J	<0.00352	<0.00352	<0.00352	<0.00352
SB-182 (2.0 - 3.3)		09/23/2011 12:40	SB-182	2	3.3	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
Number of Exceedances						**31**	**35**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Minimum Exceedance						**6.36**	**6.43**											
Maximum Exceedance						**88.5**	**104**											

Notes:

Bolded values exceed the MTG soil cleanup level
Tabulated results are presented in mg/kg
non-detect results are presented as less than the limit of detection (<LOD).

J Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R Rejected result due to QC failures
JL Estimated result; biased low due to QC failures
JH Estimated result; biased high due to QC failures
B Sample result reported as non-detect due to method blank concentration
* Data flags applied by SWI during data validation process using Level II data packages
ADEC Alaska Department of Environmental Conservation
MTG migration to groundwater
Dup duplicate sample
SWI Shannon and Wilson, Inc.

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
MW-144B (0.0 - 2.0)		09/21/2011 09:45	MW-144B	0	2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
MW-144B (6.0 - 8.0)		09/21/2011 10:33	MW-144B	6	8	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
MW-144B (90.0 - 92.0)		09/21/2011 18:44	MW-144B	90	92	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
MW-192A (15-16.5)		08/26/2011 14:48	MW-192A	15	16.5	---	<0.00362	<0.00362	---	---
MW-192B (56-58)		08/26/2011 11:15	MW-192B	56	58	---	<0.00334	<0.00334	---	---
MW-195 (0.0 - 2.0)		10/11/2011 13:37	MW-195	0	2	0.207	<0.00332	0.276	<0.0332	0.00385J
MW-195 (2.0 - 4.0)		10/11/2011 13:57	MW-195	2	4	0.0156	<0.00352	0.323	0.00307J	<0.00352
MW-195 (6.0 - 8.0)		10/11/2011 14:33	MW-195	6	8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
MW-195 (14.0 - 16.0)		10/11/2011 15:21	MW-195	14	16	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366
MW-196 (0.0 - 2.0)		10/11/2011 09:21	MW-196	0	2	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*	<0.00312 J*
MW-196 (6.0 - 8.0)		10/11/2011 10:02	MW-196	6	8	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*	<0.00320 J*
MW-196 (14.0 - 16.0)		10/11/2011 10:42	MW-196	14	16	<0.00378 J*	<0.00378 J*	0.00821 JL*	<0.00378 J*	<0.00378 J*
O-5 (0.0 - 2.0)		09/13/2011 13:48	O-5	0	2	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
O-5 (6.0 - 8.0)		09/13/2011 14:23	O-5	6	8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
O-5 (14.0 - 16.0)		09/13/2011 15:09	O-5	14	16	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
O-6 (0.0 - 2.0)		09/14/2011 09:14	O-6	0	2	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
O-6 (4.0 - 6.0)		09/14/2011 09:40	O-6	4	6	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368
O-6 (14.0 - 16.0)		09/14/2011 10:43	O-6	14	16	<0.00332	<0.00332	<0.00332	<0.00332	<0.00332
O-7 (0.0 - 2.0)		09/14/2011 13:43	O-7	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-7 (6.0 - 8.0)		09/14/2011 14:34	O-7	6	8	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
DO-7 (6.0 - 8.0)	Dup	09/14/2011 14:15	O-7	6	8	0.124	<0.00312	0.498	<0.0626	<0.00312
O-7 (14.0 - 16.0)		09/14/2011 15:40	O-7	14	16	<0.00330	<0.00330	0.00336J	<0.00330	<0.00330
O-8 (0.0 - 2.0)		09/15/2011 10:01	O-8	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-8 (6.0 - 8.0)		09/15/2011 10:36	O-8	6	8	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
O-8 (14.0 - 16.0)		09/15/2011 11:38	O-8	14	16	<0.00326	<0.00326	<0.00326	<0.00326	<0.00326
O-9 (0.0 - 2.0)		09/15/2011 14:34	O-9	0	2	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
O-9 (6.0 - 8.0)		09/15/2011 15:15	O-9	6	8	0.273	<0.0320	6.05	<0.0320	<0.0320
O-9 (16.0 - 18.0)		09/15/2011 16:41	O-9	16	18	<0.00330	<0.00330	0.00223J	<0.00330	<0.00330
O-10 (0.0 - 2.0)		09/16/2011 10:47	O-10	0	2	<0.00308	<0.00308	0.00308J	<0.00308	<0.00308
O-10 (6.0 - 8.0)		09/16/2011 11:26	O-10	6	8	0.0554	<0.00408	5.61	0.00353J	<0.00408
O-10 (8.0 - 10.0)		09/16/2011 11:39	O-10	8	10	0.939 JH*	<0.00328	15.2 JH*	<0.164	<0.00328
DO-10 (8.0 - 10.0)	Dup	09/16/2011 11:45	O-10	8	10	1.17 JH*	<0.00338	**22.5 JH***	<0.169	<0.00338
O-10 (16.0 - 18.0)		09/16/2011 13:01	O-10	16	18	0.00453J	<0.00334	0.0133	<0.00334	<0.00334
O-11 (0.0 - 2.0)		09/20/2011 10:16	O-11	0	2	<0.0156	<0.0156	<0.0156	<0.0156	<0.0156
O-11 (8.0 - 10.0)		09/20/2011 11:01	O-11	8	10	1.42 JH*	<0.163	**20.1 JH***	0.785 JH*	<0.163
O-11 (10.0 - 12.0)		09/20/2011 11:11	O-11	10	12	1.18 JH*	<0.157	13.5 JH*	0.648 JH*	<0.157
O-11 (25.0 - 27.0)		09/20/2011 12:33	O-11	25	27	<0.00336	<0.00336	0.00220J	<0.00336	<0.00336
O-12 (0.0 - 2.0)		09/21/2011 12:55	O-12	0	2	<0.108	<0.108	<0.108	<0.108	<0.108
O-12 (7.5 - 9.2)		09/21/2011 11:50	O-12	7.5	9.2	<0.0182	<0.0182	<0.0182	<0.0182	<0.0182
O-12 (14.0 - 16.0)		09/21/2011 12:30	O-12	14	16	<0.00376	<0.00376	<0.00376	<0.00376	<0.00376
O-13 (0.0 - 1.4)		09/21/2011 14:35	O-13	0	1.4	0.0956J	<0.120	0.113J	0.382	<0.120
O-13 (4.0 - 6.0)		09/21/2011 15:15	O-13	4	6	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
O-13 (8.0 - 9.1)		09/21/2011 15:45	O-13	8	9.1	0.163 J*	<0.0165	0.963 J*	0.171 J*	<0.0165
DO-13 (8.0 - 9.1)	Dup	09/21/2011 16:00	O-13	8	9.1	0.349 J*	<0.0170	4.93 J*	0.344 J*	<0.0170
O-13 (14.5 - 15.2)		09/21/2011 17:05	O-13	14.5	15.2	0.00261J	<0.00332	0.00720	0.00337J	<0.00332
O-14 (0.0 - 2.0)		10/01/2011 09:40	O-14	0	2	0.00420J	<0.00618	0.0125	0.00355J	<0.00618
O-14 (2.0 - 4.0)		10/01/2011 10:35	O-14	2	4	0.0493	<0.0154	0.135	0.0174J	<0.0154
O-14 (6.0 - 7.8)		10/01/2011 10:30	O-14	6	7.8	<0.00316	<0.00316	0.00282J	<0.00316	<0.00316
O-14 (14.0 - 16.0)		10/01/2011 11:25	O-14	14	16	<0.00320	<0.00320	0.00179J	<0.00320	<0.00320
O-15 (0.0 - 2.0)		10/06/2011 14:20	O-15	0	2	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*	<0.00310 J*
O-15 (8.0 - 10.0)		10/06/2011 15:41	O-15	8	10	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*	<0.00322 J*
O-15 (14.0 - 16.0)		10/06/2011 16:39	O-15	14	16	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*	<0.00340 J*
O-16 (0.0 - 2.0)		10/07/2011 13:00	O-16	0	2	<0.0154 J*	<0.0154 J*	<0.0154 J*	0.0136 JL*	<0.0154 J*

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
O-16 (6.0 - 8.0)		10/07/2011 14:00	O-16	6	8	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*	<0.00324 J*
O-16 (14.0 - 16.0)		10/07/2011 15:09	O-16	14	16	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*	<0.00346 J*
O-17 (0.0 - 2.0)		10/13/2011 10:16	O-17	0	2	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*
O-17 (6.0 - 8.0)		10/13/2011 11:17	O-17	6	8	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*	<0.00302 J*
O-17 (14.0 - 16.0)		10/13/2011 12:30	O-17	14	16	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*	<0.00326 J*
O-18 (0.0 - 2.0)		10/12/2011 10:48	O-18	0	2	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*	<0.00370 J*
O-18 (6.0 - 8.0)		10/12/2011 11:37	O-18	6	8	0.0173J	<0.0334	<0.0334	0.123	<0.0334
O-18 (14.0 - 15.0)		10/12/2011 13:30	O-18	14	15	<0.0312	<0.0312	<0.0312	0.0606	<0.0312
O-19 (0.0 - 2.0)		10/15/2011 09:50	O-19	0	2	<0.0710 J*	<0.0710 J*	<0.0710 J*	0.188 JL*	<0.0710 J*
DO-19 (0.0 - 2.0)	Dup	10/15/2011 09:45	O-19	0	2	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*	<0.0514 J*
O-19 (4.0 - 6.0)		10/15/2011 10:35	O-19	4	6	0.0485 JL*	<0.00342 J*	0.371 JL*	0.0245 JL*	<0.00342 J*
O-19 (6.0 - 8.0)		10/15/2011 10:40	O-19	6	8	0.182 JL*	<0.0155 J*	2.19 JL*	0.0812 JL*	<0.0155 J*
DO-19 (6.0 - 8.0)	Dup	10/15/2011 10:38	O-19	6	8	0.220J	<0.00308	1.80	<0.308	<0.00308
O-19 (14.0 - 16.0)		10/15/2011 11:44	O-19	14	16	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*	<0.0175 J*
O-20 (0.0 - 2.0)		10/13/2011 15:43	O-20	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
O-20 (6.0 - 8.0)		10/13/2011 16:33	O-20	6	8	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
DO-20 (6.0 - 8.0)	Dup	10/13/2011 16:30	O-20	6	8	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
O-20 (14.0 - 16.0)		10/13/2011 17:47	O-20	14	16	<0.00328	<0.00328	0.00399J	<0.00328	<0.00328
O-21 (0.0-2.0)		10/14/2011 12:43	O-21	0	2	0.0118 JL*	<0.0167 J*	<0.0167 J*	0.0280 JL*	0.0217 JL*
DO-21 (0.0-2.0)	Dup	10/14/2011 12:40	O-21	0	2	<0.0178	<0.0178	<0.0178	0.0215J	0.0172J
O-21 (4.0-6.0)		10/14/2011 13:12	O-21	4	6	0.300	0.0177J	**57.6**	0.557	0.119
O-21 (6.0-8.0)		10/14/2011 13:35	O-21	6	8	0.805 JL*	0.0410 JL*	9.93 JL*	1.39 JL*	0.203 JL*
DO-21 (6.0-8.0)	Dup	10/14/2011 13:30	O-21	6	8	1.07 JL*	0.0516 JL*	11.8 JL*	1.80 JL*	0.278 JL*
O-21 (14.0-16.0)		10/14/2011 14:48	O-21	14	16	<0.00340	<0.00340	0.00176J	<0.00340	<0.00340
DO-21 (14.0-16.0)	Dup	10/14/2011 14:40	O-21	14	16	<0.00346	<0.00346	0.00308J	<0.00346	<0.00346
O-22 (8-10)		11/14/2011 17:30	O-22	8	10	<0.00304	<0.00304	0.00189J	<0.00304	<0.00304
O-22D (8-10)	Dup	11/14/2011 17:35	O-22	8	10	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
O-22 (11.3-12.2)		11/14/2011 17:50	O-22	11.3	12.2	<0.00326	<0.00326	0.00610	0.00193J	<0.00326
O-23 (6-8)		12/05/2011 11:30	O-23	6	8	<0.00362	<0.00362	<0.00362	<0.00362	<0.00362
O-23D (6-8)	Dup	12/05/2011 11:15	O-23	6	8	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378
O-23 (10.6-13.0)		12/05/2011 12:00	O-23	10.6	13	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
O-25 (8-9)		11/10/2011 11:45	O-25	8	9	<0.00338	<0.00338	0.00313J	<0.00338	<0.00338
O-25 (9.7-10.3)		11/09/2011 11:30	O-25	9.7	10.3	<0.00382	<0.00382	<0.00382	<0.00382	<0.00382
O-26 (6.1-6.8)		11/09/2011 17:02	O-26	6.1	6.8	<0.00360	<0.00360	<0.00360	<0.00360	<0.00360
O-26 (8.4-9.2)		11/09/2011 13:06	O-26	8.4	9.2	<0.00368	<0.00368	<0.00368	<0.00368	<0.00368
O-27 (9-9.5)		11/09/2011 17:25	O-27	9	9.5	0.632	<0.00304	6.34	0.519	0.0108
O-27 (10.3-11)		11/09/2011 17:25	O-27	10.3	11	0.417	<0.00330	2.85	0.340	0.00602
O-28 (8-9)		11/14/2011 18:30	O-28	8	9	1.40 JH*	<0.0808	10.4 JH*	0.0826 JH*	<0.0808
O-29 (9.5-10)		11/12/2011 12:50	O-29	9.5	10	<0.00308	<0.00308	0.00219J	<0.00308	<0.00308
O-29 (11-11.5)		11/12/2011 13:10	O-29	11	11.5	0.0931 JH*	<0.00322	0.137 JH*	0.0327 JH*	<0.00322
SB-101 (0.0 - 2.0)		09/14/2011 10:25	SB-101	0	2	<0.00392	<0.00392	<0.00392	<0.00392	<0.00392
SB-101 (4.0 - 5.0)		09/14/2011 10:50	SB-101	4	5	<0.00396	<0.00396	<0.00396	<0.00396	<0.00396
SB-102 (0.0 - 2.0)		09/14/2011 11:25	SB-102	0	2	<0.00378	<0.00378	<0.00378	<0.00378	<0.00378
SB-102 (5.0 - 6.0)		09/14/2011 11:40	SB-102	5	6	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-103 (0.0 - 2.0)		09/14/2011 13:05	SB-103	0	2	<0.00366	<0.00366	<0.00366	<0.00366	<0.00366
SB-103 (5.0 - 6.7)		09/14/2011 13:25	SB-103	5	6.7	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-104 (0.0 - 2.0)		09/14/2011 14:10	SB-104	0	2	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364
SB-104 (5.0 - 6.7)		09/14/2011 14:30	SB-104	5	6.7	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-105 (0.0 - 2.0)		09/15/2011 15:05	SB-105	0	2	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344
SB-105 (5.0 - 6.2)		09/15/2011 16:00	SB-105	5	6.2	<0.00308	<0.00308	0.00230J	<0.00308	<0.00308
SB-106 (0.0 - 2.0)		09/16/2011 11:10	SB-106	0	2	<0.0175	<0.0175	<0.0175	<0.0175	<0.0175
SD-106 (0.0 - 2.0)	Dup	09/16/2011 11:25	SB-106	0	2	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161
SB-106 (3.5 - 5.2)		09/16/2011 11:40	SB-106	3.5	5.2	<0.00380	<0.00380	<0.00380	<0.00380	<0.00380
SB-107 (0.0 - 2.0)		09/16/2011 09:50	SB-107	0	2	<0.00632	<0.00632	<0.00632	<0.00632	<0.00632

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
SB-107 (5.0 - 6.6)		09/16/2011 10:15	SB-107	5	6.6	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-108 (0.0 - 2.0)		09/16/2011 13:00	SB-108	0	2	0.200J	<0.194	0.311J	0.675	<0.194
SB-108 (6.5 - 7.5)		09/16/2011 14:20	SB-108	6.5	7.5	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370
SB-109 (0.0 - 2.0)		09/17/2011 10:30	SB-109	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SD-109 (0.0 - 2.0)	Dup	09/17/2011 10:50	SB-109	0	2	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-109 (4.0 - 5.9)		09/17/2011 10:45	SB-109	4	5.9	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358
SB-109 (7.5 - 8.5)		09/17/2011 11:20	SB-109	7.5	8.5	0.799 JH*	<0.00314	10.0 JH*	0.434 JH*	<0.00314
SB-109 (16.5 - 17.5)		09/17/2011 11:50	SB-109	16.5	17.5	<0.00350	<0.00350	0.00527J	<0.00350	<0.00350
SB-110 (0.0 - 2.0)		09/16/2011 16:00	SB-110	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155
SB-110 (5.0 - 6.9)		09/16/2011 16:30	SB-110	5	6.9	0.0429	<0.00310	0.322	0.0499	<0.00310
SB-110 (7.0 - 8.5)		09/16/2011 17:00	SB-110	7	8.5	<0.00322	<0.00322	0.423	0.0366	<0.00322
SB-110 (11.0 - 12.0)		09/16/2011 17:10	SB-110	11	12	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-111 (0.0 - 2.0)		09/17/2011 09:15	SB-111	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-111 (4.0 - 6.0)		09/17/2011 09:40	SB-111	4	6	<0.0156	<0.0156	1.58 JH*	0.199 JH*	<0.0156
SB-111 (8.0 - 9.2)		09/17/2011 09:50	SB-111	8	9.2	<0.00380	<0.00380	0.00823 J*	<0.00380	<0.00380
SB-112 (0.0 - 2.0)		10/04/2011 11:20	SB-112	0	2	<0.0336	<0.0336	<0.0336	<0.0336	<0.0336
SB-112 (5.5 - 7.3)		10/04/2011 11:40	SB-112	5.5	7.3	0.550	<0.00306	3.22	0.378J	<0.306
SB-112 (10.0 - 12.0)		10/04/2011 13:00	SB-112	10	12	0.00359J	<0.00356	0.00750	0.00221J	<0.00356
SB-113 (0.0 - 2.0)		09/23/2011 14:25	SB-113	0	2	<0.0161	<0.0161	<0.0161	<0.0161	<0.0161
SB-113 (5.0 - 7.0)		09/23/2011 14:45	SB-113	5	7	0.248J	<0.00314	2.49	0.179J	<0.00314
SB-113 (11.0 - 12.3)		09/23/2011 15:15	SB-113	11	12.3	0.00184J	<0.00336	0.00300J	0.00183J	<0.00336
SB-114 (0.0 - 2.0)		10/03/2011 17:00	SB-114	0	2	0.0142J	<0.0152	0.0563	<0.0152	<0.0152
SB-114 (5.0 - 6.8)		10/03/2011 17:20	SB-114	5	6.8	0.534J	<0.00328	4.60	0.520J	0.0854
SB-114 (7.0 - 8.6)		10/03/2011 17:40	SB-114	7	8.6	0.612	<0.0640	6.79	0.660	0.143
SD-114 (7.0 - 8.6)	Dup	10/03/2011 17:50	SB-114	7	8.6	0.550	<0.0646	5.71	0.590	0.129
SB-114 (16.0 - 18.0)		10/03/2011 18:35	SB-114	16	18	<0.00326	<0.00326	0.00287J	<0.00326	<0.00326
SB-115 (0.0 - 2.0)		09/24/2011 09:15	SB-115	0	2	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-115 (6.0 - 7.3)		09/24/2011 10:00	SB-115	6	7.3	0.319	<0.00312	4.08	<0.156	<0.00312
SB-115 (15.0 - 17.0)		09/24/2011 10:50	SB-115	15	17	<0.00360	<0.00360	0.00409J	<0.00360	<0.00360
SB-116 (0.0 - 2.0)		09/24/2011 11:45	SB-116	0	2	<0.00306	<0.00306	0.00199J	<0.00306	<0.00306
SB-116 (5.5 - 7.1)		09/24/2011 12:00	SB-116	5.5	7.1	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-117 (0.0 - 2.0)		09/29/2011 14:15	SB-117	0	2	<0.0632	<0.0632	<0.0632	0.112	<0.0632
SB-117 (5.0 - 7.0)		09/29/2011 14:30	SB-117	5	7	0.372J	<0.00620	2.52	0.437J	0.0139
SD-117 (5.0 - 7.0)	Dup	09/29/2011 14:45	SB-117	5	7	0.331J	<0.00616	2.52	0.404J	0.0133
SB-117 (11.0 - 12.0)		09/29/2011 14:55	SB-117	11	12	<0.00346	<0.00346	<0.00577 B*	<0.00346	<0.00346
SB-118 (0.0 - 2.0)		09/24/2011 12:30	SB-118	0	2	0.0156J	<0.0158	<0.0158	0.110	0.0177J
SB-118 (2.0 - 3.7)		09/24/2011 12:45	SB-118	2	3.7	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374
SB-119 (0.0 - 2.0)		09/15/2011 13:40	SB-119	0	2	<0.00348	<0.00348	0.00435J	<0.00348	<0.00348
SB-119 (5.0 - 6.4)		09/15/2011 14:10	SB-119	5	6.4	<0.00330	<0.00330	<0.00330	<0.00330	<0.00330
SB-120 (0.0 - 2.0)		09/28/2011 10:50	SB-120	0	2	<0.00328	<0.00328	0.00176J	<0.00328	<0.00328
SB-120 (7.2 - 9.2)		09/28/2011 11:50	SB-120	7.2	9.2	<0.155	<0.00310	0.600	0.142J	0.00676
SD-120 (7.2 - 9.2)	Dup	09/28/2011 12:10	SB-120	7.2	9.2	0.145J	<0.00308	0.674	0.165J	0.00630
SB-120 (12.0 - 13.1)		09/28/2011 12:20	SB-120	12	13.1	0.00186J	<0.00316	0.0209	<0.00316	<0.00316
SB-121 (0.0 - 2.0)		09/27/2011 11:20	SB-121	0	2	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-121 (4.0 - 6.1)		09/27/2011 11:40	SB-121	4	6.1	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-122 (0.0 - 2.0)		09/20/2011 09:20	SB-122	0	2	<0.0164	0.0165J	<0.0164	0.0125J	0.0279
SB-122 (5.0 - 6.2)		09/20/2011 09:45	SB-122	5	6.2	0.269	<0.00338	4.12	0.111J	<0.00338
SB-122 (6.5 - 7.5)		09/20/2011 10:10	SB-122	6.5	7.5	0.472	<0.00316	7.20	0.156	<0.00316
SB-122 (11.5 - 12.5)		09/20/2011 10:20	SB-122	11.5	12.5	<0.00360	<0.00360	0.00252J	<0.00360	<0.00360
SB-123 (0.0 - 2.0)		09/30/2011 09:10	SB-123	0	2	<0.0160	<0.0160	<0.0160	<0.0160	<0.0160
SB-123 (3.5 - 5.2)		09/30/2011 09:25	SB-123	3.5	5.2	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SD-123 (3.5 - 5.2)	Dup	09/30/2011 09:45	SB-123	3.5	5.2	<0.0167	<0.0167	<0.0167	0.0408	<0.0167
SB-123 (6.0 - 8.0)		09/30/2011 10:00	SB-123	6	8	0.997	<0.00332	11.7	0.681	0.00401J
SB-123 (11.5 - 13.0)		09/30/2011 10:15	SB-123	11.5	13	0.00334J	<0.00328	0.00960	0.00452J	<0.00328

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
SB-124 (0.0 - 2.0)		09/15/2011 09:50	SB-124	0	2	0.0108	<0.00328	0.0142	0.0623	<0.00328
SD-124 (0.0 - 2.0)	Dup	09/15/2011 10:10	SB-124	0	2	0.0305	<0.00314	0.0325	0.218	0.00489J
SB-124 (5.0 - 6.3)		09/15/2011 10:40	SB-124	5	6.3	0.0913J	<0.0608	0.292	0.104	<0.0608
SB-124 (10.0 - 11.0)		09/15/2011 11:55	SB-124	10	11	<0.0334	<0.0334	0.0202J	0.0189J	<0.0334
SB-125 (0.0 - 2.0)		09/15/2011 17:00	SB-125	0	2	<0.00322	<0.00322	<0.00322	<0.00322	<0.00322
SB-125 (5.0 - 6.5)		09/15/2011 17:30	SB-125	5	6.5	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-126 (0.0 - 2.0)		09/28/2011 13:30	SB-126	0	2	<0.00314	<0.00314	0.00233J	<0.00314	<0.00314
SB-126 (6.0 - 7.5)		09/28/2011 13:45	SB-126	6	7.5	0.329	<0.154	6.34	1.45	<0.154
SB-126 (13.0 - 14.0)		09/28/2011 14:15	SB-126	13	14	<0.00348	<0.00348	0.00850	<0.00348	<0.00348
SB-127 (0.0 - 2.0)		09/28/2011 15:20	SB-127	0	2	<0.0169	<0.0169	<0.0169	<0.0169	<0.0169
SB-127 (5.0 - 7.0)		09/28/2011 15:40	SB-127	5	7	<0.00306	<0.00306	0.0118	0.00192J	<0.00306
SB-128 (0.0 - 2.0)		09/22/2011 17:20	SB-128	0	2	<0.0189	<0.0189	<0.0189	<0.0189	<0.0189
SB-128 (5.0 - 6.6)		09/22/2011 17:40	SB-128	5	6.6	0.329	<0.0308	4.98	<0.0308	<0.0308
SB-128 (11.5 - 13.0)		09/22/2011 18:00	SB-128	11.5	13	<0.00344	<0.00344	0.00460J	<0.00344	<0.00344
SB-129 (0.0 - 2.0)		09/27/2011 09:25	SB-129	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-129 (5.5 - 7.5)		09/27/2011 09:45	SB-129	5.5	7.5	<0.00306	<0.00306	0.00170J	<0.00306	<0.00306
SB-129 (7.5 - 8.7)		09/27/2011 10:25	SB-129	7.5	8.7	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-129 (10.5 - 12.2)		09/27/2011 10:30	SB-129	10.5	12.2	<0.00332	<0.00332	0.00925	<0.00332	<0.00332
SB-130 (0.0 - 2.0)		09/20/2011 11:30	SB-130	0	2	<0.00364	<0.00364	0.00246J	<0.00364	<0.00364
SB-130 (4.0 - 5.6)		09/20/2011 11:50	SB-130	4	5.6	<0.00306	<0.00306	0.314	<0.00306	<0.00306
SB-130 (7.0 - 8.4)		09/20/2011 12:15	SB-130	7	8.4	0.0396	<0.00322	0.395	<0.00322	<0.00322
SB-130 (11.5 - 12.5)		09/20/2011 12:30	SB-130	11.5	12.5	<0.00334	<0.00334	0.00485J	<0.00334	<0.00334
SD-130 (11.5 - 12.5)	Dup	09/20/2011 12:45	SB-130	11.5	12.5	<0.00334	<0.00334	0.00683	<0.00334	<0.00334
SB-131 (0.0 - 2.0)		09/17/2011 13:50	SB-131	0	2	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-131 (9.5 - 11.2)		09/17/2011 14:20	SB-131	9.5	11.2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-132 (0.0 - 2.0)		09/19/2011 09:00	SB-132	0	2	<0.0164	<0.0164	<0.0164	<0.0164	<0.0164
SB-132 (8.5 - 10.5)		09/19/2011 09:40	SB-132	8.5	10.5	<0.00346	<0.00346	<0.00346	<0.00346	<0.00346
SD-132 (8.5 - 10.5)	Dup	09/19/2011 09:55	SB-132	8.5	10.5	<0.00354	<0.00354	<0.00354	<0.00354	<0.00354
SB-133 (0.0 - 2.0)		09/19/2011 13:35	SB-133	0	2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SD-133 (0.0 - 2.0)	Dup	09/19/2011 13:45	SB-133	0	2	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-133 (4.0 - 5.8)		09/19/2011 13:55	SB-133	4	5.8	<0.00328	<0.00328	<0.00328	<0.00328	<0.00328
SB-134 (0.0 - 2.0)		10/04/2011 09:35	SB-134	0	2	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312
SB-134 (5.0 - 6.8)		10/04/2011 09:55	SB-134	5	6.8	1.14J	<0.0155	**26.8**	0.539J	<0.774 J*
SB-134 (11.0 - 12.0)		10/04/2011 10:35	SB-134	11	12	0.00583	<0.00340	0.0601	<0.00340	<0.00340
SB-135 (0.0 - 2.0)		10/06/2011 13:50	SB-135	0	2	<0.00342	<0.00342	<0.00342	<0.00342	<0.00342
SB-135 (3.0 - 4.0)		10/06/2011 14:00	SB-135	3	4	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350
SB-136 (0.0 - 2.0)		10/09/2011 10:50	SB-136	0	2	<0.00312	<0.00312	<0.00521 B*	<0.00312	<0.00312
SB-136 (4.0 - 6.0)		10/09/2011 11:00	SB-136	4	6	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-137 (0.0 - 2.0)		10/06/2011 10:55	SB-137	0	2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
SB-137 (3.5 - 5.2)		10/06/2011 11:15	SB-137	3.5	5.2	<0.00350	<0.00350	<0.00350	<0.00350	<0.00350
SB-138 (0.0 - 2.0)		10/06/2011 09:50	SB-138	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-138 (3.0 - 5.2)		10/06/2011 10:10	SB-138	3	5.2	<0.00340	<0.00340	<0.00340	<0.00340	<0.00340
SB-139 (0.0 - 2.0)		09/19/2011 16:30	SB-139	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-139 (3.0 - 5.0)		09/19/2011 16:35	SB-139	3	5	<0.00370	<0.00370	0.00209J	<0.00370	<0.00370
SB-140 (0.0 - 2.0)		09/19/2011 15:20	SB-140	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-140 (3.0 - 5.0)		09/19/2011 15:40	SB-140	3	5	<0.00390	<0.00390	<0.00390	<0.00390	<0.00390
SB-141 (0.0 - 2.0)		09/19/2011 12:05	SB-141	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-141 (3.0 - 5.0)		09/19/2011 12:15	SB-141	3	5	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374
SB-142 (0.0 - 2.0)		09/19/2011 14:25	SB-142	0	2	<0.00324	<0.00324	<0.00324	<0.00324	<0.00324
SB-142 (3.0 - 5.0)		09/19/2011 14:35	SB-142	3	5	<0.00386	<0.00386	<0.00386	<0.00386	<0.00386
SB-143 (0.0 - 2.0)		09/17/2011 15:20	SB-143	0	2	<0.00340	<0.00340	0.419	0.0513	<0.00340
SB-143 (3.0 - 5.0)		09/17/2011 15:35	SB-143	3	5	<0.00392	<0.00392	0.00392J	<0.00392	<0.00392
SB-144 (0.0 - 2.0)		10/06/2011 13:00	SB-144	0	2	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-144 (5.0 - 6.5)		10/06/2011 13:12	SB-144	5	6.5	<0.00370	<0.00370	<0.00370	<0.00370	<0.00370

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
SB-145 (0.0 - 2.0)		10/09/2011 11:40	SB-145	0	2	<0.00310	<0.00310	<0.00310	0.00622	0.00683
SB-145 (3.5 - 5.6)		10/09/2011 11:55	SB-145	3.5	5.6	<0.00366	<0.00366	<0.00610 B*	<0.00366	<0.00366
SB-146 (0.0 - 2.0)		10/09/2011 14:10	SB-146	0	2	<0.0155	<0.0155	0.0198J	0.0263	<0.0155
SB-146 (5.0 - 6.4)		10/09/2011 14:50	SB-146	5	6.4	1.24J	<0.0134	17.4	1.64J	0.0527
SD-146 (5.0 - 6.4)	Dup	10/09/2011 15:00	SB-146	5	6.4	0.969J	<0.0142	13.8	1.27J	0.0410
SB-146 (16.0 - 17.0)		10/09/2011 16:20	SB-146	16	17	<0.00312	<0.00312	0.484	<0.00312	<0.00312
SB-147 (0.0 - 2.0)		09/19/2011 10:50	SB-147	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-147 (3.0 - 5.0)		09/19/2011 11:05	SB-147	3	5	0.0470	<0.00378	<0.00378	<0.00378	<0.00378
SB-148 (0.0 - 2.0)		10/04/2011 16:20	SB-148	0	2	<0.0167	<0.0167	<0.0167	<0.0167	<0.0167
SB-148 (3.5 - 5.1)		10/04/2011 16:35	SB-148	3.5	5.1	0.187J	<0.00358	<0.358	<0.358	<0.00358
SB-148 (6.8 - 7.4)		10/04/2011 16:50	SB-148	6.8	7.4	0.0242	<0.00328	0.0508	<0.00328	<0.00328
SB-149 (0.0 - 2.0)		10/05/2011 09:20	SB-149	0	2	<0.0308	<0.0308	<0.0308	<0.0308	<0.0308
SB-149 (3.5 - 5.2)		10/05/2011 09:30	SB-149	3.5	5.2	0.357	<0.0698 J*	0.961	0.618	<0.0698 J*
SD-149 (3.5 - 5.2)	Dup	10/05/2011 09:45	SB-149	3.5	5.2	0.573	<0.0692	1.24	0.983	<0.0692
SB-150 (0.0 - 2.0)		10/08/2011 17:05	SB-150	0	2	0.00410J	<0.00314	<0.0138 B*	0.00296J	<0.00314
SB-150 (5.0 - 6.1)		10/08/2011 17:20	SB-150	5	6.1	0.358	<0.0156	4.83	0.458	0.0119J
SB-150 (6.5 - 8.0)		10/08/2011 17:50	SB-150	6.5	8	0.184	<0.0160	2.30	0.245	<0.0160
SB-150 (10.5 - 12.0)		10/08/2011 18:00	SB-150	10.5	12	0.00230J	<0.00324	<0.00540 B*	0.00212J	<0.00324
SB-151 (0.0 - 2.0)		10/08/2011 14:15	SB-151	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-151 (5.0 - 6.7)		10/08/2011 14:40	SB-151	5	6.7	0.0905	<0.00360	0.546	0.141	<0.00360
SD-151 (5.0 - 6.7)	Dup	10/08/2011 14:50	SB-151	5	6.7	<0.183	<0.183	0.388	<0.183	<0.183
SB-151 (6.7 - 8.4)		10/08/2011 16:10	SB-151	6.7	8.4	0.453	<0.0177	7.86	0.393	<0.0177
SB-151 (16.0 - 17.8)		10/08/2011 16:20	SB-151	16	17.8	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-152 (0.0 - 2.0)		09/17/2011 16:35	SB-152	0	2	<0.00374	<0.00374	<0.00374	<0.00374	<0.00374
SB-152 (3.0 - 4.9)		09/17/2011 16:50	SB-152	3	4.9	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-153A (0.0 - 2.0)		09/29/2011 13:05	SB-153A	0	2	<0.0153	<0.0153	<0.0153	<0.0153	<0.0153
SB-153A (5.0 - 6.8)		09/29/2011 13:20	SB-153A	5	6.8	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-154 (0.0 - 2.0)		09/29/2011 11:00	SB-154	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155
SB-154 (4.0 - 6.0)		09/29/2011 11:20	SB-154	4	6	<0.00334	<0.00334	<0.00334	<0.00334	<0.00334
SB-155 (0.0 - 2.0)		09/29/2011 09:25	SB-155	0	2	<0.0153	<0.0153	<0.0255 B*	0.0200J	<0.0153
SB-155 (5.0 - 6.3)		09/29/2011 09:40	SB-155	5	6.3	0.196	<0.0151	2.69	0.371	<0.0151
SB-155 (12.0 - 13.0)		09/29/2011 10:20	SB-155	12	13	<0.00328	<0.00328	<0.00551 B*	0.00216J	<0.00328
SB-156 (0.0 - 2.0)		10/05/2011 10:35	SB-156	0	2	<0.0858	<0.0858	<0.0858	<0.0858	<0.0858
SB-156 (3.0 - 4.5)		10/05/2011 10:50	SB-156	3	4.5	<0.00312	<0.00312	0.00342J	<0.00312	<0.00312
SB-156 (6.0 - 8.0)		10/05/2011 11:15	SB-156	6	8	0.784	<0.0630	**24.5**	0.504	<0.0630
SB-156 (11.0 - 12.5)		10/05/2011 11:20	SB-156	11	12.5	<0.0702	<0.0702	0.408	<0.0702	<0.0702
SB-156 (15.5 - 17.0)		10/05/2011 12:05	SB-156	15.5	17.5	<0.00338	<0.00338	0.00882	<0.00338	<0.00338
SB-157 (0.0 - 2.0)		09/23/2011 09:30	SB-157	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-157 (6.0 - 8.0)		09/23/2011 09:55	SB-157	6	8	<0.00312	<0.00312	0.00531	<0.00312	<0.00312
SB-158 (0.0 - 2.0)		09/22/2011 15:20	SB-158	0	2	0.0304	<0.00318	0.631	0.00868	<0.00318
SB-158 (7.0 - 8.4)		09/22/2011 15:40	SB-158	7	8.4	0.567	<0.0318	18.2	<0.0318	<0.0318
SB-158 (16.0 - 17.4)		09/22/2011 16:40	SB-158	16	17.4	<0.00340	<0.00340	0.00595	<0.00340	<0.00340
SB-159 (0.0 - 2.0)		09/23/2011 10:30	SB-159	0	2	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-159 (6.0 - 7.9)		09/23/2011 10:45	SB-159	6	7.9	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352
SD-159 (6.0 - 7.9)	Dup	09/23/2011 11:00	SB-159	6	7.9	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-160 (0.0 - 2.0)		10/10/2011 16:00	SB-160	0	2	<0.0162	<0.0162	0.00974J	0.0325	<0.0162
SB-160 (4.5 - 6.4)		10/10/2011 17:00	SB-160	4.5	6.4	1.64	<0.155	6.76	3.92	<0.155
SD-160 (4.5 - 6.4)	Dup	10/10/2011 17:15	SB-160	4.5	6.4	1.44	<0.155	5.22	3.39	<0.155
SB-160 (6.4 - 8.4)		10/10/2011 17:35	SB-160	6.4	8.4	1.76	<0.0163	8.41	4.29	<0.0163
SB-160 (12.0 - 13.5)		10/10/2011 17:50	SB-160	12	13.5	0.0232	<0.00326	0.0292	0.0807	<0.00326
SB-161 (0.0 - 2.0)		10/10/2011 09:20	SB-161	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SD-161 (0.0 - 2.0)	Dup	10/10/2011 09:30	SB-161	0	2	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304
SB-161 (6.0 - 7.4)		10/10/2011 09:40	SB-161	6	7.4	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SD-161 (6.0 - 7.4)	Dup	10/10/2011 09:50	SB-161	6	7.4	<0.00304	<0.00304	<0.00304	<0.00304	<0.00304

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
SB-162 (0.0 - 2.0)		10/10/2011 10:15	SB-162	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-162 (5.5 - 7.1)		10/10/2011 10:30	SB-162	5.5	7.1	<0.00308	<0.00308	0.00165J	<0.00308	<0.00308
SB-163 (0.0 - 2.0)		10/03/2011 10:50	SB-163	0	2	<0.00308	<0.00308	<0.00308	<0.00308	<0.00308
SB-163 (5.0 - 6.8)		10/03/2011 11:05	SB-163	5	6.8	<0.0304	<0.0304	<0.0304	0.0163J	<0.0304
SB-164 (0.0 - 2.0)		10/04/2011 15:15	SB-164	0	2	<0.0155	<0.0155	<0.0155	<0.0155	<0.0155
SB-164 (3.0 - 4.5)		10/04/2011 15:25	SB-164	3	4.5	<0.00372	<0.00372	<0.00372	<0.00372	<0.00372
SB-165 (0.0 - 2.0)		10/05/2011 16:20	SB-165	0	2	<0.00306	<0.00306	<0.00306	<0.00306	<0.00306
SB-165 (5.0 - 6.4)		10/05/2011 16:30	SB-165	5	6.4	1.21	0.0491J	2.75	1.46	<0.0316
SD-165 (5.0 - 6.4)	Dup	10/05/2011 16:40	SB-165	5	6.4	ND	0.0417J	2.76	1.04	ND
SB-165 (6.5 - 8.3)		10/05/2011 16:50	SB-165	6.5	8.3	0.335	<0.0650	1.03	0.569	<0.0650
SB-165 (12.0 - 13.6)		10/05/2011 17:05	SB-165	12	13.6	<0.00328	<0.00328	0.00818	<0.00328	<0.00328
SB-166 (0.0 - 2.0)		10/07/2011 09:45	SB-166	0	2	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*	<0.0154 J*
SB-166 (5.5 - 7.2)		10/07/2011 10:15	SB-166	5.5	7.2	<0.00310	<0.00310	0.00269J	<0.00310	<0.00310
SB-167 (0.0 - 2.0)		10/03/2011 15:50	SB-167	0	2	<0.00310	<0.00310	<0.00310	<0.00310	0.00158J
SB-167 (5.0 - 6.2)		10/03/2011 16:10	SB-167	5	6.2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-168 (0.0 - 2.0)		10/03/2011 11:55	SB-168	0	2	<0.0153	0.0688	<0.0153	0.0572	0.106
SB-168 (3.5 - 5.1)		10/03/2011 12:10	SB-168	3.5	5.1	<0.00392	0.00197 JH*	<0.00392	0.00723 J*	0.00560J
SD-168 (3.5 - 5.1)	Dup	10/03/2011 12:25	SB-168	3.5	5.1	<0.00388	<0.00388	<0.00388	0.00298 J*	<0.00388
SB-168 (6.0 - 8.0)		10/03/2011 12:35	SB-168	6	8	0.0292	<0.00320	0.102	0.0100	0.00222J
SB-168 (11.0 - 12.0)		10/03/2011 12:45	SB-168	11	12	<0.00330	<0.00330	0.00289J	<0.00330	<0.00330
SB-169 (0.0 - 2.0)		10/06/2011 17:20	SB-169	0	2	<0.00616	<0.00616	<0.00616	0.00343J	<0.00616
SB-169 (3.5 - 5.4)		10/06/2011 17:35	SB-169	3.5	5.4	<0.00388	<0.00388	<0.00388	<0.00388	<0.00388
SB-170 (0.0 - 2.0)		10/03/2011 09:30	SB-170	0	2	<0.00314	0.00161 JH*	<0.00314	<0.00314	<0.00314
SB-170 (6.0 - 7.6)		10/03/2011 09:45	SB-170	6	7.6	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-171 (0.0 - 2.0)		10/06/2011 15:00	SB-171	0	2	<0.00310	<0.00310	<0.00310	<0.00310	<0.00310
SB-171 (3.5 - 5.6)		10/06/2011 15:10	SB-171	3.5	5.6	<0.00316	<0.00316	<0.00316	<0.00316	<0.00316
SB-172 (0.0 - 2.0)		10/08/2011 09:40	SB-172	0	2	<0.0158	<0.0158	<0.0158	<0.0158	<0.0158
SB-172 (5.0 - 6.5)		10/08/2011 09:55	SB-172	5	6.5	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-173 (0.0 - 2.0)		10/07/2011 15:55	SB-173	0	2	<0.0154	<0.0154	0.0101J	<0.0154	<0.0154
SB-173 (3.0 - 4.5)		10/07/2011 16:15	SB-173	3	4.5	0.413 J*	0.0183 JH*	3.95 J*	0.623 J*	0.115 JH*
SB-173 (5.0 - 6.0)		10/07/2011 16:35	SB-173	5	6	0.598	0.0183	5.10	0.936	0.0953
SB-173 (7.5 - 8.5)		10/07/2011 16:25	SB-173	7.5	8.5	0.0120	<0.00366	0.0918	0.0187	0.00221J
SB-174 (0.0 - 2.0)		10/03/2011 14:10	SB-174	0	2	<0.0151	<0.0151	<0.0151	<0.0151	<0.0151
SB-174 (5.5 - 7.2)		10/03/2011 14:25	SB-174	5.5	7.2	0.413	<0.0618	3.34	0.216	0.0617J
SB-174 (7.5 - 9.5)		10/03/2011 14:55	SB-174	7.5	9.5	<0.322	0.00847	3.28	<0.322	0.0396
SB-174 (12.0 - 13.3)		10/03/2011 15:10	SB-174	12	13.3	<0.00334	<0.00334	0.00982	<0.00334	<0.00334
SB-175 (0.0 - 2.0)		10/08/2011 11:00	SB-175	0	2	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-175 (5.0 - 7.0)		10/08/2011 11:30	SB-175	5	7	<0.0308	<0.0308	<0.0308	0.0317J	<0.0308
SB-175 (7.0 - 9.0)		10/08/2011 11:45	SB-175	7	9	<0.320	<0.00320	1.20	<0.320	<0.00320
SB-175 (10.5 - 12.5)		10/08/2011 12:15	SB-175	10.5	12.5	<0.00344	<0.00344	<0.00344	<0.00344	<0.00344
SB-176 (0.0 - 2.0)		10/10/2011 11:25	SB-176	0	2	<0.00312	<0.00312	<0.00312	<0.00312	<0.00312
SB-176 (6.0 - 7.1)		10/10/2011 11:50	SB-176	6	7.1	<0.00338	<0.00338	<0.00338	<0.00338	<0.00338
SB-177 (0.0 - 2.0)		10/05/2011 13:50	SB-177	0	2	<0.0152	<0.0152	<0.0152	<0.0152	<0.0152
SB-177 (5.0 - 6.3)		10/05/2011 14:00	SB-177	5	6.3	<0.00348	<0.00348	<0.00348	<0.00348	<0.00348
SB-178 (0.0 - 2.0)		10/05/2011 14:55	SB-178	0	2	<0.0154	<0.0154	<0.0154	<0.0154	<0.0154
SB-178 (6.0 - 7.3)		10/05/2011 15:10	SB-178	6	7.3	<0.00310	<0.00310	0.00172J	<0.00310	<0.00310
SB-179 (0.0 - 2.0)		09/22/2011 14:10	SB-179	0	2	<0.00306	<0.00306	0.00251J	<0.00306	<0.00306
SB-179 (6.0 - 7.2)		09/22/2011 14:20	SB-179	6	7.2	<0.00314	<0.00314	<0.00314	<0.00314	<0.00314
SB-179 (8.0 - 9.2)		09/22/2011 14:30	SB-179	8	9.2	<0.00320	<0.00320	<0.00320	<0.00320	<0.00320
SB-180 (0.0 - 2.0)		10/07/2011 11:20	SB-180	0	2	<0.0306	<0.0306	<0.0306	<0.0306	<0.0306
SB-180 (5.5 - 7.2)		10/07/2011 13:25	SB-180	5.5	7.2	1.53	<0.0154	16.6	1.60	<0.0154
SB-180 (7.5 - 9.5)		10/07/2011 14:00	SB-180	7.5	9.5	0.333	0.00299J	5.84	0.566	0.0345
SB-180 (16.0 - 17.5)		10/07/2011 14:55	SB-180	16	17.5	<0.00372	<0.00372	0.0138	0.00196J	<0.00372
SB-181 (0.0 - 2.0)		09/23/2011 15:45	SB-181	0	2	<0.00364	<0.00364	<0.00364	<0.00364	<0.00364

Table 33
2011 Soil Analytical Results - PAHs
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Name	Dup	Date	Location	top	bottom	Fluorene	Indeno-(1,2,3-c,d)-pyrene	Naphthalene	Phen-anthrene	Pyrene
ADEC MTG Soil Cleanup Level (mg/kg)						**220**	**41**	**20**	**3000**	**1000**
SB-181 (2.5 - 4.1)		09/23/2011 15:00	SB-181	2.5	4.1	<0.00336	<0.00336	<0.00336	<0.00336	<0.00336
SB-182 (0.0 - 2.0)		09/23/2011 12:30	SB-182	0	2	<0.00352	<0.00352	<0.00352	<0.00352	<0.00352
SB-182 (2.0 - 3.3)		09/23/2011 12:40	SB-182	2	3.3	<0.00358	<0.00358	<0.00358	<0.00358	<0.00358
SB-183 (0.0 - 2.0)		10/10/2011 13:15	SB-183	0	2	<0.00318	<0.00318	<0.00318	<0.00318	<0.00318
SB-183 (5.0 - 6.1)		10/10/2011 13:30	SB-183	5	6.1	<0.00306	<0.00306	0.00178J	<0.00306	<0.00306
Number of Exceedances						**0**	**0**	**5**	**0**	**0**
Minimum Exceedance								**20.1**		
Maximum Exceedance								**57.6**		

Notes:

Bolded values exceed the MTG soil cleanup level
Tabulated results are presented in mg/kg
non-detect results are presented as less than the limit of detection (<LOD).

J Estimated result due to QC failures or detection below the limit of quantitation (LOQ).
R Rejected result due to QC failures
JL Estimated result; biased low due to QC failures
JH Estimated result; biased high due to QC failures
B Sample result reported as non-detect due to method blank concentration
* Data flags applied by SWI during data validation process using Level II data packages
ADEC Alaska Department of Environmental Conservation
MTG migration to groundwater
Dup duplicate sample
SWI Shannon and Wilson, Inc.

Table 34
Downgradient Surface Soil Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Sample Date	Work Order	TOC (%)	Sulfolane (mg/kg)	Address	Sample Location
316512-01	10/22/2011	1119803	9.65	< 0.0254	2457 Loomis Dr.	From greenhouse raised bed. †
316512-02	10/22/2011	1119803	1.8	< 0.00754	2457 Loomis Dr.	From strawberry patch ‡
299693-01	10/20/2011	1119681	20.7 JL	< 0.0272	2413 Tanana Dr.	From rhubarb area in outside raised-garden bed §
299693-02	10/20/2011	1119681	23.1 JL	< 0.0288	2413 Tanana Dr.	Duplicate of 299693-01
299693-03	10/20/2011	1119681	10.9 JL	< 0.00830	2413 Tanana Dr.	From peppers area in greenhouse raised-garden bed §

Notes:

TOC Total Organic Carbon

mg/kg milligrams per kilogram

<LOD non-detect results are presented as less than limit of detection (LOD)

JL biased low due to laboratory QC sample failure

† The greenhouse was not used to grow vegetation during the 2011 growing season. The roof was open and exposed to rain water; however, during previous growing seasons, the roof was closed and the soil was not fully exposed to rain water.

‡ According to the owner, rain water was the only source used on the strawberry patch. The strawberries are located within the same garden next to the flower patch that was watered using the tainted well-water source.

§ Samples were collected from a location where city water was used to water the plants during the 2011 growing season.
The sampler confirmed at the time of sampling that all locations had the same soil that was used during the 2010 growing season when sulfolane-tainted well water was used.

Table 35
Summary of Soil Analytical Results from the Laboratory Drain Investigation
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft BGS)	Sample ID	Sample Date	Method	AK101	AK102	AK103	SW8260B	SW8260B	SW8260B	SW8260B	SW8260B
				Parameter	GRO	DRO	RRO	Benzene	Toluene	Ethyl-benzene	n-Butyl-benzene	1,3,5-Trimethyl-benzene
				SCL	300	250	11,000	25	6,500	6,900	15,000	23,000
				units	mg/Kg	mg/Kg	mg/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
SBLAB-1	3-3.2	SBLAB-1-3-3.2	3/29/2011		ND(0.989)	ND(20.4)	ND(20.4)	ND(4.94)	ND(19.8)	ND(9.89)	ND(9.89)	ND(9.89)
	5.2-5.4	SBLAB-1-5.2-5.4	3/29/2011		ND(1.22)	ND(20.5)	ND(20.5)	ND(6.16)	ND(24.7)	ND(12.3)	ND(12.3)	ND(12.3)
SBLAB-2	3-3.2	SBLAB-2-3-3.2	3/29/2011		ND(1.18)	ND(20.6)	ND(20.6)	ND(5.91)	ND(23.7)	ND(11.8)	ND(11.8)	ND(11.8)
	5.8-5.9	SBLAB-2-5.8-5.9	3/29/2011		ND(1.13)	ND(20.6)	ND(20.6)	ND(5.67)	ND(22.7)	ND(11.3)	ND(11.3)	ND(11.3)
SBLAB-3	2.5-2.7	SBLAB-3-2.5-2.7	3/29/2011		ND(0.984)	ND(20.4)	ND(20.4)	ND(4.92)	ND(19.7)	ND(9.84)	ND(9.84)	ND(9.84)
	4.4-4.6	SBLAB-3-4.4-4.6	3/29/2011		ND(1.10)	ND(20.7)	ND(20.7)	ND(5.51)	ND(22.1)	ND(11.0)	ND(11.0)	ND(11.0)
SBLAB-4	1.6-1.8	SBLAB-4-1.6-1.8	3/29/2011		19.6	**5,650**	499	ND(4.96)	530	516	566	1230
	1.6-1.8[D]	DUP-1	3/29/2011		16.4	**5,440**	493	ND(4.41)	891	775	880	1530
	3.8-4.0	SBLAB-4-3.8-4.0	3/29/2011		ND(1.27)	**260**	179	ND(6.37)	ND(25.5)	ND(12.7)	ND(12.7)	24.0
SBLAB-5	2.5-2.7	SBLAB-5-2.5-2.7	3/29/2011		ND(2.17)	ND(20.3)	ND(20.3)	ND(12.7)	ND(50.6)	ND(25.3)	ND(25.3)	ND(25.3)
	6.9-7.0	SBLAB-5-6.9-7.0	3/29/2011		ND(1.42)	ND(20.8)	ND(20.8)	ND(7.10)	ND(28.4)	ND(14.2)	ND(14.2)	ND(14.2)

ft BGS feet below ground surface
SCL ADEC Soil Cleanup Level: Table B1 and B2 Under 40-Inch Zone (Migration to Groundwater)
ADEC Alaska Department of Environmental Conservation
GRO Gasoline Range Organics
DRO Diesel Range Organics
RRO Residual Range Organics
[D] Duplicate Sample
-- not available/not established
mg/Kg milligrams per kilogram
ug/Kg micrograms per kilogram
ND not detected above limit of quantitation
Bold Result exceeds ADEC Soil Cleanup Level

Table 35
Summary of Soil Analytical Results from the Laboratory Drain Investigation
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft BGS)	Sample ID	Sample Date	Method	SW8260B	SW8260B	SW8260B	SW8260B	SW8260B	SW8260B	SW8260B	SW8260B
				Parameter	4-Isopropyl-toluene	n-Propyl-benzene	Tetrachloro-ethene	sec-Butyl-benzene	P & M - Xylene	o-Xylene	Bromoform	Xylenes (total)
				SCL	--	15,000	24	12,000	--	--	340	63,000
				units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
SBLAB-1	3-3.2	SBLAB-1-3-3.2	3/29/2011		ND(9.89)	ND(9.89)	ND(4.94)	ND(9.89)	ND(19.8)	ND(19.8)	ND(9.89)	ND(39.5)
	5.2-5.4	SBLAB-1-5.2-5.4	3/29/2011		ND(12.3)	ND(12.3)	ND(6.16)	ND(12.3)	ND(24.7)	ND(24.7)	ND(12.3)	ND(49.3)
SBLAB-2	3-3.2	SBLAB-2-3-3.2	3/29/2011		ND(11.8)	ND(11.8)	ND(5.91)	ND(11.8)	ND(23.7)	ND(23.7)	ND(11.8)	ND(47.3)
	5.8-5.9	SBLAB-2-5.8-5.9	3/29/2011		ND(11.3)	ND(11.3)	ND(5.67)	ND(11.3)	ND(22.7)	ND(22.7)	ND(11.3)	ND(45.4)
SBLAB-3	2.5-2.7	SBLAB-3-2.5-2.7	3/29/2011		ND(9.84)	ND(9.84)	10.0	ND(9.84)	ND(19.7)	ND(19.7)	ND(9.84)	ND(39.4)
	4.4-4.6	SBLAB-3-4.4-4.6	3/29/2011		ND(11.0)	ND(11.0)	6.40	ND(11.0)	ND(22.1)	ND(22.1)	ND(11.0)	ND(44.1)
SBLAB-4	1.6-1.8	SBLAB-4-1.6-1.8	3/29/2011		315	382	22.8	321	2590	1320	ND(9.93)	3910
	1.6-1.8[D]	DUP-1	3/29/2011		432	483	5.56	399	3720	1760	ND(8.82)	5480
	3.8-4.0	SBLAB-4-3.8-4.0	3/29/2011		ND(12.7)	ND(12.7)	ND(6.37)	ND(12.7)	46.8	ND(25.5)	ND(12.7)	69.4
SBLAB-5	2.5-2.7	SBLAB-5-2.5-2.7	3/29/2011		ND(25.3)	ND(25.3)	ND(12.7)	ND(25.3)	ND(50.6)	ND(50.6)	ND(25.3)	ND(101)
	6.9-7.0	SBLAB-5-6.9-7.0	3/29/2011		ND(14.2)	ND(14.2)	11.6	ND(14.2)	ND(28.4)	ND(28.4)	ND(14.2)	ND(56.8)

ft BGS feet below ground surface
SCL ADEC Soil Cleanup Level: Table B1 and B2 Under 40-Inch Zone (Migration to Groundwater)
ADEC Alaska Department of Environmental Conservation
GRO Gasoline Range Organics
DRO Diesel Range Organics
RRO Residual Range Organics
[D] Duplicate Sample
-- not available/not established
mg/Kg milligrams per kilogram
ug/Kg micrograms per kilogram
ND not detected above limit of quantitation
Bold Result exceeds ADEC Soil Cleanup Level

Table 35
Summary of Soil Analytical Results from the Laboratory Drain Investigation
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft BGS)	Sample ID	Sample Date	Method	SW8260B	SW8260B	SW8260B	SW6020	SW6020	SW6020	SW6020	SW6020
				Parameter	1,2,4-Trimethyl-benzene	tert-Butyl-benzene	Isopropylbenzene (Cumene)	Arsenic	Barium	Chromium	Lead	Silver
				SCL	23,000	12,000	51,000	3.9	1,100	25	800	11.2
				units	ug/Kg	ug/Kg	ug/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
SBLAB-1	3-3.2	SBLAB-1-3-3.2	3/29/2011		ND(19.8)	ND(9.89)	ND(9.89)	**4.92**	62.1	10.9	3.94	ND(0.0944)
	5.2-5.4	SBLAB-1-5.2-5.4	3/29/2011		ND(24.7)	ND(12.3)	ND(12.3)	**4.13**	58.6	9.43	4.07	ND(0.101)
SBLAB-2	3-3.2	SBLAB-2-3-3.2	3/29/2011		ND(23.7)	ND(11.8)	ND(11.8)	3.47	85.2	10.1	4.20	ND(0.0982)
	5.8-5.9	SBLAB-2-5.8-5.9	3/29/2011		ND(22.7)	ND(11.3)	ND(11.3)	3.45	52.7	10.3	3.83	ND(0.0962)
SBLAB-3	2.5-2.7	SBLAB-3-2.5-2.7	3/29/2011		ND(19.7)	ND(9.84)	ND(9.84)	3.38	50.1	13.6	3.58	ND(0.0950)
	4.4-4.6	SBLAB-3-4.4-4.6	3/29/2011		ND(22.1)	ND(11.0)	ND(11.0)	3.85	57.7	12.8	4.50	ND(0.101)
SBLAB-4	1.6-1.8	SBLAB-4-1.6-1.8	3/29/2011		3040	26.4	192	2.88	56.0	9.69	4.51	0.301
	1.6-1.8[D]	DUP-1	3/29/2011		3910	31.1	263	3.13	70.2	12.2	4.55	0.297
	3.8-4.0	SBLAB-4-3.8-4.0	3/29/2011		64.2	ND(12.7)	ND(12.7)	2.96	86.2	6.95	4.33	ND(0.0980)
SBLAB-5	2.5-2.7	SBLAB-5-2.5-2.7	3/29/2011		ND(50.6)	ND(25.3)	ND(25.3)	3.82	56.4	11.2	3.75	ND(0.0924)
	6.9-7.0	SBLAB-5-6.9-7.0	3/29/2011		ND(28.4)	ND(14.2)	ND(14.2)	3.17	48.4	10.1	3.76	0.227

ft BGS feet below ground surface
SCL ADEC Soil Cleanup Level: Table B1 and B2 Under 40-Inch Zone (Migration to Groundwater)
ADEC Alaska Department of Environmental Conservation
GRO Gasoline Range Organics
DRO Diesel Range Organics
RRO Residual Range Organics
[D] Duplicate Sample
-- not available/not established
mg/Kg milligrams per kilogram
ug/Kg micrograms per kilogram
ND not detected above limit of quantitation
Bold Result exceeds ADEC Soil Cleanup Level

Table 35
Summary of Soil Analytical Results from the Laboratory Drain Investigation
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft BGS)	Sample ID	Sample Date	Method	SW8270D	SW8270D	SW8270D	SW8270D	SM20 2540G	
				Parameter	Naphthalene	2-Methyl-naphthalene	Phenanthrene	Anthracene	Total Solids	Sulfolane
				SCL	20	6.1	3,000	3,000	--	--
				units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	%	mg/Kg
SBLAB-1	3-3.2	SBLAB-1-3-3.2	3/29/2011		ND(0.254)	ND(0.254)	ND(0.254)	ND(0.254)	97.8	ND(0.508)
	5.2-5.4	SBLAB-1-5.2-5.4	3/29/2011		ND(0.255)	ND(0.255)	ND(0.255)	ND(0.255)	97.0	ND(0.509)
SBLAB-2	3-3.2	SBLAB-2-3-3.2	3/29/2011		ND(0.258)	ND(0.258)	ND(0.258)	ND(0.258)	96.1	ND(0.516)
	5.8-5.9	SBLAB-2-5.8-5.9	3/29/2011		ND(0.256)	ND(0.256)	ND(0.256)	ND(0.256)	96.7	ND(0.512)
SBLAB-3	2.5-2.7	SBLAB-3-2.5-2.7	3/29/2011		ND(0.252)	ND(0.252)	ND(0.252)	ND(0.252)	97.6	ND(0.504)
	4.4-4.6	SBLAB-3-4.4-4.6	3/29/2011		ND(0.258)	ND(0.258)	ND(0.258)	ND(0.258)	96.4	ND(0.516)
SBLAB-4	1.6-1.8	SBLAB-4-1.6-1.8	3/29/2011		2.72	**16.6**	ND(0.247)	3.87	99.1	ND(0.495)
	1.6-1.8[D]	DUP-1	3/29/2011		2.60	**18.3**	4.07	ND(2.53)	98.7	ND(0.506)
	3.8-4.0	SBLAB-4-3.8-4.0	3/29/2011		ND(0.263)	ND(0.263)	ND(0.263)	ND(0.263)	94.9	ND(0.525)
SBLAB-5	2.5-2.7	SBLAB-5-2.5-2.7	3/29/2011		ND(0.252)	ND(0.252)	ND(0.252)	ND(0.252)	98.2	ND(0.505)
	6.9-7.0	SBLAB-5-6.9-7.0	3/29/2011		ND(0.259)	ND(0.259)	ND(0.259)	ND(0.259)	95.8	ND(0.519)

ft BGS feet below ground surface
SCL ADEC Soil Cleanup Level: Table B1 and B2 Under 40-Inch Zone (Migration to Groundwater)
ADEC Alaska Department of Environmental Conservation
GRO Gasoline Range Organics
DRO Diesel Range Organics
RRO Residual Range Organics
[D] Duplicate Sample
-- not available/not established
mg/Kg milligrams per kilogram
ug/Kg micrograms per kilogram
ND not detected above limit of quantitation
Bold Result exceeds ADEC Soil Cleanup Level

Table 36
LNAPL Physical Measurements
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Location	S-20	S-21	S-22	S-22	S-33	S-39	S-50	S-51	S-51
Date Sampled	10/3/2011	2/28/2011	2/28/2011	10/3/2011	2/28/2011	2/28/2011	10/7/2011	2/28/2011	10/7/2011
Density (g/cm^3)	0.8220	NA	NA	0.8213	NA	NA	0.8421	NA	0.8249
Specific Gravity (unitless)	0.8217	0.7880	0.8100	0.8211	0.7670	0.8120	0.8418	0.8170	0.8247
^{o}API (unitless)	42.8	48.1	43.2	42.9	53	42.8	38.6	41.7	42.2
Color, ASTM D1500 Color Index	NA	0	2	NA	2.5	4.5	NA	> 8.0	NA
Viscosity @60°F (cP)	1.58	0.60	0.76	1.56	0.42	0.73	2.53	0.90	1.78
Viscosity @34°F (cP)	2.12	NA	NA	2.04	NA	NA	3.53	NA	2.40
Air-Groundwater Interfacial (Surface) Tension (dyne/cm)	65.5	NA	NA	65.1	NA	NA	65.8	NA	65.2
Air-LNAPL Interfacial Tension (dyne/cm)	26.4	NA	NA	25.7	NA	NA	27.3	NA	25.6
LNAPL-Groundwater Interfacial Tension (dyne/cm)	23.2	NA	NA	22.7	NA	NA	22.1	NA	22.6

Table 36
LNAPL Physical Measurements
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well Location	S-52	R-21	R-32	R-33	R-40	MW-115	MW-138	MW-138	O-13
Date Sampled	10/6/2011	9/30/2011	2/28/2011	2/28/2011	9/31/2011	2/28/2011	2/28/2011	10/1/2011	10/24/2011
Density (g/cm^3)	0.8520	0.8157	NA	NA	0.8217	NA	NA	0.8315	0.8291
Specific Gravity (unitless)	0.8516	0.8155	0.8140	0.8410	0.8216	0.8580	0.8200	0.8309	0.8292
^{o}API (unitless)	36.6	44.1	42.3	36.8	42.9	33.4	41.1	40.8	41.3
Color, ASTM D1500 Color Index	NA	NA	4.5	> 8.0	NA	>8.0	7.5	NA	NA
Viscosity @60°F (cP)	3.46	1.52	0.85	1.71	1.37	2.16	0.74	1.60	1.75
Viscosity @34°F (cP)	5.04	1.96	NA	NA	1.77	NA	NA	2.09	2.30
Air-Groundwater Interfacial (Surface) Tension (dyne/cm)	64.6	71.3	NA	NA	72.5	NA	NA	62.8	62.3
Air-LNAPL Interfacial Tension (dyne/cm)	23.9	25.8	NA	NA	25.7	NA	NA	25.9	26.2
LNAPL-Groundwater Interfacial Tension (dyne/cm)	19.3	22.0	NA	NA	16.8	NA	NA	18.1	25.7

TABLE 37
Summary of Smear Zone LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

								VOCs (8021B, µg/kg)					VOCs (8260B, µg/kg)					
Sample Location	Sample Depth (ft)	Sample Number	Sample Date	SGS Work Order	Sulfolane (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	Benzene	Toluene	Ethyl-benzene	o-Xylene	p- & m-Xylenes	Benzene	Toluene	Ethyl-benzene	o-Xylene	p- & m-Xylenes	Xylenes (total)
O-1	15-16.5	*O-1 (15-16.5)*	9/23/10	1106753	1.74	<3.40	<23.0	<17.0	<67.9	<67.9	<67.9	<67.9	18	<67.9	<34.0	<67.9	<67.9	<136
O-1	2.5-4	*O-1 (2.5-4)*	10/19/10	1106857	<0.510	—	—	—	—	—	—	—	<11.3	<45.1	<22.6	<45.1	<45.1	<90.2
O-1	5-6.5	*O-1 (5-6.5)*	10/19/10	1106857	<0.513	—	—	—	—	—	—	—	<8.20	<32.8	<16.4	<32.8	<32.8	<65.6
O-1	10-11.5	*O-1 (10-11.5)*	10/19/10	1106857	<0.554	—	—	—	—	—	—	—	11	<39.0	<19.5	<39.0	<39.0	<77.9
O-1	12.5-14	*O-1 (12.5-14)*	10/19/10	1106857	0.887	—	—	—	—	—	—	—	<10.5	<41.9	<20.9	<41.9	<41.9	<83.8
O-2	7.5-9	*O-2 (7.5-9)*	9/23/10	1106753	58.9	1,440	6,760	1,720	2,390	27,300	31,700	89,700	369	<2850	21,100	24,100	74,500	98,600
O-2	15-16.5	*O-2 (15-16.5)*	9/23/10	1106753	<0.563	79	89	102	179	983	482	2,500	<10.9	<43.5	416	326	1,800	2,130
O-2	2.5-4	*O-2 (2.5-4)*	10/20/10	1106861	<0.560	—	—	—	—	—	—	—	<12.4	<49.8	<24.9	<49.8	<49.8	<99.6
O-2	5-6.5	*O-2 (5-6.5)*	10/20/10	1106861	<0.557	—	—	—	—	—	—	—	<17.5	<70.0	<35.0	<70.0	<70.0	<140
O-2	5-6.5	*O-2 D**	10/20/10	1106861	<0.535	—	—	—	—	—	—	—	<13.2	<52.8	<26.4	<52.8	<52.8	<106
O-2	10-11.5	*O-2 (10-11.5)*	10/20/10	1106861	<11.5	—	—	—	—	—	—	—	3,580	<5680	111,000	92,500	407,000	500,000
O-2	10-11.5	*O-2 DD**	10/20/10	1106861	<15.5	—	—	—	—	—	—	—	1,670	<5370	59,300	53,900	246,000	300,000
O-2	12.5-14	*O-2 (12.5-14)*	10/20/10	1106861	<0.561	—	—	—	—	—	—	—	<10.1	<40.4	325	321	1,460	1,780
O-3	15-16.5	*O-3 (15-16.5)*	9/23/10	1106753	<0.647	<4.24	<25.5	<21.2	<84.7	<84.7	<84.7	<84.7	<21.2	<84.7	<42.4	<84.7	<84.7	<169
O-3	2.5-4	*O-3 (2.5-4)*	10/20/10	1106861	<0.517	—	—	—	—	—	—	—	<9.44	<37.8	<18.9	<37.8	<37.8	<75.5
O-3	5-6.5	*O-3 (5-6.5)*	10/20/10	1106861	<0.622	—	—	—	—	—	—	—	<18.6	<74.5	<37.2	<74.5	<74.5	<149
O-3	10-11.5	*O-3 (10-11.5)*	10/20/10	1106861	<0.644	—	—	—	—	—	—	—	<19.2	<76.8	<38.4	<76.8	<76.8	<154
O-3	12.5-14	*O-3 (12.5-14)*	10/20/10	1106861	<0.658	—	—	—	—	—	—	—	<17.1	<68.3	<34.1	<68.3	<68.3	<137
O-4	15-16.5	*O-4 (15-16.5)*	9/16/10	1106723	<0.603	<3.38	<24.3	<16.9	<67.7	<67.7	<67.7	<67.7	<16.9	<67.7	<33.8	<67.7	<67.7	<135
O-4	2.5-4	*O-4 (2.5-4)*	10/20/10	1106861	<0.648	—	—	—	—	—	—	—	<22.5	<90.1	105	97.3	427	525
O-4	5-6.5	*O-4 (5-6.5)*	10/20/10	1106861	<0.543	—	—	—	—	—	—	—	<14.8	<59.4	29.7	<59.4	123	152
O-4	10-11.5	*O-4 (10-11.5)*	10/20/10	1106861	<0.549	—	—	—	—	—	—	—	<10.8	<43.0	<21.5	<43.0	<43.0	<86.1
O-4	12.5-14	*O-4 (12.5-14)*	10/20/10	1106861	<0.539	—	—	—	—	—	—	—	<8.11	<32.4	<16.2	<32.4	<32.4	<64.9

Notes:

GRO Gasoline-range organics
DRO Diesel-range organics
— Analysis not performed
µg/kg microgram per kilogram
mg/kg milligram per kilogram
* Duplicate of previous sample
< Concentration not reported above limit of quantitation (LOQ).
Only detected VOC and SVOC analytes are tabulated. See laboratory reports for full analyte list and LOQs.

Wells O-1 through O-4 are observation wells installed to monitor light nonaqueous phase liquids

TABLE 37
Summary of Smear Zone LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

					VOCs (8260B, µg/kg)									SVOCs (8270D, mg/kg)			
Sample Location	Sample Depth (ft)	Sample Number	Sample Date	SGS Work Order	n-Propyl-benzene	n-Butyl-benzene	sec-Butyl-benzene	tert-Butyl-benzene	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Isopropyl-benzene	4-Isopropyl-toluene	Naphthalene	Naphthalene	2-Methyl-naphthalene	Dibenzo-furan	Fluorene
O-1	15-16.5	*O-1 (15-16.5)*	9/23/10	1106753	<34.0	<34.0	<34.0	<34.0	<67.9	<34.0	<34.0	<34.0	<67.9	<0.288	<0.288	<0.288	<0.288
O-1	2.5-4	*O-1 (2.5-4)*	10/19/10	1106857	<22.6	<22.6	<22.6	<22.6	<45.1	<22.6	<22.6	<22.6	<45.1	<0.254	<0.254	<0.254	<0.254
O-1	5-6.5	*O-1 (5-6.5)*	10/19/10	1106857	<16.4	<16.4	<16.4	<16.4	<32.8	<16.4	<16.4	<16.4	<32.8	<0.257	<0.257	<0.257	<0.257
O-1	10-11.5	*O-1 (10-11.5)*	10/19/10	1106857	<19.5	<19.5	<19.5	<19.5	<39.0	<19.5	<19.5	<19.5	<39.0	<0.273	<0.273	<0.273	<0.273
O-1	12.5-14	*O-1 (12.5-14)*	10/19/10	1106857	<20.9	<20.9	<20.9	<20.9	<41.9	<20.9	<20.9	<20.9	<41.9	<0.282	<0.282	<0.282	<0.282
O-2	7.5-9	*O-2 (7.5-9)*	9/23/10	1106753	15,800	10,700	5,780	377	48,700	19,400	8,460	4,510	22,400	19.8	51.0	1.31	1.34
O-2	15-16.5	*O-2 (15-16.5)*	9/23/10	1106753	499	431	237	<21.7	1,740	641	278	180	724	<0.283	<0.283	<0.283	<0.283
O-2	2.5-4	*O-2 (2.5-4)*	10/20/10	1106861	<24.9	<24.9	<24.9	<24.9	<49.8	<24.9	<24.9	<24.9	<49.8	<0.279	<0.279	<0.279	<0.279
O-2	5-6.5	*O-2 (5-6.5)*	10/20/10	1106861	<35.0	<35.0	<35.0	<35.0	<70.0	<35.0	<35.0	<35.0	<70.0	<0.277	<0.277	<0.277	<0.277
O-2	5-6.5	*O-2 D**	10/20/10	1106861	<26.4	<26.4	<26.4	<26.4	<52.8	<26.4	<26.4	<26.4	<52.8	<0.266	<0.266	<0.266	<0.266
O-2	10-11.5	*O-2 (10-11.5)*	10/20/10	1106861	72,700	34,300	25,300	<2840	205,000	81,100	41,600	20,200	125,000	62.0	155	<14.4	<14.4
O-2	10-11.5	*O-2 DD**	10/20/10	1106861	45,400	24,200	16,800	<2690	138,000	53,700	25,400	14,400	68,500	96.4	240	<8.10	<8.10
O-2	12.5-14	*O-2 (12.5-14)*	10/20/10	1106861	338	278	162	<20.2	1,190	481	174	97.1	472	<0.278	0.711	<0.278	<0.278
O-3	15-16.5	*O-3 (15-16.5)*	9/23/10	1106753	<42.4	<42.4	<42.4	<42.4	<84.7	<42.4	<42.4	<42.4	<84.7	<0.325	<0.325	<0.325	<0.325
O-3	2.5-4	*O-3 (2.5-4)*	10/20/10	1106861	<18.9	<18.9	<18.9	<18.9	<37.8	<18.9	<18.9	<18.9	<37.8	<0.260	<0.260	<0.260	<0.260
O-3	5-6.5	*O-3 (5-6.5)*	10/20/10	1106861	<37.2	<37.2	<37.2	<37.2	<74.5	<37.2	<37.2	<37.2	<74.5	<0.314	<0.314	<0.314	<0.314
O-3	10-11.5	*O-3 (10-11.5)*	10/20/10	1106861	<38.4	<38.4	<38.4	<38.4	<76.8	<38.4	<38.4	<38.4	<76.8	<0.318	<0.318	<0.318	<0.318
O-3	12.5-14	*O-3 (12.5-14)*	10/20/10	1106861	<34.1	<34.1	<34.1	<34.1	<68.3	<34.1	<34.1	<34.1	<68.3	<0.324	<0.324	<0.324	<0.324
O-4	15-16.5	*O-4 (15-16.5)*	9/16/10	1106723	<33.8	<33.8	<33.8	<33.8	<67.7	<33.8	<33.8	<33.8	<67.7	<0.305	<0.305	<0.305	<0.305
O-4	2.5-4	*O-4 (2.5-4)*	10/20/10	1106861	81.6	61.3	<45.1	<45.1	283	110	<45.1	<45.1	119	<0.321	<0.321	<0.321	<0.321
O-4	5-6.5	*O-4 (5-6.5)*	10/20/10	1106861	<29.7	<29.7	<29.7	<29.7	101	36.8	<29.7	<29.7	<59.4	<0.272	<0.272	<0.272	<0.272
O-4	10-11.5	*O-4 (10-11.5)*	10/20/10	1106861	<21.5	<21.5	<21.5	<21.5	<43.0	<21.5	<21.5	<21.5	<43.0	<0.275	<0.275	<0.275	<0.275
O-4	12.5-14	*O-4 (12.5-14)*	10/20/10	1106861	<16.2	<16.2	<16.2	<16.2	<32.4	<16.2	<16.2	<16.2	<32.4	<0.272	<0.272	<0.272	<0.272

Notes:

GRO Gasoline-range organics
DRO Diesel-range organics
— Analysis not performed
µg/kg microgram per kilogram
mg/kg milligram per kilogram
* Duplicate of previous sample
< Concentration not reported above limit of quantitation (LOQ).
Only detected VOC and SVOC analytes are tabulated. See laboratory reports for full analyte list and LOQs.

Wells O-1 through O-4 are observation wells installed to monitor light nonaqueous phase liquids

TABLE 37
Summary of Smear Zone LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample Location	Sample Depth (ft)	Sample Number	Sample Date	SGS Work Order	Phenan-threne
O-1	15-16.5	*O-1 (15-16.5)*	9/23/10	1106753	<0.288
O-1	2.5-4	*O-1 (2.5-4)*	10/19/10	1106857	<0.254
O-1	5-6.5	*O-1 (5-6.5)*	10/19/10	1106857	<0.257
O-1	10-11.5	*O-1 (10-11.5)*	10/19/10	1106857	<0.273
O-1	12.5-14	*O-1 (12.5-14)*	10/19/10	1106857	<0.282
O-2	7.5-9	*O-2 (7.5-9)*	9/23/10	1106753	0.927
O-2	15-16.5	*O-2 (15-16.5)*	9/23/10	1106753	<0.283
O-2	2.5-4	*O-2 (2.5-4)*	10/20/10	1106861	<0.279
O-2	5-6.5	*O-2 (5-6.5)*	10/20/10	1106861	<0.277
O-2	5-6.5	*O-2 D**	10/20/10	1106861	<0.266
O-2	10-11.5	*O-2 (10-11.5)*	10/20/10	1106861	<14.4
O-2	10-11.5	*O-2 DD**	10/20/10	1106861	<8.10
O-2	12.5-14	*O-2 (12.5-14)*	10/20/10	1106861	<0.278
O-3	15-16.5	*O-3 (15-16.5)*	9/23/10	1106753	<0.325
O-3	2.5-4	*O-3 (2.5-4)*	10/20/10	1106861	<0.260
O-3	5-6.5	*O-3 (5-6.5)*	10/20/10	1106861	<0.314
O-3	10-11.5	*O-3 (10-11.5)*	10/20/10	1106861	<0.318
O-3	12.5-14	*O-3 (12.5-14)*	10/20/10	1106861	<0.324
O-4	15-16.5	*O-4 (15-16.5)*	9/16/10	1106723	<0.305
O-4	2.5-4	*O-4 (2.5-4)*	10/20/10	1106861	<0.321
O-4	5-6.5	*O-4 (5-6.5)*	10/20/10	1106861	<0.272
O-4	10-11.5	*O-4 (10-11.5)*	10/20/10	1106861	<0.275
O-4	12.5-14	*O-4 (12.5-14)*	10/20/10	1106861	<0.272

Notes:

GRO Gasoline-range organics
DRO Diesel-range organics
— Analysis not performed
µg/kg microgram per kilogram
mg/kg milligram per kilogram
* Duplicate of previous sample
< Concentration not reported above limit of quantitation (LOQ).
Only detected VOC and SVOC analytes are tabulated. See laboratory reports for full analyte list and LOQs.

Wells O-1 through O-4 are observation wells installed to monitor light nonaqueous phase liquids

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	S-21			S-22		
		Date Collected	12/3/2010			12/3/2010		
Gasoline Range Organics			76800			35000		
Diesel range Organics			53200			699000		
Residual Range Organics								
Benzene	78.1	1789.2	673	0.00000	0	248	0.00000	0
Toluene	92.1	517.9	989	0.00000	0		0.00000	0
Ethylbenzene	106.2	168.3	2610	0.00000	0	1090	0.00000	0
n-Butylbenzene	134.2	14.4	682	0.00000	0	746	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	1580	0.00000	0	2290	0.00000	0
4-isopropytoluene	134.22		386	0.00000	0	563	0.00000	0
n-Propylbenzene	120.2	54.9	1040	0.00000	0	756	0.00000	0
sec-Butylbenzene	134.2	14.4	440	0.00000	0	483	0.00000	0
P & M Xylene	106.18	180.3	9030	0.00000	0	8870	0.00000	0
Napthalene	128.2	31.5	1730	0.00000	0	3080	0.00000	0
o-xylene	106.18	184.5	3170	0.00000	0	4940	0.00000	0
Xylenes (total)			12200		0	138000		0
1,2,4 Trimethylbenzene	120.2	56.2	3830	0.00000	0	5840	0.00000	0
Isopropylbenzene	120.2		611	0.00000	0	513	0.00000	0
sulfolane	120.17	1266000.0	<0.0143			<0.0137		
Assumed Average NAPL Molar Mass	165							

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	S-33			S-39		
		Date Collected	12/3/2010			12/3/2010		
Gasoline Range Organics			97400			146000		
Diesel range Organics			25900			561000		
Residual Range Organics								
Benzene	78.1	1789.2	837	0.00000	0	2250	0.00000	0
Toluene	92.1	517.9	14900	0.00000	0	152000	0.00000	0
Ethylbenzene	106.2	168.3	4700	0.00000	0	3430	0.00000	0
n-Butylbenzene	134.2	14.4	373	0.00000	0	1050	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	842	0.00000	0	3600	0.00000	0
4-isopropytoluene	134.22		263	0.00000	0	715	0.00000	0
n-Propylbenzene	120.2	54.9	709	0.00000	0	1620	0.00000	0
sec-Butylbenzene	134.2	14.4		0.00000	0	770	0.00000	0
P & M Xylene	106.18	180.3	135000	0.00000	0	21100	0.00000	0
Napthalene	128.2	31.5	904	0.00000	0	1770	0.00000	0
o-xylene	106.18	184.5	4060	0.00000	0	10800	0.00000	0
Xylenes (total)			17600		0	31800		0
1,2,4 Trimethylbenzene	120.2	56.2	2110	0.00000	0	9590	0.00000	0
Isopropylbenzene	120.2		418	0.00000	0	952	0.00000	0
sulfolane	120.17	1266000.0	<0.0142			<0.0134		
Assumed Average NAPL Molar Mass	165							

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	S-51					
		Date Collected	12/3/2010			4/18/2011		
Gasoline Range Organics			50500					
Diesel range Organics			637000			720000		
Residual Range Organics						43700		
Benzene	78.1	1789.2	726	0.00000	0	907	0.00000	0
Toluene	92.1	517.9	5540	0.00000	0	5520	0.00000	0
Ethylbenzene	106.2	168.3	1230	0.00000	0	1580	0.00000	0
n-Butylbenzene	134.2	14.4	549	0.00000	0	598	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	1590	0.00000	0	1770	0.00000	0
4-isopropytoluene	134.22		390	0.00000	0	361	0.00000	0
n-Propylbenzene	120.2	54.9	422	0.00000	0	633	0.00000	0
sec-Butylbenzene	134.2	14.4	303	0.00000	0	332	0.00000	0
P & M Xylene	106.18	180.3	10000	0.00000	0	11400	0.00000	0
Napthalene	128.2	31.5	1960	0.00000	0	1460	0.00000	0
o-xylene	106.18	184.5	4390	0.00000	0	4510	0.00000	0
Xylenes (total)			14400		0	15900		0
1,2,4 Trimethylbenzene	120.2	56.2	3860	0.00000	0	4650	0.00000	0
Isopropylbenzene	120.2		358	0.00000	0	421	0.00000	0
sulfolane	120.17	1266000.0	<0.0140			<0.0973		0
Assumed Average NAPL Molar Mass	165							

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	R-32					
		Date Collected	12/3/2010			4/18/2011		
Gasoline Range Organics			22100					
Diesel range Organics			723000			842000		
Residual Range Organics						44500		
Benzene	78.1	1789.2		0.00000	0	19.8	0.00000	0
Toluene	92.1	517.9		0.00000	0	26	0.00000	0
Ethylbenzene	106.2	168.3	1400	0.00000	0	865	0.00000	0
n-Butylbenzene	134.2	14.4	880	0.00000	0	662	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	2050	0.00000	0	2430	0.00000	0
4-isopropytoluene	134.22		433	0.00000	0	428	0.00000	0
n-Propylbenzene	120.2	54.9	1340	0.00000	0	891	0.00000	0
sec-Butylbenzene	134.2	14.4	546	0.00000	0	431	0.00000	0
P & M Xylene	106.18	180.3	7520	0.00000	0	6840	0.00000	0
Napthalene	128.2	31.5	3530	0.00000	0	3280	0.00000	0
o-xylene	106.18	184.5	3560	0.00000	0	3280	0.00000	0
Xylenes (total)			11100		0	10100		0
1,2,4 Trimethylbenzene	120.2	56.2	5460	0.00000	0	6450	0.00000	0
Isopropylbenzene	120.2		732	0.00000	0	545	0.00000	0
sulfolane	120.17	1266000.0	<0.0129			<0.0975		
Assumed Average NAPL Molar Mass	165							

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	R-33			MW-115		
		Date Collected	12/6/2010			12/6/2010		
Gasoline Range Organics			57000			30500		
Diesel range Organics			63700			794000		
Residual Range Organics			69600			112000		
Benzene	78.1	1789.2		0.00000	0	139	0.00000	0
Toluene	92.1	517.9	1210	0.00000	0	274	0.00000	0
Ethylbenzene	106.2	168.3	754	0.00000	0	657	0.00000	0
n-Butylbenzene	134.2	14.4	495	0.00000	0	548	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	1490	0.00000	0	456	0.00000	0
4-isopropytoluene	134.22		296	0.00000	0	812	0.00000	0
n-Propylbenzene	120.2	54.9		0.00000	0	605	0.00000	0
sec-Butylbenzene	134.2	14.4	251	0.00000	0	615	0.00000	0
P & M Xylene	106.18	180.3	6810	0.00000	0	3040	0.00000	0
Napthalene	128.2	31.5	1730	0.00000	0	1850	0.00000	0
o-xylene	106.18	184.5	3590	0.00000	0		0.00000	0
Xylenes (total)			10400		0	3140		0
1,2,4 Trimethylbenzene	120.2	56.2	3120	0.00000	0	7890	0.00000	0
Isopropylbenzene	120.2			0.00000	0	453	0.00000	0
sulfolane	120.17	1266000.0	<0.0131			<0.0132		
Assumed Average NAPL Molar Mass	165							

TABLE 38
LNAPL Composition Data
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Formula Weight, g/mol	Saturation Concentration, mg/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L	Measured NAPL Concentration, mg/kg	Mole Fraction	Equilibrium Aqueous Concentration, ug/L
		Well Location	MW-138					
		Date Collected	12/6/2010			4/18/2011		
Gasoline Range Organics			148000					
Diesel range Organics			594000			89600		
Residual Range Organics						44800		
Benzene	78.1	1789.2	6280	0.00000	0	4010	0.00000	0
Toluene	92.1	517.9	23200	0.00000	0	15500	0.00000	0
Ethylbenzene	106.2	168.3	3190	0.00000	0	2180	0.00000	0
n-Butylbenzene	134.2	14.4	992	0.00000	0	898	0.00000	0
1,3,5-Trimethylbenzene	120.2	47.9	3920	0.00000	0	3810	0.00000	0
4-isopropytoluene	134.22		588	0.00000	0	597	0.00000	0
n-Propylbenzene	120.2	54.9	1290	0.00000	0	988	0.00000	0
sec-Butylbenzene	134.2	14.4	733	0.00000	0	729	0.00000	0
P & M Xylene	106.18	180.3	29300	0.00000	0	27800	0.00000	0
Napthalene	128.2	31.5	2280	0.00000	0	1960	0.00000	0
o-xylene	106.18	184.5	13500	0.00000	0	12000	0.00000	0
Xylenes (total)			42800		0	39800		0
1,2,4 Trimethylbenzene	120.2	56.2	10200	0.00000	0	9600	0.00000	0
Isopropylbenzene	120.2		930	0.00000	0	856	0.00000	0
sulfolane	120.17	1266000.0	<13.1			0.573	0.00000	0
Assumed Average NAPL Molar Mass	165							

Table 39
Sulfolane Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analysis Method					Sulfolane-EPA1625B w/Iso Dil-W
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Sulfolane Result µg/L**
ADEC Interim Groundwater Cleanup Level					**25 µg/L**
Onsite Wells					
Water table groundwater monitoring zone					
0-1		O-1	1119690	10/20/2011	10,400
0-3		O-3	1119690	10/19/2011	10.1J
0-4		O-4	1119690	10/19/2011	112
0-5		O-5	1119690	10/19/2011	171
0-6		O-6	1119690	10/19/2011	198
0-8		O-8	1119690	10/20/2011	13
0-12		O-12	1119690	10/19/2011	309 J
0-14		O-14	1119690	10/20/2011	<6.40
0-15		O-15	1119690	10/20/2011	<6.20
0-16		O-16	1119690	10/20/2011	<6.20
0-17		O-17	1119690	10/19/2011	346
0-18		O-18	1119690	10/20/2011	23.4
0-20		O-20	1119690	10/20/2011	1,920
0-21		O-21	1119690	10/20/2011	136 §
MW-105A		MW-105A	1119660	10/17/2011	<6.20
MW-106		MW-106	1119621	10/11/2011	<6.20
MW-109		MW-109	1119660	10/17/2011	<6.20
MW-110		MW-110	1119791	10/18/2011	1,150
MW-111		MW-111	1119621	10/11/2011	78.2
MW-113		MW-113	1119642	10/14/2011	111
MW-213	Dup	MW-113	1119642	10/14/2011	118
MW-116		MW-116	1119791	10/20/2011	28.2 JH §
MW-125		MW-125	1119791	10/18/2011	11.1
MW-127		MW-127	1119791	10/20/2011	141
MW-227	Dup	MW-127	1119791	10/20/2011	142
MW-130		MW-130	1119791	10/19/2011	1,080
			1119896	12/13/2011	1,130
MW-131		MW-131	1119791	10/18/2011	37.3
MW-132		MW-132	1119791	10/18/2011	<6.20
MW-133		MW-133	1119791	10/18/2011	<6.40
MW-135		MW-135	1119645	10/14/2011	<6.20
MW-139		MW-139	1119621	10/12/2011	312
MW-239	Dup	MW-139	1119621	10/12/2011	326
MW-141		MW-141	1119642	10/14/2011	<6.20
MW-142		MW-142	1119791	10/18/2011	489
MW-242	Dup	MW-142	1119791	10/18/2011	467
MW-143		MW-143	1119791	10/20/2011	56.4
MW-144A		MW-144A	1119642	10/14/2011	<6.20
MW-145		MW-145	1119791	10/19/2011	<6.20
MW-148A		MW-148A	1118990	10/7/2011	139
MW-248A	Dup	MW-148A	1118990	10/7/2011	128
MW-149A		MW-149A	1119633	10/13/2011	<6.20
MW-173A		MW-173A	1119621	10/12/2011	<6.20
MW-178A		MW-178A	1119642	10/14/2011	100

Table 39
Sulfolane Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analysis Method					Sulfolane-EPA1625B w/Iso Dil-W
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Sulfolane Result µg/L**
ADEC Interim Groundwater Cleanup Level					**25 µg/L**
MW-179A		MW-179A	1119642	10/14/2011	18.4
MW-180A		MW-180A	1119754	11/4/2011	<6.20
MW-195		MW-195A	1119661	10/15/2011	319
MW-196		MW-196	1119661	10/15/2011	<6.20
MW-301-CMT-10		MW-301-10	1119783	11/8/2011	<6.20
MW-302-CMT-10		MW-302-10	1119806	11/10/2011	55.5
MW-303-CMT-9		MW-303-9	1119808	11/11/2011	4.22J
10-55 feet below water table groundwater monitoring zone					
MW-101		MW-101	1119621	10/11/2011	35.6
MW-104		MW-104	1119621	10/11/2011	<6.20
MW-105		MW-105	1119660	10/17/2011	<6.40
MW-129		MW-129	1119791	10/19/2011	<6.20
MW-147B		MW-147B	1119621	10/11/2011	<6.20
MW-148B		MW-148B	1118990	10/7/2011	284
MW-148C		MW-148C	1118971	10/5/2011	170
MW-174A		MW-174A	1119642	10/13/2011	37.3
MW-178B		MW-178B	1119642	10/14/2011	243
MW-179B		MW-179B	1119642	10/14/2011	4.80J
MW-180B		MW-180B	1119695	10/24/2011	<6.20
MW-186B		MW-186B	1119621	10/12/2011	35.8
MW-301-CMT-20		MW-301-20	1119783	11/7/2011	<6.20
MW-601-CMT-20	Dup	MW-301-20	1119783	11/7/2011	<6.20
MW-301-CMT-30		MW-301-30	1119783	11/7/2011	<6.20
MW-301-CMT-40		MW-301-40	1119783	11/7/2011	3.24J
MW-301-CMT-50		MW-301-50	1119783	11/7/2011	5.35J
MW-301-60		MW-301-60	1119806	11/10/2011	7.02J
MW-302-CMT-20		MW-302-20	1119806	11/10/2011	76.2
MW-302-CMT-30		MW-302-30	1119806	11/10/2011	63.0
MW-302-CMT-40		MW-302-40	1119806	11/10/2011	33.2
MW-302-CMT-50		MW-302-50	1119806	11/10/2011	33.1
MW-303-CMT-19		MW-303-19	1119808	11/11/2011	123 JH
MW-303-CMT-29		MW-303-29	1119808	11/11/2011	88.5
MW-603-CMT-29	Dup	MW-303-29	1119808	11/11/2011	87.9
MW-303-CMT-39		MW-303-39	1119808	11/11/2011	47.5
MW-303-CMT-49		MW-303-49	1119808	11/11/2011	29.3
MW-303-CMT-59		MW-303-59	1119808	11/11/2011	26.8
MW-304-CMT-20		MW-304-20	1119748	11/3/2011	262
MW-304-CMT-30		MW-304-30	1119748	11/3/2011	215
MW-304-CMT-40		MW-304-40	1119748	11/3/2011	172
MW-304-CMT-50		MW-304-50	1119748	11/3/2011	24.2
MW-304-CMT-60		MW-304-60	1119748	11/3/2011	12.8
MW-305-CMT-20		MW-305-18	1119783	11/8/2011	23.5
MW-305-CMT-30		MW-305-28	1119783	11/8/2011	53.8
MW-305-CMT-40		MW-305-38	1119783	11/8/2011	10.9
MW-305-CMT-50		MW-305-48	1119783	11/8/2011	7.67J
MW-305-CMT-60		MW-305-58	1119783	11/8/2011	4.96J
MW-306-CMT-20		MW-306-20	1119806	11/9/2011	<6.20

Table 39
Sulfolane Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analysis Method					Sulfolane-EPA1625B w/Iso Dil-W
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Sulfolane Result µg/L**
ADEC Interim Groundwater Cleanup Level					**25 µg/L**
MW-306-CMT-30		MW-306-30	1119806	11/9/2011	<6.20
MW-606-CMT-30	Dup	MW-306-30	1119806	11/9/2011	<6.20
MW-306-CMT-40		MW-306-40	1119806	11/9/2011	<6.20
MW-306-CMT-50		MW-306-50	1119806	11/9/2011	<6.20
MW-306-CMT-60		MW-306-60	1119806	11/9/2011	<6.20
55-90 feet below water table groundwater monitoring zone					
MW-144B		MW-144B	1119642	10/13/2011	<6.20
MW-144B		MW-144B	1119755	11/4/2011	<6.32
MW-154A		MW-154A	1119642	10/13/2011	33.1
MW-154B		MW-154B	1119642	10/13/2011	35.1
MW-174B		MW-174B	1119642	10/13/2011	<6.20
MW-175		MW-175	1119791	10/19/2011	<6.20
MW-176C		MW-176C	1119791	10/19/2011	<6.20
MW-177		MW-177	1119642	10/13/2011	<6.20
MW-178C		MW-178C	1119642	10/14/2011	<6.20
MW-179C		MW-179C	1119642	10/14/2011	<6.20
MW-180C		MW-180C	1119695	10/24/2011	<6.20
MW-301		MW-301-70	1119662	10/17/2011	5.72J
MW-302-70		MW-302-70	1119806	11/10/2011	28.7
MW-302-80		MW-302-80	1119806	11/10/2011	3.39J
MW-303-70		MW-303-70	1119808	11/11/2011	19.3
MW-303-80		MW-303-80	1119808	11/11/2011	10.2
MW-304-70		MW-304-70	1119707	10/25/2011	16.8
MW-404-70	Dup	MW-304-70	1119707	10/25/2011	22.3
MW-304-80		MW-304-80	1119808	11/12/2011	6.65J
MW-305-70		MW-305-70	1119707	10/25/2011	<6.20
MW-305-80		MW-305-80	1119808	11/12/2011	<6.20
MW-605-80	Dup	MW-305-80	1119808	11/12/2011	<6.20
MW-306-70		MW-306-70	1119808	11/12/2011	<6.20
MW-306-80		MW-306-80	1119808	11/12/2011	<6.20
MW-306-100		MW-306-100	1119662	10/17/2011	<6.52
90-160 feet below water table groundwater monitoring zone					
MW-148D		MW-148D	1118971	10/5/2011	<6.20
MW-173B		MW-173B	1119621	10/11/2011	<6.20
MW-186C		MW-186C	1119791	10/19/2011	<6.20
MW-302-110		MW-302-110	1119806	11/10/2011	<6.20
MW-303-130		MW-303-130	1119808	11/11/2011	<6.20
MW-304-125		MW-304-125	1119707	10/25/2011	<6.20
MW-305A		MW-305-100	1119662	10/17/2011	4.45J
MW-306-150		MW-306-150	1119662	10/17/2011	<6.20
Offsite Wells					
Water table groundwater monitoring zone					
MW-150A		MW-150A	1119660	10/14/2011	105
MW-250A	Dup	MW-150A	1119660	10/14/2011	94.8
MW-151A		MW-151A	1119633	10/13/2011	106
MW-251A	Dup	MW-151A	1119633	10/13/2011	109

Table 39
Sulfolane Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analysis Method					Sulfolane-EPA1625B w/Iso Dil-W
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Sulfolane Result µg/L**
ADEC Interim Groundwater Cleanup Level					**25 µg/L**
MW-152A		MW-152A	1118990	10/7/2011	119
MW-153A		MW-153A	1119619	10/12/2011	66.2
MW-253A	Dup	MW-153A	1119619	10/12/2011	65.5
MW-155A		MW-155A	1119660	10/14/2011	22.2
MW-156A		MW-156A	1118979	10/6/2011	104
MW-256A	Dup	MW-156A	1118979	10/6/2011	106
MW-157		MW-157A	1119619	10/12/2011	91.3
MW-257	Dup	MW-157A	1119619	10/12/2011	89.1
MW-158A		MW-158A	1119619	10/12/2011	13.7
MW-159		MW-159A	1119619	10/11/2011	27.2
MW-161A		MW-161A	1118990	10/7/2011	138
MW-261A	Dup	MW-161A	1118990	10/7/2011	151
MW-162A		MW-162A	1118979	10/6/2011	63.6
MW-163A		MW-163A	1118979	10/6/2011	39.2
MW-164A		MW-164A	1118948	10/3/2011	106
MW-165A		MW-165A	1118979	10/5/2011	<6.20
MW-166A		MW-166A	1118979	10/4/2011	16.5
MW-167A		MW-167A	1118948	10/3/2011	3.25J
MW-168		MW-168A	1118948	10/3/2011	8.59J
MW-169A		MW-169A	1118979	10/4/2011	9.64J
MW-170A		MW-170A	1119606	10/8/2011	<6.20
MW-171A		MW-171A	1118979	10/6/2011	<6.20
MW-172A		MW-172A	1118948	10/1/2011	<6.32
MW-181A		MW-181A	1118948	10/1/2011	<6.46
MW-182A		MW-182A	1118948	10/3/2011	24.1
MW-183A		MW-183A	1119660	10/14/2011	87.1
MW-185A		MW-185A	1118948	10/1/2011	3.63J
MW-187		MW-187	1118979	10/4/2011	4.67J
MW-189A		MW-189A	1119619	10/11/2011	<6.20
MW-190A		MW-190A	1119660	10/14/2011	<6.20
MW-191A		MW-191A	1119606	10/10/2011	<6.20
MW-193A		MW-193A	1118979	10/4/2011	5.26J
MW-194A		MW-194A	1119606	10/10/2011	20.0
10-55 feet below water table groundwater monitoring zone					
MW-150B		MW-150B	1119660	10/14/2011	84.9
MW-151B		MW-151B	1119633	10/13/2011	63.2
MW-151C		MW-151C	1119660	10/14/2011	39.6
MW-152B		MW-152B	1118990	10/7/2011	114
MW-152C		MW-152C	1118971	10/5/2011	60.0
MW-153B		MW-153B	1119619	10/12/2011	33.3
MW-155B		MW-155B	1119660	10/14/2011	<6.52
MW-156B		MW-156B	1118979	10/6/2011	55.0
MW-157B		MW-157B	1119668	10/18/2011	87.3
MW-158B		MW-158B	1119619	10/12/2011	127
MW-258B	Dup	MW-158B	1119619	10/12/2011	132
MW-159B		MW-159B	1119668	10/18/2011	117
MW-161B		MW-161B	1118990	10/7/2011	316

Table 39
Sulfolane Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analysis Method					Sulfolane-EPA1625B w/Iso Dil-W
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Sulfolane Result µg/L**
ADEC Interim Groundwater Cleanup Level					**25 µg/L**
MW-162B		MW-162B	1118979	10/6/2011	85.4
MW-163B		MW-163B	1118979	10/6/2011	64.5
MW-164B		MW-164B	1118948	10/3/2011	134
MW-164C		MW-164C	1118948	10/3/2011	133
MW-165B		MW-165B	1118979	10/5/2011	<6.20
MW-166B		MW-166B	1118979	10/4/2011	37.4
MW-167B		MW-167B	1118948	10/3/2011	7.35J
MW-168B		MW-168B	1119668	10/18/2011	11.7
MW-169C		MW-169C	1118979	10/4/2011	<6.20
MW-170D		MW-170D	1119606	10/8/2011	<6.20
MW-171B		MW-171B	1118979	10/6/2011	<6.52
MW-181B		MW-181B	1118948	10/1/2011	<6.46
MW-182B		MW-182B	1118948	10/3/2011	19.5
MW-183B		MW-183B	1119660	10/14/2011	145
MW-184		MW-184	1119660	10/14/2011	<6.20
MW-185B		MW-185B	1118948	10/1/2011	10.9
MW-188		MW-188	1118948	10/1/2011	<6.40
MW-189B		MW-189B	1119619	10/11/2011	<6.52
MW-190B		MW-190B	1119660	10/14/2011	<6.20
MW-191B		MW-191B	1119606	10/10/2011	<6.20
MW-193B		MW-193B	1118979	10/4/2011	3.91J
MW-194B		MW-194B	1119606	10/10/2011	45.4
55-90 feet below water table groundwater monitoring zone					
MW-159C		MW-159C	1119668	10/18/2011	106
MW-160B		MW-160B	1119619	10/12/2011	116
MW-260B	Dup	MW-160B	1119619	10/12/2011	118
MW-170B		MW-170B	1119606	10/8/2011	<6.20
90-160 feet below water table groundwater monitoring zone					
MW-170C		MW-170C	1119606	10/8/2011	<6.20
MW-172B		MW-172B	1118948	10/1/2011	<6.46
MW-181C		MW-181C	1119668	10/18/2011	<6.60
MW-185C		MW-185C	1119707	10/25/2011	3.65J

Notes:

µg/L	micrograms per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation (LOQ) or due to laboratory QC failures
JH	Estimated results biased high due to sulfolane-d8 surrogate failure
EPA	Environmental Protection Agency
<LOD	non-detect results are presented as <limit of detection (LOD).
Dup	Duplicate
ADEC	Alaska Department of Environmental Conservation
§	Sulfolane concentration quantified using quant ion 46, per ESI direction.

Table 40
BTEX Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

BTEX					SW8260B			
Sample	Dup	Location	Work Order	Collect Date	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes (total) µg/L
ADEC Groundwater Cleanup Level					5 µg/L	1,000 µg/L	700 µg/L	10,000 µg/L
Onsite Wells								
Water table groundwater monitoring zone								
0-1		O-1	1119690	10/20/2011	<0.240	<0.620	1.32	<1.86
0-3		O-3	1119690	10/19/2011	6.34	<0.620	<0.620	56.7
0-4		O-4	1119690	10/19/2011	<0.240	<0.620	<0.620	<1.86
0-5		O-5	1119690	10/19/2011	9.22	<0.620	2.27	5.27
0-6		O-6	1119690	10/19/2011	<0.240	<0.620	<0.620	<1.86
0-8		O-8	1119690	10/20/2011	<0.240	<0.620	<0.620	<1.86
0-12		O-12	1119690	10/19/2011	0.82	<0.620	<0.620	<1.86
0-14		O-14	1119690	10/20/2011	<0.240	<0.620	<0.620	<1.86
0-15		O-15	1119690	10/20/2011	<0.240	<0.620	<0.620	<1.86
0-16		O-16	1119690	10/20/2011	5.1	<0.620	0.440J	<1.86
0-17		O-17	1119690	10/19/2011	<0.240	<0.620	<0.620	<1.86
0-18		O-18	1119690	10/20/2011	<0.240	<0.620	<0.620	<1.86
0-20		O-20	1119690	10/20/2011	1,420	2.59	179	1,698
0-21		O-21	1119690	10/20/2011	2,100	0.490J	403	2,848
MW-101A		MW-101A	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-106		MW-106	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-109		MW-109	1119687	10/17/2011	<0.240	<0.620	<0.620	<1.86
MW-110		MW-110	1119794	10/18/2011	104	0.340J	2.47	53.7
MW-210	Dup	MW-110	1119687	10/18/2011	111	0.390J	2.39	53.3
MW-111		MW-111	1119641	10/11/2011	1.05	<0.620	<0.620	<1.86
MW-113		MW-113	1119640	10/14/2011	<0.240	<0.620	<0.620	<1.88
MW-116		MW-116	1119686	10/20/2011	7,470	1.42	260	4,334
MW-124		MW-124	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-224	Dup	MW-124	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-125		MW-125	1119794	10/18/2011	406	<0.620	9.08	752
MW-126		MW-126	1119687	10/19/2011	<0.240	<0.620	<0.620	<1.86
MW-127		MW-127	1119686	10/20/2011	<0.240	<0.620	<0.620	<1.24
			1119794	10/20/2011	<0.240	<0.620	<0.620	<1.88
MW-132		MW-132	1119687	10/18/2011	<0.240	<0.620	<0.620	1.31J
MW-133		MW-133	1119794	10/18/2011	<0.240	<0.620	<0.620	<1.88
MW-135		MW-135	1119644	10/14/2011	2,430	6,080	586	3,100
MW-137		MW-137	1119646	10/14/2011	2.44	<0.620	11.6	14.9J
MW-237	Dup	MW-137	1119646	10/14/2011	2.5	<0.620	10.8	14.4J
MW-139		MW-139	1119640	10/12/2011	46.8	<0.620	39.8	555
MW-239	Dup	MW-139	1119640	10/12/2011	47.5	<0.620	41.8	544
MW-140		MW-140	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-141		MW-141	1119640	10/14/2011	<0.240	<0.620	<0.620	<1.88
MW-142		MW-142	1119687	10/18/2011	0.170J	<0.620	<0.620	<1.86
MW-143		MW-143	1119686	10/20/2011	<0.240	<0.620	<0.620	<1.86
MW-144A		MW-144A	1119641	10/11/2011	<0.240	<0.620	<0.620	<1.86
MW-145		MW-145	1119687	10/19/2011	0.170J	<0.620	<0.620	<1.86
MW-148A		MW-148A	1118991	10/7/2011	<0.240	<0.620	<0.620	<1.88
MW-149A		MW-149A	1119631	10/13/2011	<0.240	<0.620	<0.620	<1.88

Table 40
BTEX Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

BTEX					SW8260B			
Sample	**Dup**	**Location**	**Work Order**	**Collect Date**	**Benzene µg/L**	**Toluene µg/L**	**Ethylbenzene µg/L**	**Xylenes (total) µg/L**
ADEC Groundwater Cleanup Level					**5 µg/L**	**1,000 µg/L**	**700 µg/L**	**10,000 µg/L**
MW-179A		MW-179A	1119641	10/11/2011	0.220J	<0.620	<0.620	0.570J
MW-180A		MW-180A	1119753	11/4/2011	4.51	<0.620	18.9	30.7
10-55 feet below water table groundwater monitoring zone								
MW-148B		MW-148B	1118992	10/7/2011	<0.240	<0.620	<0.620	<1.86
MW-149B		MW-149B	1119630	10/13/2011	<0.240	<0.620	<0.620	<1.86
Offsite Wells								
Water table groundwater monitoring zone								
MW-153A		MW-153A	1119631	10/12/2011	<0.240	<0.620	<0.620	<1.88
10-55 feet below water table groundwater monitoring zone								
MW-153B		MW-153B	1119630	10/12/2011	<0.240	<0.620	<0.620	<1.86

Notes:

µg/L	micrograms per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation
EPA	Environmental Protection Agency
<LOD	non-detect results are presented as <limit of detection (LOD).
Dup	Duplicate
ADEC	Alaska Department of Environmental Conservation
BTEX	benzene, toluene, ethylbenzene and total xylenes

Table 41
COPC Analytical Results - Hydrocarbons, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

COPC Analysis Method					AK101	AK102	AK103	SW8015B	
Sample	Dup	Location	Work Order	Collect Date	GRO	DRO	RRO	Isopropyl Alcohol	Propylene Glycol
					µg/L	µg/L	µg/L	µg/L	µg/L
ADEC Groundwater Cleanup Level					**2,200 µg/L**	**1,500 µg/L**	**1,100 µg/L**	**--**	**--**
Onsite Wells - Water table groundwater monitoring zone									
MW-110		MW-110	1119794	10/18/2011	408	1,410	<300	<400	<2,000
MW-113		MW-113	1119640	10/14/2011	<62.0	285J	<300	<400	<2,000
MW-125		MW-125	1119794	10/18/2011	2,850	<600 UB	<300	<400	<2,000
MW-127		MW-127	1119794	10/20/2011	<62.0	<360	<300	<400	<2,000
MW-133		MW-133	1119794	10/18/2011	<62.0	<360	<300	<400	<2,000
MW-135		MW-135	1119644	10/14/2011	20,800	1,520	<515 UB	<400	<2,000
MW-139		MW-139	1119640	10/12/2011	1,860 JH	1,630	<300	<400	<2,000
MW-239	Dup	MW-139	1119640	10/12/2011	1,930 JH	1,860	<300	<400	<2,000
MW-141		MW-141	1119640	10/14/2011	<62.0	227J	<300	<400	<2,000
MW-148A		MW-148A	1118991	10/7/2011	<62.0	313J NPS	<300	<400	<2,000
MW-149A		MW-149A	1119631	10/13/2011	<62.0	247J NPS	<300	<400	<2,000
Offsite Wells - Water table groundwater monitoring zone									
MW-153A		MW-153A	1119631	10/12/2011	<62.0	<360	<300	<400	<2,000

Notes:

µg/L	micrograms per liter
GRO	gasoline range organics
DRO	diesel range organics
RRO	residual range organics
<LOD	non-detect results are presented as <limit of detection (LOD).
ADEC	Alaska Department of Environmental Conservation
J	Estimated Concentration
UB	Result considered non-detect due to method blank detection; presented as less than the LOQ or reported concentration (higher
NPS	no petroleum signature in the chromatogram; concentration likely due to natrual organics
JH	Estimated concentration biased high due to elevated surrogate recovery
Dup	Duplicate

Table 42
COPC Analytical Results - Inorganics, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

COPC Analysis Method					SW6020								SM20 4500-CN C,E
Sample	Dup	Location	Work Order	Collect Date	Antimony	Barium	Cadmium	Chromium (Total)	Copper	Iron	Lead	Selenium	Cyanide
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ADEC Groundwater Cleanup Level					**6 µg/L**	**2,000 µg/L**	**5 µg/L**	**100 µg/L**	**1,000 µg/L**	**11,000 µg/L[a]**	**15 µg/L**	**50 µg/L**	**200 µg/L**
Onsite Wells													
MW-110		MW-110	1119794	10/18/2011	<0.620	339	<1.20	<2.40	<3.60	43,300	<0.620	1.95J	3.20J
MW-113		MW-113	1119640	10/14/2011	<0.620	163	<1.20	<2.40	1.91J	4,840	0.350J	<3.00	2.60J
MW-125		MW-125	1119794	10/18/2011	<0.620	189	<1.20	<2.40	4.48J	11,000	<0.620	2.16J	5.60
MW-127		MW-127	1119794	10/20/2011	<0.620	199	<1.20	<2.40	<3.60	4,960	<0.620	2.13J	1.50J
MW-133		MW-133	1119794	10/18/2011	<0.620	61.6	<1.20	<2.40	<3.60	<620	<0.620	2.33J	<3.00
MW-135		MW-135	1119644	10/14/2011									2.10J
			1119793	10/19/2011	<0.620	149	<1.20	1.20J	2.53J	17,700	<0.620	1.92J	
MW-139		MW-139	1119640	10/12/2011	<0.620	405	<1.20	<2.40	<3.60	17,600	<0.620	<3.00	2.00J
MW-239	Dup	MW-139	1119640	10/12/2011	<0.620	402	<1.20	<2.40	<3.60	17,600	<0.620	<3.00	2.30J
MW-141		MW-141	1119640	10/14/2011									<3.00
			1119793	10/19/2011	<0.620	120	<1.20	1.35J	<3.60	1,900	<0.620	2.86J	
MW-148A		MW-148A	1118991	10/7/2011	<0.620	191	<1.20	1.32J	4.49J	6,090	<0.620	<3.00	<3.00
MW-149A		MW-149A	1119631	10/13/2011	<0.620	49.2	<1.20	<2.40	6.60	<620	<0.620	<3.00	<3.00
Offsite Wells - Water table groundwater monitoring zone													
MW-153A		MW-153A	1119631	10/12/2011	<0.620	151	<1.20	<2.40	2.25J	<620	<0.620	<3.00	<3.00

Notes:

µg/L	micrograms per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation (LOQ) or due to laboratory QC failures
<LOD	non-detect results are presented as <limit of detection (LOD).
ADEC	Alaska Department of Environmental Conservation
[a]	United States Environmental Protection Agency Regions 3, 6, and 9. (Updated November 2011). Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Dup	Duplicate

Table 43A
COPC Analytical Results - SVOCs and VOCs, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

COPC Analysis Method					SW8270D	SW8260B								
Sample	Dup	Location	Work Order	Collect Date	Dibenzo-furan	1,1-Dichloro-ethylene	n-Hexane	Methylene chloride	Methyl tert-butyl ether	n-Propyl-benzene	1,3,5-Trimethyl-benzene	4-Isopropyl-toluene (p-cymene)	Cyclo-hexane	1,2,4-Trimethyl-benzene
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ADEC Groundwater Cleanup Level					**73 µg/L**	**7 µg/L**	**--**	**5 µg/L**	**470 µg/L**	**370 µg/L**	**1,800 µg/L**	**--**	**--**	**1,800 µg/L**
Onsite Wells - Water table groundwater monitoring zone														
MW-110		MW-110	1119794	10/18/2011	<6.20	<0.620	2.02	<2.00	<3.00	1.00	1.93	<0.620	27.7	6.20
MW-113		MW-113	1119640	10/14/2011	<6.20	<0.620	<0.620	<2.00	<3.00	<0.620	<0.620	<0.620	<0.620	<0.620
MW-125		MW-125	1119794	10/18/2011	<6.20	<0.620	33.5J	<2.00	<3.00	15.7	17.2	1.65	454	57.5
MW-127		MW-127	1119794	10/20/2011	<6.20	<0.620	<0.620	<2.00	7.10	<0.620	<0.620	<0.620	<0.620	<0.620
MW-133		MW-133	1119794	10/18/2011	<6.20	<0.620	<0.620	<2.00	<3.00	<0.620	<0.620	<0.620	<0.620	<0.620
MW-135		MW-135	1119644	10/14/2011	<6.40	<0.620	64.8	<2.00	<3.00	64.0	69.2	4.37	441	249
MW-139		MW-139	1119640	10/12/2011	<6.20	<0.620	<0.620	<2.00	<3.00	37.4	56.3	6.31	156	170
MW-239	Dup	MW-139	1119640	10/12/2011	<6.20	<0.620	<0.620	<2.00	<3.00	38.5	57.5	6.18	160	164
MW-141		MW-141	1119640	10/14/2011	<6.20	<0.620	<0.620	<2.00	<3.00	<0.620	<0.620	<0.620	<0.620	<0.620
MW-148A		MW-148A	1118991	10/7/2011	<6.20	<0.620	<0.620	<2.00	1.69J	<0.620	<0.620	<0.620	<0.620	<0.620
MW-149A		MW-149A	1119631	10/13/2011	<6.20	<0.620	<0.620	<2.00	<3.00	<0.620	<0.620	<0.620	<0.620	<0.620
Offsite Wells - Water table groundwater monitoring zone														
MW-153A		MW-153A	1119631	10/12/2011	<6.46	<0.620	<0.620	<2.00	<3.00	<0.620	<0.620	<0.620	<0.620	<0.620

Notes:

µg/L	micrograms per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation (LOQ) or due to laboratory QC failures
<LOD	non-detect results are presented as
ADEC	Alaska Department of Environmental Conservation
Dup	Duplicate

Table 43B
COPC Analytical Results - PAHs, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

COPC Analysis Method					8270D SIMS (PAH)								
Sample	Dup	Location	Work Order	Collect Date	1-Methyl-naphthalene	2-Methyl-naphthalene	Naphthalene	Benzo(a)-anthracene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Benzo(a) pyrene	Indeno (1,2,3-c,d) pyrene	Dibenzo (a,h)-anthracene
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
ADEC Groundwater Cleanup Level					**150 µg/L**	**150 µg/L**	**730 µg/L**	**1.2 µg/L**	**1.2 µg/L**	**12 µg/L**	**0.2 µg/L**	**1.2 µg/L**	**0.12 µg/L**
Onsite Wells - Water table groundwater monitoring zone													
MW-110		MW-110	1119794	10/18/2011	2.14	2.17	1.68	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-113		MW-113	1119640	10/14/2011	<0.05 UB	0.0395J	0.0829J	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-125		MW-125	1119794	10/18/2011	9.72	8.14	18.1	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-127		MW-127	1119794	10/20/2011	<0.0300	0.0160J	<0.0620	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-133		MW-133	1119794	10/18/2011	<0.0312	<0.0312	<0.0646	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312	<0.0312
MW-135		MW-135	1119644	10/14/2011	8.63	8.97	29.4	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-139		MW-139	1119640	10/12/2011	34.2	29.8	48.1	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-239	Dup	MW-139	1119640	10/12/2011	35.0	30.9	56.4	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-141		MW-141	1119640	10/14/2011	<0.0300	0.0163J	<0.0620	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-148A		MW-148A	1118991	10/7/2011	<0.0974 UB	<0.105 UB	<0.203 UB	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
MW-149A		MW-149A	1119631	10/13/2011	<0.0316	<0.0316	<0.0652	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316
Offsite Wells - Water table groundwater monitoring zone													
MW-153A		MW-153A	1119631	10/12/2011	<0.0316	<0.0316	<0.0652	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316	<0.0316

Notes:

µg/L	micrograms per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation (LOQ) or due to laboratory QC failures
UB	Result considered non-detect due to method blank detection; presented as less than the LOQ or reported concentration (higher value).
<LOD	non-detect results are presented as <limit of detection (LOD).
ADEC	Alaska Department of Environmental Conservation
Dup	Duplicate

Table 44
Residential Well Sulfolane Results - Initial Sampling Event - Isotope Dilution Method, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

PAN	Collection Date	Sulfolane Results µg/L	Sample Type	Laboratory WO #
315206	10/4/2011	38.2	PS	1118965
315206	10/4/2011	33.9	Dup	1118965
326691	10/4/2011	7.76 J	PS	1118963
328219.1	10/5/2011	19.0	PS	1118962
404730	10/6/2011	< 6.66	PS	1118977
287458	10/13/2011	< 6.82	PS	1119625
430111	10/13/2011	8.80 J	PS	1119637
289230	10/18/2011	< 6.20	PS	1119663
402141	10/19/2011	3.48 J	PS	1119678
296643	10/21/2011	< 6.40	PS	1119798
390801	10/22/2011	< 6.60	PS	1119802
383759	10/28/2011	< 6.88	PS	1119716
404799	10/28/2011	< 6.66	PS	1119715
296562	11/1/2011	< 6.20	PS	1119723
427063	11/1/2011	< 6.20	PS	1119722
427063	11/1/2011	< 6.20	Dup	1119722
296805	11/1/2011	< 6.20	PS	1119726
296597	11/1/2011	< 6.60	PS	1119724
296627	11/1/2011	< 6.46	PS	1119725
296635	11/2/2011	< 6.20	PS	1119747
296767	11/2/2011	< 6.60	PS	1119737
296601	11/2/2011	< 6.52	PS	1119736
296601	11/2/2011	< 6.20	Dup	1119736
466689	11/2/2011	< 6.46	PS	1119745
348155	11/2/2011	< 6.46	PS	1119746
295884	11/2/2011	< 6.52	PS	1119744
303810	11/2/2011	< 6.52	PS	1119738
348465	11/2/2011	< 6.40	PS	1119743
348473	11/2/2011	< 7.30	PS	1119742
348724	11/2/2011	< 6.40	PS	1119741
348767	11/2/2011	< 6.20	PS	1119740
375641	11/3/2011	< 6.60	PS	1119751
375608	11/3/2011	< 6.96	PS	1119750
375594	11/3/2011	< 6.40	PS	1119749
348783	11/4/2011	< 6.66	PS	1119769
296741	11/4/2011	< 6.60	PS	1119767
303895	11/4/2011	< 6.60	PS	1119768
303836	11/4/2011	< 6.52	PS	1119762
303836	11/4/2011	< 6.20	Dup	1119762
303798	11/4/2011	< 6.74	PS	1119773
348490	11/4/2011	< 6.46	PS	1119763
375683	11/4/2011	< 6.60	PS	1119764
375624	11/4/2011	< 6.20	PS	1119770
383864	11/4/2011	< 6.20	PS	1119774
348732	11/4/2011	< 6.40	PS	1119765
326755	11/5/2011	< 6.20	PS	1119758
560731	11/5/2011	< 6.60	PS	1119760

Table 44
Residential Well Sulfolane Results - Initial Sampling Event - Isotope Dilution Method, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

PAN	Collection Date	Sulfolane Results µg/L	Sample Type	Laboratory WO #
296589	11/5/2011	< 6.40	PS	1119761
404802	11/5/2011	< 6.20	PS	1119759
296759	11/5/2011	< 6.52	PS	1119766
296759	11/5/2011	< 6.40	Dup	1119766
375578	11/5/2011	< 6.52	PS	1119777
383830	11/5/2011	< 6.20	PS	1119778
383881	11/5/2011	< 6.46	PS	1119779
375667	11/5/2011	< 6.74	PS	1119776
375616	11/5/2011	< 6.66	PS	1119775
375632	11/5/2011	< 6.20	PS	1119772
348902	11/11/2011	< 6.52	PS	1119819
348449	11/11/2011	< 6.32	PS	1119812
326607	11/11/2011	< 6.60	PS	1119814
348651	11/11/2011	< 6.46	PS	1119810
326658	11/11/2011	< 6.52	PS	1119817
326615	11/12/2011	< 6.52	PS	1119813
348791	11/12/2011	< 6.52	PS	1119809
303852	11/12/2011	< 6.82	PS	1119811
303852	11/12/2011	< 6.82	Dup	1119811
296783	11/12/2011	< 6.40	PS	1119815
383872	11/12/2011	< 6.52	PS	1119816
296724	11/14/2011	< 6.20	PS	1119824
348881	11/16/2011	< 6.40	PS	1119830
348643	11/16/2011	< 6.40	PS	1119833
375586	11/16/2011	< 6.20	PS	1119832
296716	11/16/2011	< 6.40	PS	1119831
296856	11/19/2011	< 6.74	PS	1119842
567639	11/19/2011	< 6.20	PS	1119841
296775	11/19/2011	< 6.20	PS	1119843
375659	11/19/2011	< 6.20	PS	1119840
424391	11/19/2011	< 6.40	PS	1119844
375675	11/21/2011	< 6.52	PS	1119845
348872	11/21/2011	< 6.52	PS	1119847
375560	11/21/2011	< 6.20	PS	1119846
296571	11/21/2011	< 6.20	PS	1119839
296571	11/21/2011	< 6.20	Dup	1119839
544761	11/22/2011	< 6.52	PS	1119848
347892	11/28/2011	< 6.52	PS	1119850
347400	11/29/2011	< 6.96	PS	1119851
535257	11/29/2011	< 6.40	PS	1119852
535257	11/29/2011	< 6.40	Dup	1119852
348775	11/29/2011	< 6.32	PS	1119853
479659.2	12/1/2011	< 6.32	PS	1119858
479659.2	12/1/2011	< 6.20	Dup	1119858
479659.1	12/1/2011	< 6.32	PS	1119858
302406	12/1/2011	< 6.60	PS	1119859
375543	12/3/2011	< 6.46	PS	1119862

Table 44
Residential Well Sulfolane Results - Initial Sampling Event - Isotope Dilution Method, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

PAN	Collection Date	Sulfolane Results µg/L	Sample Type	Laboratory WO #
296830	12/3/2011	< 6.20	PS	1119863
302457	12/3/2011	< 6.46	PS	1119864
321486	12/6/2011	< 6.20	PS	1119871
383848	12/6/2011	< 6.46	PS	1119872
296732	12/8/2011	< 6.52	PS	1119873
306916	12/8/2011	< 6.40	PS	1119875
375551	12/9/2011	< 6.20	PS	1119880
348660	12/12/2011	< 6.52	PS	1119884
328821	12/14/2011	93.1	PS	1119897
360635	12/19/2011	< 6.20	PS	1119901
360635	12/19/2011	< 6.40	Dup	1119901

Notes:
The samples tabulated above were collected per FHRA direction.

PAN	Parcel Account Number
µg/L	micrograms per liter
< LOD	Non-detect results are presented as < LOD (Limit of Detection)
J	estimated result detected between the detection limit (DL) and limit of quantitation (LOQ)
PS	Project Sample
Dup	Duplicate
WO #	Work order number

Table 45
Residential Well Sulfolane Results - Second Sampling Event - Isotope Dilution Method, Fourth Quarter 2011 North Pole Refinery
Flint Hills Resources Alaska, LLC

PAN	Original Collection Date	Original Sulfolane Result µg/L †	2nd Sampling Collection Date	Sulfolane Results µg/L	Sample Type	Laboratory WO #
391565	03/07/2010	< 10.0	10/3/2011	21.4	PS	1118945
406384	03/05/2010	< 10.0	10/5/2011	< 6.20	PS	1118964
301981	02/16/2010	< 10.0	10/7/2011	< 6.52	PS	1118984
402150	02/22/2010	< 10.9	10/12/2011	< 6.96	PS	1119627
395340	03/12/2011	< 10.3	10/13/2011	< 6.46	PS	1119628
395226	01/26/2010	< 10.5	10/13/2011	< 6.40	PS	1119626
304042	04/17/2010	< 10.9	10/15/2011	17.5	PS	1119653
395277	04/23/2010	< 11.6	10/15/2011	< 7.04	PS	1119657
395374	04/19/2010	< 10.0	10/15/2011	< 6.20	PS	1119654
395196	04/16/2010	< 10.8	10/15/2011	< 6.20	PS	1119655
303933	02/25/2010	< 10.9	10/15/2011	7.25 J	PS	1119656
395200	04/16/2010	< 10.8	10/18/2011	< 6.52	PS	1119664
544752	03/11/2010	< 10.4	10/18/2011	13.1	PS	1119665
544752	--	--	10/18/2011	13.9	Dup	1119665
303887	02/25/2010	< 10.0	10/19/2011	< 6.46	PS	1119679
586960	01/16/2010	< 10.4	10/19/2011	< 6.40	PS	1119677
395358	04/16/2010	< 10.0	10/21/2011	< 6.88	PS	1119799
395218	04/10/2010	< 10.4	10/22/2011	< 6.60	PS	1119805
395242	05/13/2010	< 10.3	10/22/2011	< 6.74	PS	1119804
395251	05/12/2010	< 10.0	10/25/2011	< 6.60	PS	1119699
459151	05/05/2010	< 10.3	10/25/2011	8.13 J	PS	1119698
459151	--	--	10/25/2011	7.46 J	Dup	1119698
317411	11/09/2010	< 10.5	10/28/2011	< 6.20	PS	1119719
301906	02/13/2010	< 10.3	10/28/2011	5.16 J	PS	1119717
406295	09/29/2010	< 10.1	10/28/2011	< 6.20	PS	1119718
302422.2	03/11/2010	< 10.8	11/2/2011	< 6.32	PS	1119739
304034	04/21/2010	< 10.4	11/4/2011	9.88 J	PS	1119771
303917	02/27/2010	< 11.0	11/11/2011	< 6.52	PS	1119818
479659	5/27/2010	< 10.0	12/1/2011	< 6.46	PS	1119858
348481	4/9/2010	< 10.5	12/8/2011	< 6.20	PS	1119874

Notes:
The samples tabulated above were collected per FHRA direction.

PAN	Parcel Account Number
†	Original sample was analyzed using the "old" sulfolane method (8270D).
< LOD	Non-detect results are presented as < LOD (Limit of Detection)
J	estimated result detected between the detection limit (DL) and limit of quantitation (LOQ)
PS	Project Sample
Dup	Duplicate
µg/L	micrograms per liter
WO #	Work order number
--	Not applicable

Table 46A
Geochemical Field Parameter Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Samples	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH (std. units)	Mn(II) (mg/L)	Mn(tot) (mg/L)	Mn(IV) (mg/L)	Sulfide (mg/L)†	Fe(II)‡	Fe(tot)‡	Fe(III)	Notes: Dilution factors The dilution factor is 1 unless otherwise noted
10/17/2011	MW105	3.9	200.8	0.21	7.30	0.180	0.576	0.396	0.01	0.86	0.99	0.13	Mn (tot) 2
10/17/2011	MW-105A	4.6	244.4	0.13	7.08	0.355	1.42	1.07	0.01	1.66	2.33	0.67	Mn (tot) 10
10/17/2011	MW-109	13.1	314.3	0.13	7.25	0.347	1.77	1.42	0.03	1.81	2.19	0.38	Mn (tot) 10
10/18/2011	MW-110	7.0	586	0.18	6.84	1.58	5.51	3.93	0.03	33.6	43.8	10.2	Mn (II) 10, Fe (II) 20, Fe (tot) 20, Mn (tot) 10
10/20/2011	MW-116	11.0	643	0.27	6.80	1.63	8.68	7.05	0.05	2.86	61.4	58.5	Mn (II) 10, Fe (tot) 20, Mn (tot) 20
10/20/2011	MW-127	5.8	307.7	0.13	7.29	1.16	4.42	3.26	0.01	1.9	5.24	3.4	Mn (II) 2, Fe (II) 2, and Fe (tot) 2, Mn (tot) 10
10/20/2011	MW-227	duplicate of MW-127				1.07	4.48	3.41	0.01	2.46	5.20	2.74	Mn (II) 2, Fe (II) 2, and Fe (tot) 2, Mn (tot) 10
10/18/2011	MW-131	4.7	269.8	0.19	7.05	0.484	5.36	4.88	<0.01	0.24	0.31	0.07	Mn (tot) 10
10/18/2011	MW-142	4.8	306.3	0.15	7.36	1.52	4.50	2.98	0.01	6.37	10.0	3.63	Mn (II) 2, Mn (tot) 10, Fe (tot) 10/3, Fe (II) 10/3
10/18/2011	MW-242	duplicate of MW-142				1.52	4.70	3.18	<0.01	6.23	10.1	3.90	Mn (II) 2, Mn (tot) 10, Fe (tot) 10/3, Fe (II) 10/3
10/20/2011	MW-143	4.6	339.8	1.18	6.94	0.26	2.75	2.5	0.01	0.11	1.41	1.3	Mn (II) 5, Mn (tot) 5
10/7/2011	MW-148A	4.8	234.5	0.22	6.80	0.235	2.74	2.51	0.01	5.18	5.42	0.240	Mn (tot) 10, Fe (II) 2, Fe (tot) 2
10/7/2011	MW-148B	2.9	265.9	0.15	7.32	0.387	2.85	2.46	0.01	3.70	3.84	0.140	Mn (tot) 10, Fe (II) 2, Fe (tot) 2
10/13/2011	MW-151A	3.1	286.7	0.11	7.16	0.436	2.35	1.91	<0.01	0.63	0.65	<0.03	Mn (tot) 10
10/13/2011	MW-151B	1.7	245.0	0.19	7.42	0.410	1.87	1.46	<0.01	1.03	1.09	0.06	Mn (tot) 5
10/7/2011	MW-152A	6.2	268.8	0.12	7.23	0.614	2.07	1.46	0.01	1.58	1.60	<0.03	Mn (tot) 10
10/7/2011	MW-152B	2.9	236.9	0.16	7.33	0.365	1.83	1.47	0.02	1.02	0.98	<0.03	Mn (tot) 10
10/6/2011	MW-156A	4.1	418.3	0.17	7.13	0.398	6.61	6.21	0.02	1.52	4.58	3.06	Mn (tot) 10, Fe (tot) 2
10/6/2011	MW-156B	0.4	209.9	0.20	7.43	0.368	0.845	0.477	<0.01	0.10	0.18	0.080	Mn (tot) 5
10/12/2011	MW-157	3.1	296.9	0.24	7.19	0.657	1.79	1.13	0.01	1.00	1.52	0.52	Mn (tot) 10
10/12/2011	MW-158A	4.6	534	0.19	6.47	0.697	2.20	1.50	0.02	5.40	6.75	1.35	Mn (tot) 5, Fe (II) 5, Fe (tot) 5
10/11/2011	MW-159	5.1	402.5	1.91	6.61	0.301	0.625	0.324	<0.01	<0.03	<0.03	<0.03	Mn (tot) 5
10/7/2011	MW-161A	1.3	363.5	0.30	7.07	0.215	1.20	0.985	0.01	2.73	10.7	7.99	Mn (tot) 10, Fe (tot) 4
10/7/2011	MW-261A	duplicate of MW-161A				0.213	1.15	0.937	0.01	2.78	10.6	7.86	Mn (tot) 10, Fe (tot) 4
10/7/2011	MW-161B	0.2	286.3	0.20	7.33	0.163	0.542	0.379	0.02	0.40	0.44	0.040	No dilutions
10/6/2011	MW-162A	3.6	338.1	0.27	7.18	0.357	3.80	3.44	0.01	2.57	7.89	5.32	Mn (tot) 10, Fe (tot) 100/35
10/6/2011	MW-162B	0.3	217.8	0.18	7.30	0.172	0.743	0.571	<0.01	<0.03	<0.03	<0.03	No dilutions
10/6/2011	MW-163A	2.6	247.5	0.41	6.84	0.158	0.450	0.292	<0.01	0.06	0.14	0.08	No dilutions
10/6/2011	MW-163B	0.2	208.6	0.22	7.32	0.205	0.589	0.384	<0.01	1.37	1.52	0.150	No dilutions
10/3/2011	MW-164A	2.4	284.8	0.20	6.96	0.420	1.37	0.950	0.01	1.53	11.0	9.42	Mn (tot) 10, Fe (tot) 5
10/5/2011	MW-165A	3.4	219.1	0.71	6.69	0.184	0.185	<0.020	0.02	0.23	0.59	0.36	No dilutions
10/4/2011	MW-166A	0.9	277.2	0.20	7.21	0.443	1.42	0.977	0.02	8.40	12.8	4.35	Mn (tot) 10, Fe (II) 5, Fe (tot) 5
10/4/2011	MW-166B	0.1	283.2	0.21	7.30	0.440	2.19	1.75	<0.01	2.45	3.28	0.830	Mn (tot) 10, Fe (tot) 2
10/3/2011	MW-167A	0.9	559	0.65	6.87	0.347	0.964	0.617	<0.01	1.61	2.38	0.770	Mn (tot) 2, Fe (tot) 2
10/3/2011	MW-167B	0.1	507	0.22	6.91	0.788	2.49	1.70	<0.01	0.65	0.87	0.22	Mn (tot) dilution factor of 10
10/3/2011	MW-168	2.3	234.4	0.18	7.12	0.121	2.55	2.43	<0.01	2.51	11.3	8.79	Mn (tot), Fe (tot) dilution factor of 10
10/8/2011	MW-170A	6.9	481.2	0.16	6.64	0.762	3.46	2.70	0.06	7.20	7.72	0.520	Mn (II) 2, Fe (II) 4, Fe (tot) 4, Mn (tot) 10
10/8/2011	MW-270A	duplicate of MW-170A				0.700	3.38	2.68	0.06	7.20	7.68	0.480	Mn (II) 2, Fe (II) 4, Fe (tot) 4, Mn (tot) 10
10/6/2011	MW-171A	4.2	360.9	0.29	6.78	0.244	0.78	0.54	<0.01	<0.03	0.14	<0.03	Mn (tot) 10
10/6/2011	MW-171B	0.4	248.5	0.24	7.00	0.388	1.03	0.638	<0.01	4.86	5.56	0.700	Mn (tot) 2, Fe (II) 2, Fe (tot) 2
10/19/2011	MW-176A	--	--	--	--	--	--	--	--	--	--	--	3.62 ft. LNAPL found
10/20/2011	MW-176B	--	--	--	--	--	--	--	--	--	--	--	Trace LNAPL found
11/4/2011	MW-180A	5.3	317.7	0.30	6.78	0.480	1.94	1.46	0.01	1.74	2.64	0.90	Mn (tot) 10
10/24/2011	MW-180B	4.1	208.2	0.05	7.33	0.261	0.692	0.431	0.01	<0.03	<0.03	<0.03	No dilutions
10/3/2011	MW-182A	1.0	271.8	0.27	7.08	0.381	1.58	1.20	<0.01	2.15	3.50	1.35	Mn (tot) 2, Fe (tot) 2

Table 46A
Geochemical Field Parameter Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Samples	Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH (std. units)	Mn(II) (mg/L)	Mn(tot) (mg/L)	Mn(IV) (mg/L)	Sulfide (mg/L)†	Fe(II)‡	Fe(tot)‡	Fe(III)	Notes: Dilution factors The dilution factor is 1 unless otherwise noted

Notes:
Estimated Detection Limits (EDLs) provided by HACH in "HACH DR/890 Colorimeter Procedures Manual," Hach Company, 1997-2009. China.
EDLs:
Mn, LR is 0.020 mg/L
Fe is 0.03 mg/L
Sulfide 0.01 mg/L

µS/cm	micro Siemens per centimeters
mg/L	milligrams per liter
std	standard
tot	total
Mn	Manganese
Fe	Iron

Table 46B
Geochemical Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

MNA Analysis Method					SM20 4500NO3-F		EPA 300.0			SM20 2340B	SM 5310B	SM20 2320B				SM20 4500-N D	SM20 4500P-B,E	
Sample	Dup	Location	Work Order	Collect Date	Nitrate	Nitrite	Nitrate	Nitrite	Sulfate	Hardness as CaCO3	Total Organic Carbon	Alkalinity	HCO3 Alkalinity	CO3 Alkalinity	OH Alkalinity	Total Kjeldahl Nitrogen	Total Phosphorus	Methane
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
Onsite Wells																		
Water table groundwater monitoring zone																		
MW-105A		MW-105A	1119659	10/17/2011	<0.0620	<0.0620												
			1119792	10/17/2011					38.0	186	2.05	144	144	<6.20	<6.20	<1.00 UB	<0.0620	79.6
MW-109		MW-109	1119659	10/17/2011	<0.0620	<0.0620												
			1119792	10/20/2011					36.0	172	1.70	145	145	<6.20	<6.20	<1.02 UB	0.0310J	<6.56
MW-110		MW-110	1119666	10/18/2011			<0.0620	<0.0620										
			1119792	10/18/2011					4.56	189	8.05	183	183	<6.20	<6.20	2.23	0.0660	2,290
MW-116		MW-116	1119688	10/20/2011			0.0520J	<0.0620										
			1119792	10/20/2011					0.184	179	22.5	224	224	<6.20	<6.20	<3.46 UB	0.0628	4,880
MW-127		MW-127	1119688	10/20/2011			<0.0620	<0.0620										
			1119792	10/20/2011					30.3	187	3.08	160	160	<6.20	<6.20	<1.00 UB	<0.00620	170
MW-227	Dup	MW-127	1119688	10/20/2011			<0.0620	<0.0620										
			1119792	10/20/2011					30.3	185	2.99	160	160	<6.20	<6.20	<1.00 UB	0.0338J	225
MW-131		MW-131	1119666	10/18/2011			<0.0620	<0.0620										
			1119792	10/18/2011					37.0	196	2.21	167	167	<6.20	<6.20	<1.00 UB	0.0446J	25.3
MW-142		MW-142	1119666	10/18/2011			<0.0620	<0.0620										
			1119792	10/18/2011					12.4	190	4.50	195	195	<6.20	<6.20	<1.00 UB	<0.00620	236
MW-242	Dup	MW-142	1119666	10/18/2011			0.0380J	<0.0620										
			1119792	10/18/2011					12.3	193	4.38	196	196	<6.20	<6.20	<1.09 UB	0.00655J	225
MW-143		MW-143	1119688	10/20/2011			0.0980J	<0.0620										
			1119792	10/20/2011					28.1	211	3.16	185	185	<6.20	<6.20	<1.00 UB	<0.0620	14.3
MW-148A		MW-148A	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					18.1	162	15.4	134	134	<6.20	<6.20	<1.00 UB	<0.310	38.4
MW-180A		MW-180A	1119752	11/4/2011			<0.0620	<0.0620	39.1	195	2.27	145	145	<6.20	<6.20	<1.80 UB	<0.124	<6.56
10-55 feet below water table groundwater monitoring zone																		
MW-105		MW-105	1119659	10/17/2011	<0.0620	<0.0620												
			1119792	10/17/2011					43.4	156	1.12	117	117	<6.20	<6.20	<1.00 UB	<0.0620	<6.56
MW-148B		MW-148B	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					32.5	193	3.30	160	160	<6.20	<6.20	<1.00 UB	<0.124	9.29
MW-180B		MW-180B	1119693	10/24/2011			<0.0620	<0.0620										
			1119694	10/24/2011					44.2	151	<1.13 UB	119	119	<6.20	<6.20	<1.06 UB	0.00479J	<6.56
Offsite Wells																		
Water table groundwater monitoring zone																		
MW-151A		MW-151A	1119623	10/13/2011			<0.0620	<0.0620										
			1119632	10/13/2011					35.6	179	2.92	170	170	<6.20	<6.20	<1.00 UB	0.0383J	
MW-152A		MW-152A	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					38.3	180	2.50	146	146	<6.20	<6.20	0.426J	<0.0620	
MW-156A		MW-156A	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					22.6	260	10.1	237	237	<6.20	<6.20	0.489J	<0.0620	
MW-157		MW-157A	1119615	10/12/2011			0.0610J	<0.0620										
			1119618	10/12/2011					32.6	227	3.41	187	187	<6.20	<6.20	<1.00 UB	<0.0620	

Table 46B
Geochemical Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

MNA Analysis Method					SM20 4500NO3-F		EPA 300.0			SM20 2340B	SM 5310B	SM20 2320B				SM20 4500-N D	SM20 4500P-B,E	
Sample	Dup	Location	Work Order	Collect Date	Nitrate	Nitrite	Nitrate	Nitrite	Sulfate	Hardness as CaCO3	Total Organic Carbon	Alkalinity	HCO3 Alkalinity	CO3 Alkalinity	OH Alkalinity	Total Kjeldahl Nitrogen	Total Phosphorus	Methane
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
MW-158A		MW-158A	1119615	10/12/2011			0.0590J	<0.0620										
			1119618	10/12/2011					17.0	412	34.4	386	386	<6.20	<6.20	<1.58 UB	0.0167	1,230
MW-159		MW-159A	1119608	10/11/2011			1.40	<0.0620										
			1119618	10/11/2011					221	313	5.29	258	258	<6.20	<6.20	<1.00 UB	<0.00620	
MW-161A		MW-161A	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					12.2	262	3.44	256	256	<6.20	<6.20	0.566J	<0.0620	212
MW-261A	Dup	MW-161A	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					11.9	267	4.01	260	260	<6.20	<6.20	0.650J	<0.0620	164
MW-162A		MW-162A	1118978	10/6/2011			0.0820J	<0.0620										
			1118989	10/6/2011					28.3	225	7.94	216	216	<6.20	<6.20	1.02	0.00809J	
MW-163A		MW-163A	1118978	10/6/2011			0.0680J	<0.0620										
			1118989	10/6/2011					30.5	195	3.29	173	173	<6.20	<6.20	0.312J	<0.0620	
MW-164A		MW-164A	1118947	10/3/2011	<0.100 UB	0.0455J												
			1118989	10/3/2011					24.3	235	5.71	207	207	<6.20	<6.20	0.668J	0.0382	
MW-165A		MW-165A	1118967	10/5/2011			0.121	<0.0620										
			1118989	10/5/2011					18.5	168	3.99	144	144	<6.20	<6.20	0.337J	0.00818J	
MW-166A		MW-166A	1118954	10/4/2011			<0.0620	<0.0620										
			1118989	10/4/2011					15.4	290	7.28	187	187	<6.20	<6.20	0.741J	2.19	12.9 JL
MW-167A		MW-167A	1118947	34B	<0.116 UB	0.0340J												
			1118989	10/3/2011					28.5	406	5.87	313	313	<6.20	<6.20	0.412J	<0.0620	
MW-168		MW-168A	1118947	10/3/2011	<0.100 UB	0.107												
			1118989	10/3/2011					22.2	176	3.81	153	153	<6.20	<6.20	0.567J	<0.0620	
MW-170A		MW-170A	1118993	10/8/2011			<0.0620	<0.0620										
			1119618	10/8/2011					26.6	336	8.47	318	318	<6.20	<6.20	<1.10 UB	<0.00620	
MW-270A	Dup	MW-170A	1118993	10/8/2011			<0.0620	<0.0620										
			1119618	10/8/2011					26.0	339	7.31	322	322	<6.20	<6.20	<1.00 UB	0.0136 J	
MW-171A		MW-171A	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					16.5	293	10.7	271	271	<6.20	<6.20	0.539J	<0.0620	
MW-182A		MW-182A	1118947	10/3/2011	<0.100 UB	<0.0620												
			1118989	10/3/2011					14.7	210	5.25	195	195	<6.20	<6.20	0.520J	0.177J	
10-55 feet below water table groundwater monitoring zone																		
MW-151B		MW-151B	1119623	10/13/2011			0.0600J	<0.0620										
			1119632	10/13/2011					36.4	200	2.29	145	145	<6.20	<6.20	<1.00 UB	0.0396J	
MW-152B		MW-152B	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					39.0	182	2.15	141	141	<6.20	<6.20	<0.620	0.0386	
MW-156B		MW-156B	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					34.8	163	1.82	139	139	<6.20	<6.20	<0.620	<0.0620	
MW-161B		MW-161B	1118988	10/7/2011			<0.0620	<0.0620										
			1118989	10/7/2011					23.2	248	3.10	199	199	<6.20	<6.20	0.413J	0.284	

Table 46B
Geochemical Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

MNA Analysis Method					SM20 4500NO3-F		EPA 300.0			SM20 2340B	SM 5310B	SM20 2320B				SM20 4500-N D	SM20 4500P-B,E	
Sample	Dup	Location	Work Order	Collect Date	Nitrate	Nitrite	Nitrate	Nitrite	Sulfate	Hardness as CaCO3	Total Organic Carbon	Alkalinity	HCO3 Alkalinity	CO3 Alkalinity	OH Alkalinity	Total Kjeldahl Nitrogen	Total Phosphorus	Methane
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
MW-162B		MW-162B	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					33.8	176	2.26	152	152	<6.20	<6.20	0.360J	<0.0620	
MW-163B		MW-163B	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					32.5	178	2.50	150	150	<6.20	<6.20	0.441J	0.0333J	
MW-166B		MW-166B	1118954	10/4/2011			<0.0620	<0.0620										
			1118989	10/4/2011					17.1	245	5.16	210	210	<6.20	<6.20	0.557J	0.172	
MW-167B		MW-167B	1118947	10/3/2011	<0.100 UB	0.0560J												
			1118989	10/3/2011					14.4	337	5.48	305	305	<6.20	<6.20	0.577J	<0.0620	
MW-171B		MW-171B	1118978	10/6/2011			<0.0620	<0.0620										
			1118989	10/6/2011					35.9	200	3.35	172	172	<6.20	<6.20	0.349J	<0.00620	

Notes:

EPA	Environmental Protection Agency
mg/L	milligrams per liter
J	Estimated concentration detected above the detection limit and below the limit of quantiation (LOQ) or due to laboratory QC failures
JL	Result biased low due to sample over hold time
UB	Result considered non-detect due to method blank detection; presented as less than the LOQ or reported concentration (higher value).
<LOD	non-detect results are presented as <limit of detection (LOD).
Dup	Duplicate
CaCO3	calcium carbonate
HCO3	bicarbonate
CO3	carbon trioxide
OH	hydroxide

Table 47
Sediment Characterization Data, Isotherm Test
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Units	Replicate Measurement 1	Replicate Measurement 2	Replicate Measurement 3
Total Organic Carbon	**mg/kg**	<0.0544	0.0662	0.0665
Dry Density	**pcf**	127.7	NM	NM
Sulfolane	**mg/kg**	<0.548	<0.546	<0.553

Table 48
Isotherm Test Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Jar ID	Mass Sediment, g	Mass Water, g	Measured sulfolane, ppb	Koc, computed	Kobs, computed
900#1 1/18	900	1100	517	0.68	4.26E-05
900#2 1/19	900	1100	511	0.92	5.74E-05
900#3 1/20	900	1100	498	1.46	9.08E-05
750 #1 1/18	750	1350	535	0.00	0.00E+00
750 #2 1/19	750	1350	515	1.12	6.99E-05
750 #3 1/20	750	1350	496	2.27	1.42E-04
500 #1 1/18	500	1600	516	1.89	1.18E-04
500 #2 1/19	500	1600	524	1.08	6.72E-05
500 #3 1/20	500	1600	462	8.11	5.06E-04
250 #1 1/18	250	1850	526	2.03	1.27E-04
250 #2 1/19	250	1850	527	1.80	1.12E-04
250 #3 1/20	250	1850	481	13.32	8.31E-04

Table 49
Published Koc Values
North Pole Refinery
Flint Hills Resources Alaska, LLC

Parameter	Koc value, L/kg	Reference
Sulfolane	1.1	Shell Chemicals Europe, Limited (1994). Sulfolane Data Sheet
Benzene	58.9	Alaska State Cooperation Working Group, 2006. Three and Four-Phase Partitioning of Petroleum Hydrocarbons and Human Health Risk Calculations.
Toluene	182	
Ethylbenzene	278	
Xylene	368	

Table 50
Isotopic Composition (δ13Carbon) of Sulfolane Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Concentration	Sulfolane $\delta^{13}C$ (‰)	Distance Downgradient from Southern Property Boundary (feet)	Well Screen Interval (feet BGS)	Analytical Laboratory Run #	Notes
Sulfolane product "North Pole"	n/a	-30.9	NA	NA	566	
MW-110	1,150	-30.4	485	13-18	564	
MW-127	141	-30.2	1,985	20-24.5	568, 570	1
MW-142	489	-30.4	2,145	5.4-19.4	561	
MW-148B	284	-30.7	3,285	22-27	565, 574	1
MW-182	24.1	-29.3	16,655	5.7-15.4	571	

Duplicate Analyses		
Analytical Laboratory Run #	**Sample ID**	**Sulfolane $\delta^{13}C$ (‰)**
568	MW-127	-30.5
570	MW-127	-29.9
	Standard Deviation	0.4
565	MW-148B	-30.9
574	MW-148B	-30.4
	Standard Deviation	0.4

Table 50
Isotopic Composition (δ13Carbon) of Sulfolane Analytical Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Analytical Standards		
Analytical Laboratory Run #	**Sample ID**	**Sulfolane δ13C (‰)**
560	Sulfolane Standard	-27.5
562	Sulfolane Standard	-28.1
563	Sulfolane Standard	-28.3
567	Sulfolane Standard	-27.9
569	Sulfolane Standard	-28.3
572	Sulfolane Standard	-27.2
	Sulfolane δ13C Average	-27.9
	Standard Deviation (n=6)	0.4
	Maximum Standard Deviation (n=2)	0.8

Notes:

[1] Sample duplicates were analyzed; the average was used for the CSIA evaluation.

University of Oklahoma project numbers: 542 and 549
‰ = per mil
BGS = below ground surface
NA = not applicable

Table 51
Subpermafrost and Suprapermafrost Groundwater Geochemistry
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Screen Bottom Depth	Permafrost Depth When Well Installed	Sulfolane	Temperature	Conductivity	pH	DO	ORP	Fe (total)	Fe(II)	Mn (total)	Mn(II)	Mercury	Antimony	Arsenic	Barium
	(feet bgs)	(feet bgs)	(mg/L)	(°C)	(µS/cm)	(std. units)	(mg/L)	(mV)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Area 1																
A1-1	>215	6 to 215	0.154	0.9	225	7.38	2.9	-86.5	8.5	7.7	14.6	3.5	<0.200	<1.00	<5.00	207
MW-162A	15.2		0.0959	0.4	304	6.88	0.3	4.8	11.8	11.1	70	11.6	<0.200	<1.00	28.4	238
MW-162B	64.7	67.5	0.0802	0.1	208	7.10	0.2	49.2	0.03	<0.02	11.9	5.4	<0.200	<1.00	<5.00	76.9
MW-262A†			0.0819	---	---	---	---	---	---	---	---	---	<0.200	<1.00	27.0	237
Area 2																
A2-1	>100		0.0680	1.6	195	7.26	2.0	-22.3	3.0	2.34	9.1	2.2	<0.200	<1.00	5.55	102
A2-2			0.0829	---	---	---	---	---	---	---	---	---	<0.200	<1.00	5.71	102
A2-3 (not sampled)	<40	ca. 40	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A2-4	<40	ca. 40	<0.0111	1.3	228	7.17	1.3	-9.0	4.6	2.78	11.5	1.6	<0.200	<1.00	14.1	105
A2-5	<40	ca. 40	<0.0103	1.3	214	7.52	2.7	-19.1	3.8	2.78	14.1	4.1	<0.200	<1.00	13.7	94.4
MW-163A	15.2		0.0449	0.5	208	7.07	0.44	290.4	0.23	0.15	8.7	3.1	<0.200	<1.00	<5.00	61.7
MW-163B	39.9	40	0.0589	0.1	190	7.40	0.20	200.2	1.24	0.92	8.8	2.9	<0.200	<1.00	8.00	70.4
MW-171A	14.8		<0.0103	0.9	271	6.74	0.43	54.6	4.0	0.05	1.05	0.361	<0.200	<1.00	<5.00	107
MW-171B	39.7	42	<0.0107	0.4	266	6.71	0.29	-30.8	6.3	1.34	1.05	0.236	<0.200	<1.00	18.5	90.6
Area 3																
A3-1 (not sampled)	>180	12 to 180	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A3-2	>230	8 to 230	0.0118	2.6	222	6.90	1.6	42.3	4.7	3.24	12.8	4.4	<0.200	<1.00	11.3	165
A3-3	>120	3 to 120	0.0199	2.8	203	7.57	2.1	-34.0	2.9	2.83	10.1	1.7	<0.200	<1.00	5.65	135
MW-164A	15.2		0.0997	0.4	255	7.33	0.30	-43.7	6.7	2.18	1.43	0.351	<0.200	<1.00	15.9	97.5
MW-164B	50.1		0.0813	0.2	231	7.46	0.21	-24.4	1.62	1.51	1.7	0.489	<0.200	<1.00	5.19	129
EB-164A§			<0.0111	---	---	---	---	---	---	---	---	---	---	---	---	---
Additional Wells to Assess Suprapermafrost Geochemistry																
MW-158A	15.2		0.101	1.1	373	6.42	0.46	-14.0	8.9	2.1	2.55	0.583	<0.200	<1.00	7.89	267
MW-158B	60.1		0.118	0.5	217	7.19	0.22	43.1	0.02	0.02	1.33	0.201	<0.200	<1.00	<5.00	67.7
MW-167A	15.4		<0.0102	0.1	511	6.99	0.51	243.2	3.4	2.65	24	9.2	<0.200	<1.00	5.79	193
MW-167B	33.2		<0.0103	0.1	487	7.01	0.29	321.9	0.70	0.65	35	15.8	<0.200	<1.00	<5.00	210

Notes:
Temperature, conductivity, pH, dissolved oxygen, and oxidation/reduction potential measured with field meter.
Total and reduced iron (Fe) and manganese (Mn) measured in field using Hach Co. DR/2010 meter and reagents.
Other analytes determined by SGS Environmental Services, Inc.
--- = Analyte not measured or measurement not taken.
JL = Sample result biased low due to low matrix spike recovery
† Duplicate sample for MW-162A
‡ Duplicate sample for 2845 Horseshoe Way
§ EB-164A is a sulfolane equipment blank.

Table 51
Subpermafrost and Suprapermafrost Groundwater Geochemistry
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Screen Bottom Depth	Permafrost Depth When Well Installed	Beryllium	Cadmium	Calcium	Chromium	Copper	Magnesium	Nickel	Selenium	Silver	Sodium	Thallium	Zinc	Potassium	Chloride
	(feet bgs)	(feet bgs)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(mg/L)
Area 1																
A1-1	>215	6 to 215	<0.400	<0.500	48100	<2.00	34.8	11100	<2.00	<5.00	<1.00	10600	<1.00	<5.00	4020	11.6
MW-162A	15.2		<0.400	<0.500	57200	<2.00	2.61	19000	2.94	<5.00	<1.00	14100	<1.00	<5.00	6540	16.7
MW-162B	64.7	67.5	<0.400	<0.500	46500	<2.00	1.68	13300	<2.00	<5.00	<1.00	8290	<1.00	<5.00	3510	5.78
MW-262A†			<0.400	<0.500	56700	<2.00	2.23	18300	2.7	<5.00	<1.00	13800	<1.00	<5.00	6390	16.9
Area 2																
A2-1	>100		<0.400	<0.500	39800	<2.00	56.7	8990	<2.00	<5.00	<1.00	4130	<1.00	17.6	2950	3.19
A2-2			<0.400	<0.500	41100	<2.00	69.0	9010	<2.00	<5.00	<1.00	4170	<1.00	21.8	3010	3.23
A2-3 (not sampled)	<40	ca. 40	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A2-4	<40	ca. 40	<0.400	<0.500	44800	<2.00	80.5	10800	<2.00	<5.00	<1.00	5010	<1.00	10.2	3240	3.75
A2-5	<40	ca. 40	<0.400	<0.500	45200	<2.00	<1.00	11000	2.09	<5.00	<1.00	5220	<1.00	61.2	3160	4.16
MW-163A	15.2		<0.400	<0.500	43500	<2.00	2.14	17400	3.35	<5.00	<1.00	5080	<1.00	<5.00	2890	2.63
MW-163B	39.9	40	<0.400	<0.500	44700	<2.00	<1.00	13900	<2.00	<5.00	<1.00	5080	<1.00	<5.00	2960	2.61
MW-171A	14.8		<0.400	0.541	61500	2.19	10.8	18300	9.57	<5.00	<1.00	5540	<1.00	9.17	3920	4.84
MW-171B	39.7	42	<0.400	<0.500	55500	<2.00	1.08	16200	2.85	<5.00	<1.00	5820	<1.00	<5.00	3430	4.95
Area 3																
A3-1 (not sampled)	>180	12 to 180	---	---	---	---	---	---	---	---	---	---	---	---	---	---
A3-2	>230	8 to 230	<0.400	<0.500	47900	7.09	164	10500	6.83	<5.00	<1.00	4150	<1.00	1000	3460	8.59
A3-3	>120	3 to 120	<0.400	<0.500	43700	<2.00	<1.00	8970	<2.00	<5.00	<1.00	3880	<1.00	50.5	3120	10.4
MW-164A	15.2		<0.400	<0.500	54400	<2.00	<1.00	19200	<2.00	<5.00	<1.00	6990	<1.00	<5.00	3370	5.66
MW-164B	50.1		<0.400	<0.500	49500	<2.00	1.18	15600	<2.00	<5.00	<1.00	6520	<1.00	<5.00	3440	5.39
EB-164A§			---	---	---	---	---	---	---	---	---	---	---	---	---	---
Additional Wells to Assess Suprapermafrost Ge																
MW-158A	15.2		<0.400	<0.500	80900	<2.00	1.57	27200	8.06	<5.00	<1.00	14000	<1.00	<5.00	5320	19.9
MW-158B	60.1		<0.400	<0.500	45700	<2.00	1.35	12800	<2.00	<5.00	<1.00	10400	<1.00	<5.00	3360	11.3
MW-167A	15.4		<0.400	<0.500	91900	<2.00	4.78	32900	8.38	<5.00	<1.00	43700	<1.00	<5.00	6980	116
MW-167B	33.2		<0.400	<0.500	85100	<2.00	7.28	26800	6.84	<5.00	<1.00	47400	<1.00	<5.00	6520	114

Table 51
Subpermafrost and Suprapermafrost Groundwater Geochemistry
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Screen Bottom Depth	Permafrost Depth When Well Installed	Fluoride	Nitrate-N	Sulfate	Total Organic Carbon	Alkalinity	HCO3 Alkalinity	CO3 Alkalinity	OH Alkalinity	pH	Ammonia-N	Total Phosphorus
	(feet bgs)	(feet bgs)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(std. units)	(mg/L)	(mg/L)
Area 1													
A1-1	>215	6 to 215	0.102	<0.100	26.3	2.87	156	156	<10.0	<10.0	7.6	<0.100	<0.0100
MW-162A	15.2		0.129	<0.100	34.9	6.54	203	203	<10.0	<10.0	7.4	0.863	0.0831
MW-162B	64.7	67.5	0.139	<0.100	32.6 JL	2.17	161	161	<10.0	<10.0	7.7	0.186	<0.100
MW-262A†			0.13	<0.100	34.8	6.46	204	204	<10.0	<10.0	7.4	0.856	0.0788
Area 2													
A2-1	>100		0.125	<0.100	30.0	1.53	122	122	<10.0	<10.0	7.8	<0.100	0.0295
A2-2			0.123	<0.100	30.0	1.57	123	123	<10.0	<10.0	7.8	<0.100	0.0281
A2-3 (not sampled)	<40	ca. 40	---	---	---	---	---	---	---	---	---	---	---
A2-4	<40	ca. 40	0.128	<0.100	33.4	2.63	156	156	<10.0	<10.0	7.5	<0.100	<0.0100
A2-5	<40	ca. 40	0.128	<0.100	33.1	2.63	162	162	<10.0	<10.0	7.5	<0.100	<0.100
MW-163A	15.2		0.146	<0.100	31.9	2.72	175	175	<10.0	<10.0	7.4	<0.100	<0.100
MW-163B	39.9	40	0.141	<0.100	31.5	2.31	156	156	<10.0	<10.0	7.7	<0.100	<0.100
MW-171A	14.8		0.137	<0.100	29.9	7.00	209	209	<10.0	<10.0	7.4	<0.100	<0.0100
MW-171B	39.7	42	0.121	<0.100	33.6	4.07	193	193	<10.0	<10.0	7.4	<0.100	0.0146
Area 3													
A3-1 (not sampled)	>180	12 to 180	---	---	---	---	---	---	---	---	---	---	---
A3-2	>230	8 to 230	0.123	<0.100	20.8	4.05	152	152	<10.0	<10.0	7.6	<0.100	0.149
A3-3	>120	3 to 120	0.121	<0.100	26.0	1.71	137	137	<10.0	<10.0	7.6	<0.100	0.0253
MW-164A	15.2		0.134	<0.100	25.7	4.62	203	203	<10.0	<10.0	7.5	0.221	0.0545
MW-164B	50.1		0.113	<0.100	28.1	3.48	186	186	<10.0	<10.0	7.6	0.154	<0.0100
EB-164A§			---	---	---	---	---	---	---	---	---	---	---
Additional Wells to Assess Suprapermafrost Ge													
MW-158A	15.2		0.122	<0.100	31.8	16.8	286	286	<10.0	<10.0	7.2	0.471	0.0109
MW-158B	60.1		0.137	<0.100	32.3	2.05	153	153	<10.0	<10.0	7.8	<0.100	<0.100
MW-167A	15.4		0.125	<0.100	20.3	6.25	322	322	<10.0	<10.0	7.3	0.170	0.0293
MW-167B	33.2		0.112	<0.100	14.6	5.82	317	317	<10.0	<10.0	7.4	0.332	<0.100

Table 52
Gravel Pit and Surface Water Sampling Results
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method	SW8270D
Analyte	Sulfolane
Sample ID	ug/L
North Gravel Pit	<10.0
South Gravel Pit	<10.0
Surface-001	<10.2

Table 53
Soil Analytical Results - Pore Water Locations, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	**Pore-5 (3-4 ft)**	**Pore-5 (pile)**
Collection Date	**12/08/11**	**12/08/11**
Units	**ug/kg**	**ug/kg**
BTEX by EPA 8021B		
Benzene	< 13.2	< 11.6
Toluene	< 25.6	< 22.6
Ethylbenzene	< 25.6	< 22.6
o-Xylene	< 25.6	< 22.6
P & M -Xylene	< 49.4	< 43.4
Sulfolane by EPA 8270D modified w/Isotope Dilution		
Sulfolane	< 7.44	< 7.12
PAHs by EPA 8270D SIMS		
Naphthalene	< 3.58	< 3.42
2-Methylnaphthalene	< 3.58	< 3.42
1-Methylnaphthalene	< 3.58	< 3.42
Acenaphthylene	< 3.58	< 3.42
Acenaphthene	< 3.58	< 3.42
Fluorene	< 3.58	< 3.42
Phenanthrene	< 3.58	< 3.42
Anthracene	< 3.58	< 3.42
Fluoranthene	< 3.58	< 3.42
Pyrene	< 3.58	< 3.42
Benzo(a)Anthracene	< 3.58	< 3.42
Chrysene	< 3.58	< 3.42
Benzo[b]Fluoranthene	< 3.58	< 3.42
Benzo[k]fluoranthene	< 3.58	< 3.42
Benzo[a]pyrene	< 3.58	< 3.42
Indeno[1,2,3-c,d] pyrene	< 3.58	< 3.42
Dibenzo[a,h]anthracene	< 3.58	< 3.42
Benzo[g,h,i]perylene	< 3.58	< 3.42

Notes:
The above-listed soil samples were collected from the HC gravel pit.

µg/kg micrograms per kilogram
< LOD non-detect results are presented as less than the limit of detection (LOD).
BTEX Benzene, Toluene, Ethylbenzene, and Xylenes
PAH Polynuclear Aromatic Hydrocarbons
EPA Environmental Protection Agency

Table 54
Pore Water Analytical Results, Fourth Quarter 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample ID	Dup	Location	Collection Date	Sulfolane by EPA 1625B with Isotope Dilution
				ug/L
Pore-1		Pore-1	12/13/11	407
Pore-9	Dup	Pore-1	12/13/11	414
Pore-5		Pore-5	12/13/2011	< 6.20

Notes:

µg/L	micrograms per liter
< LOD	non-detect results are presented as less than the limit of detection (LOD).
EPA	Environmental Protection Agency
Dup	Duplicate

Table 55
Remediation System Operation-Groundwater Recovery
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Monthly Total (gallons)	Monthly Average (gallons / day)	Monthly Average (gallons / minute)
January 2009	5,637,292	181,848	126
February 2009	4,965,414	177,336	123
March 2009	5,673,504	183,016	127
April 2009	5,845,823	194,861	135
May 2009	6,430,915	207,449	144
June 2009	6,229,883	207,663	144
July 2009	6,316,965	203,773	142
August 2009	6,243,319	201,397	140
September 2009	10,634,423	354,481	246
October 2009	5,114,811	164,994	115
November 2009	0	0	0
December 2009	6,153,173	198,489	138
January 2010	8,676,601	279,890	194
February 2010	9,185,582	328,057	228
March 2010	9,424,363	304,012	211
April 2010	9,914,262	330,475	229
May 2010	9,812,735	316,540	220
June 2010	9,282,464	309,415	215
July 2010	9,325,475	300,822	209
August 2010	9,872,250	318,460	221
September 2010	9,122,386	304,080	211
October 2010	7,700,526	248,404	173
November 2010	7,489,601	249,653	173
December 2010	7,279,463	234,821	163
January 2011	8,605,402	277,594	193
February 2011	7,409,928	264,640	184
March 2011	7,144,062	230,454	160
April 2011	8,034,008	267,800	186
May 2011	8,076,367	260,528	181
June 2011	9,735,245	324,508	225
July 2011	11,838,286	381,880	265
August 2011	12,119,042	390,937	271
September 2011	15,458,620	515,287	358
October 2011	15,492,362	499,754	347
November 2011	16,279,722	542,657	377
December 2011	16,711,381	539,077	374

Table 56
Groundwater Recovery System
Sulfolane Mass Recovery
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date	Groundwater Recovery (gpm)	Recovered Sulfolane Concentration (ug/L)*	Sulfolane Mass Recovery (lb/day)
1/24/2011	191.54	180 J	0.41
2/17/2011	197.52	166	0.39
3/16/2011	147.44	160	0.28
4/15/2011	176.38	168	0.36
5/13/2011	232.88	111	0.31
6/12/2011	240.91	188	0.54
7/2/2011	269.74	207	0.67
7/15/2011	251.05	169	0.51
8/3/2011	323.06	101	0.39
9/13/2011	378.51	142	0.65
9/29/2011	387.78	120	0.56
10/13/2011	387.43	139	0.65
10/27/2011	338.28	123	0.50
11/9/2011	415.33	141	0.70
11/21/2011	356.38	119	0.51
12/1/2011	361.48	115	0.50
12/14/2011	363.72	105	0.46
		Average	0.49

notes:

J: Result estimated (imprecise) due to LCS/LCSD RPD failure

*: As measured at the combined air stripper influent

Table 57
2011 LNAPL Recovery
North Pole Refinery
Flint Hills Resources Alaska, LLC

All units in gallons

2011	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
MW-138	0.0	44.0	0.0	29.3	0.0	0.0	0.0	0.0	0.0	30.0	0.0	41.0	144.3
O-2	***	***	***	***	***	0.0	0.0	0.0	0.0	0.0	176.0	0.0	176.0
R-18	0.0	2.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2
R-20-R	***	***	***	***	***	0.0	0.0	0.0	14.0	0.0	20.0	0.0	34.0
R-21	39.4	119.1	210.0	145.6	77.9	42.4	28.2	6.5	0.0	780.0	477.0	328.0	2254.2
R-32	0.0	10.3	0.0	10.5	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.9
R-33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	10.0
R-34	0.0	0.0	0.0	2.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5
R-35-R	0.0	0.0	0.0	0.4	3.2	0.0	3.6	0.0	0.0	69.0	52.0	72.6	200.9
R-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	16.0	5.5	46.1
R-40	0.0	5.0	0.0	17.2	1.2	0.0	5.0	0.0	85.0	123.0	58.0	55.4	349.8
S-50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coalescer	23.0	26.5	3.0	3.0	0.0	0.0	0.0	0.0	29.0	117.0	147.5	5.5	354.5
TOTAL	62.4	206.9	213.0	211.7	87.5	42.4	36.8	6.5	128.0	1153.6	946.5	508.0	3603.4

*****Well not installed at this time.**

Note: This summary includes only product that has been recovered for recycling. Product has been recovered from locations such as R-34, but has not yet been removed from the storage tank for recycling and is thus not included in the table.

Table 58
Annual LNAPL Recovery
North Pole Refinery
Flint Hills Resources Alaska, LLC

Well ID	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Well Total (gallons)
R-1	3,243	1,165	340	218	60	35	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Removed July 2008				**5,086**
R-2	1,538	1,546	175	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**3,299**
R-3	39	313	0	42	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**419**
R-4	412	430	110	148	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1,140**
R-5&5A	4,170	3,606	978	1,464	1,115	447	316	209	141	321	175	236	222	25	0	0	0	0	0	0	0	0	0	0	0	0	**13,425**
R-6	25	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Removed October 2009			**80**
R-7 & 8	14,216	17,108	67	809	1,438	575	1,793	1,693	385	250	0	Removed															**38,334**
R-9	11,011	22,378	744	479	385	510	1,036	565	106	71	23	25	29	12	0	0	0	0	0	0	0	0	0	5	2	0	**37,381**
R-10&10A	2,558	5,271	200	352	280	127	0	20	0	0	0	0	0	0	0	0	0	0	0	Removed May 2005							**8,808**
R-11	15,796	14,920	724	241	190	5	0	317	444	117	0	0	0	11	0	0	0	0	0	Removed May 2005							**32,765**
R-12	4,099	0	80	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4,230**
R-13	1,044	3,563	79	177	55	0	27	15	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**5,022**
R-14	4,664	773	125	341	344	48	116	182	96	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6,812**
R-18	0	1,955	5,128	13	0	10	17	0	151	30	0	25	0	0	1	2	0	0	0	0	0	0	0	7	29	5	**7,373**
R-19	0	6,106	1,623	106	90	30	138	496	205	9	0	0	0	0	2	0	0	0	0	0	0	0	0	12	14	0	**8,831**
R-20/R-20R	0	5,165	28,603	46	281	2,443	2,193	1,131	296	69	123	112	88	115	33	56	16	0	94	46	100	87	49	50	48	34	**41,278**
R-21	0	4,859	46,028	767	422	175	370	5,993	6,621	1,441	2,154	1,118	3,364	737	314	207	112	303	786	1,225	157	6,489	2,799	92	2,403	2,254	**91,189**
R-22	0	0	411	136	45	101	775	34	0	64	26	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	**1,593**
R-23	0	210	147	0	0	15	7	183	71	33	12	5	0	0	0	0	0	0	0	Removed May 2005							**683**
R-24	0	1,070	109	30	0	30	18	254	156	5	40	0	0	0	0	0	0	0	0	Removed May 2005							**1,712**
R-25	0	435	44	20	30	70	91	227	177	62	40	62	5	0	21	0	0	0	0	Removed May 2005							**1,284**
R-26	0	0	26	73	157	149	79	57	47	13	12	2	0	0	0	0	0	0	0	Removed May 2005							**615**
R-27	0	460	477	120	305	124	68	25	55	26	0	9	54	11	3	0	0	0	0	Removed May 2005							**1,737**
R-28	0	35	14	10	78	0	48	40	0	7	0	0	0	0	0	0	0	0	0	Removed May 2005							**232**
R-29	0	0	6	0	0	0	0	40	21	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	0	**75**
R-30	0	0	10	0	0	0	0	0	26	21	0	14	5	0	0	0	0	0	0	0	0	0	0	3	3	0	**82**
R-31	0	2,255	3,452	269	110	350	316	340	343	20	52	85	110	0	6	0	0	0	0	0	0	0	0	0	0	0	**7,708**
R-32	0	7,360	5,498	394	543	1,089	1,242	1,074	1,642	555	118	315	602	141	18	56	0	0	0	0	0	0	0	55	318	25	**21,044**
R-33	0	0	162	47	290	685	19	112	50	0	25	22	0	0	0	0	0	0	0	0	0	0	0	12	0	10	**1,434**
R-34	0	0	201	1,216	4,922	2,734	4,208	3,177	5,923	3,077	508	193	200	407	190	5	155	110	502	327	913	201	0	11	43	4	**29,225**
R-35/R-35R	0	0	22	37	1,042	2,659	740	468	26	0	0	0	0	0	4	5	0	0	13	0	0	0	0	18	234	201	**5,469**
R-36	0	0	20	23	0	0	191	261	491	0	26	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1,016**
R-37	0	0	8	15	65	1,147	297	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1,532**
R-38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
R-39	0	0	0	0	50	336	40	68	27	0	0	1,261	1,090	6	61	7	4	9	1	4	21	0	58	2	33	46	**3,124**
R-40	0	0	0	0	0	141	128	27	0	0	0	0	0	0	28	173	85	85	106	27	211	58	253	46	19	350	**1,736**
MW-138													Installed April 2001			0	0	76	352	469	365	367	187	321	216	144	**2,497**
S-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
S-27	0	0	0	0	0	0	0	0	0	0	340	0	0	2	1	0	4	0	0	Removed May 2005							**347**
S-28	0	0	0	0	0	0	0	0	0	0	44	0	0	0	1	3	1	0	0	Removed May 2005							**49**
S-33	0	0	0	0	0	4	0	0	0	28	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	**37**
S-34	0	0	0	0	0	0	0	0	0	0	38	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**43**
S-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	**53**
S-42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	**6**
S-43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
S-44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	**4**
S-45	0	0	0	0	0	0	0	0	0	0	0	Removed 1997															**0**
S-46	0	0	0	0	0	0	0	0	0	0	50	21	0	Removed May 1999													**71**
S-47	0	0	0	0	0	0	0	0	0	0	92	9	0	0	1	2	0	0	0	0	0	0	0	0	0	0	**104**
S-48	0	0	0	0	0	0	0	0	0	0	225	44	0	0	1	2	0	0	0	0	0	0	0	0	0	0	**272**
S-49	0	0	0	0	0	0	0	0	0	0	450	401	181	38	0	1	0	0	0	0	0	0	0	0	0	0	**1,071**
S-50	0	0	0	0	0	0	0	0	0	0	0	9	0	0	3	4	4	0	0	0	0	0	0	1	4	0	**25**
S-51	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	1	4	0	0	0	0	0	0	1	0	0	**71**
S-52	0	0	0	0	0	0	0	0	0	0	0	70	22	0	3	6	6	0	0	0	0	0	0	0	1	0	**108**
O-2																							Installed September 2010			176	**176**
Coalescer																						Installed December 2009			264	355	**618**
Annual Total	**62,815**	**101,038**	**95,611**	**7,684**	**12,342**	**14,059**	**14,298**	**17,008**	**17,562**	**6,342**	**4,573**	**4,111**	**5,972**	**1,505**	**703**	**537**	**393**	**583**	**1,854**	**2,150**	**1,767**	**7,201**	**3,345**	**635**	**3,634**	**3,603**	**391,325**

Table 59
Remediation System Operation-Air Stripper Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method / Analyte	JANUARY 2011 Combined Influent (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Combined Effluent (µg/L)	Percent Removal (%)	FEBRUARY 2011 Combined Influent (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Combined Effluent (µg/L)	Percent Removal (%)	MARCH 2011 Combined Influent (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Combined Effluent (µg/L)	Percent Removal (%)
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes															
Benzene	**73.1**	<0.400	<0.400	<0.400	>99.45	**66.7**	<0.400	0.8	<0.400	>99.40	**57.3**	<0.400	<0.400	<0.400	>99.30
Toluene	**30.0**	<1.00	<1.00	<1.00	>96.67	**17.5**	<1.00	1.9	<1.00	>94.29	**32.8**	<1.00	<1.00	<1.00	>96.95
Ethylbenzene	**29.1**	<1.00	<1.00	<1.00	>96.56	**17.7**	<1.00	<1.00	<1.00	>94.35	**16.3**	<1.00	<1.00	<1.00	>93.87
P & M -Xylene	**127**	<2.00	<2.00	<2.00	>98.43	**80.9**	<2.00	<2.00	<2.00	>97.53	**76.9**	<2.00	<2.00	<2.00	>97.40
o-Xylene	**32.6**	<1.00	<1.00	<1.00	>96.93	**18.1**	<1.00	<1.00	<1.00	>94.48	**19.5**	<1.00	<1.00	<1.00	>94.87
EPA 625M-SIMS - Polyaromatic Hydrocarbons															
Naphthalene	**8.91**	0.436	<0.105	<0.103	>98.84	**4.01**	<0.114	<0.101	<0.115	>97.13	**4.19**	<0.104	<0.102	<0.103	>97.54
Acenaphthylene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Acenaphthene	**0.136**	<0.0562	<0.0562	<0.0513	>62.30	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Fluorene	**0.356**	0.139	0.0965	0.125	64.89	0.0922	<0.0568	<0.0505	<0.0575	>37.64	0.0972	<0.0518	<0.0510	<0.0515	>47.02
Phenanthrene	**0.300**	0.077	<0.0562	0.0531	82.30	0.0660	<0.0568	<0.0505	<0.0575	>12.88	0.0638	<0.0518	<0.0510	<0.0515	>19.28
Anthracene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Fluoranthene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Pyrene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Benzo(a)Anthracene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Chrysene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Benzo[b]Fluoranthene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Benzo[k]fluoranthene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Benzo[a]pyrene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Indeno[1,2,3-c,d] pyrene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Dibenzo[a,h]anthracene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
Benzo[g,h,i]perylene	<0.0562	<0.0562	<0.0562	<0.0513	ND	<0.0505	<0.0568	<0.0505	<0.0575	ND	<0.0515	<0.0518	<0.0510	<0.0515	ND
SW8270D - Sulfolane															
Sulfolane	**180 J**	--	--	**88.2 J**	51.00	**166**	--	--	**82.9**	50.06	**160**	--	--	**75.0**	53.13

Notes:

-- Sample not analyzed for analyte
µg/L micrograms per liter
Bold Result or LOQ exceeds ADEC interim remediation goal (sulfolane), or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
J Result estimated (imprecise) due to LCS/LCSD RPD failure

Table 59
Remediation System Operation-Air Stripper Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method / Analyte	APRIL 2011							MAY 2011					JUNE 2011					
	Combined Influent (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Gallery Pond Effluent (µg/L)	Percent Removal (%)	MW-106 (µg/L)	MW-141 (µg/L)	Combined Influent (µg/L)	Air Stripper Effluent (A Tower) (µg/L)	Air Stripper Effluent (B Tower) (µg/L)	Gallery Pond Effluent (µg/L)	Percent Removal (%)	Combined Influent (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	GAC Vessel A Influent (A Tower) (µg/L)	Final Effluent (µg/L)	Percent Removal (%)
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes																		
Benzene	**63.3**	0.5	0.6	<0.400	>99.37	<0.400	<0.400	**48.8**	0.880	0.480	0.510	98.95	**61.9**	<0.400	0.410	<0.400	<0.400	>99.35
Toluene	**34.5**	<1.00	<1.00	<1.00	>97.10	<1.00	<1.00	**33.8**	<1.00	<1.00	<1.00	>97.04	**44.8**	1.69	1.74	<1.00	<1.00	>97.77
Ethylbenzene	**16.6**	<1.00	<1.00	<1.00	>93.98	<1.00	<1.00	**25.6**	<1.00	<1.00	<1.00	>96.09	**29.9**	<1.00	<1.00	<1.00	<1.00	>96.66
P & M -Xylene	**83**	<2.00	<2.00	<2.00	>97.59	<2.00	<2.00	**107**	2.14	<2.00	<2.00	>98.13	**99.9**	<2.00	<2.00	<2.00	<2.00	>98.00
o-Xylene	**21**	<1.00	<1.00	<1.00	>95.924	<1.00	<1.00	**25.8**	1.22	<1.00	<1.00	>96.12	**27.3**	<1.00	<1.00	<1.00	<1.00	>96.34
Xylenes (Total)						<2.00	<2.00											
1,2,4-Trimethylbenzene						<1.00	<1.00											
EPA 625M-SIMS - Polyaromatic Hydrocarbons																		
Naphthalene	**4.26**	<0.104	<0.106	<0.111	>97.39	<0.118	<0.103	**3.31**	0.960	<0.114	0.183	94.47	**3.70**	1.78	1.65	1.76	<0.100	97.3
Acenaphthylene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Acenaphthene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Fluorene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	0.082	<0.0543	<0.0568	<0.0538	>34.39	**0.0807**	0.0735	0.0712	0.0722	<0.0500	>38.04
Phenanthrene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Anthracene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Fluoranthene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Pyrene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Benzo(a)Anthracene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Chrysene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Benzo[b]Fluoranthene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Benzo[k]fluoranthene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Benzo[a]pyrene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Indeno[1,2,3-c,d] pyrene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Dibenzo[a,h]anthracene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
Benzo[g,h,i]perylene	<0.562	<0.0521	<0.0532	<0.0556	ND	<0.0588	<0.0515	<0.0521	<0.0543	<0.0568	<0.0538	ND	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	ND
SW8270D - Sulfolane																		
Sulfolane	**168**	--	--	13.4	92.02	<10.9	<10.5	**111**	--	--	**133**	0	**188**	--	--	**186**	<10.0	>94.68

Notes:

-- Sample not analyzed for analyte
µg/L micrograms per liter
Bold Result or LOQ exceeds ADEC interim remediation goal (sulfolane), or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
J Result estimated (imprecise) due to LCS/LCSD RPD failure

Table 59
Remediation System Operation-Air Stripper Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method / Analyte	JULY 2011 Combined Influent (µg/L)	JULY 2011 Air Stripper Effluent (C Tower) (µg/L)	JULY 2011 Air Stripper Effluent (D Tower) (µg/L)	JULY 2011 Final Effluent (µg/L)	JULY 2011 Percent Removal (%)	AUGUST 2011 Combined Influent (µg/L)	AUGUST 2011 Air Stripper Effluent (A Tower) (µg/L)	AUGUST 2011 Air Stripper Effluent (B Tower) (µg/L)	AUGUST 2011 Final Effluent (µg/L)	AUGUST 2011 Percent Removal (%)	SEPTEMBER 2011 Combined Influent (µg/L)	SEPTEMBER 2011 Air Stripper Effluent (A Tower) (µg/L)	SEPTEMBER 2011 Air Stripper Effluent (B Tower) (µg/L)	SEPTEMBER 2011 Final Effluent (µg/L)	SEPTEMBER 2011 Percent Removal (%)
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes															
Benzene	**73.4**	<0.400	<0.400	<0.400	>99.46	**60.8**	**3.000**	**1.870**	<0.400	>99.34	**145.0**	**14.6**	**2.970**	<0.400	>99.72
Toluene	**56.9**	1.1	<1.00	<1.00	>98.24	**27.3**	**1.6**	**0.970 J**	<1.00	>96.34	**344.0**	**28.70**	**5.59**	<1.00	>99.71
Ethylbenzene	**39.2**	<1.00	<1.00	<1.00	>97.45	**26.4**	**1.2**	**0.820 J**	<1.00	>96.21	**72.0**	**5.9**	**1.1**	<1.00	>98.61
P & M -Xylene	**129**	<2.00	<2.00	<2.00	>98.45	**90.9**	**5.33**	**3.2**	<2.00	>97.80	**349.0**	**38.1**	**6.6**	<2.00	>99.43
o-Xylene	**38.9**	<1.00	<1.00	<1.00	>97.43	**22.4**	**2.77**	**1.3**	<1.00	>95.54	**150**	**26.4**	**4.47**	<1.00	>99.33
1,2,4-Trimethylbenzene	**26.8**	<1.00	<1.00	<1.00	>96.27	**20.4**	**2.85**	**1.28**	<1.00	>95.10	**124**	**24.8**	**4.05**	<1.00	>99.19
EPA 625M-SIMS - Polyaromatic Hydrocarbons															
Naphthalene	**6.81**	<0.102	<0.100	<0.100	>98.53	**6.74**	**2.610**	**1.61**	<0.108	>98.40	**16.00**	**12.5**	**7.15**	<0.0620	>99.61
Acenaphthylene	**0.0877**	<0.0510	<0.0500	<0.0500	>42.99	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Acenaphthene	**0.0659**	<0.0510	<0.0500	<0.0500	>24.13	<0.0556	<0.0532	<0.0500	<0.0538	ND	**0.16**	**0.149**	**0.115**	<0.0300	>81.25
Fluorene	**0.134**	0.0815	0.0505	<0.0500	>62.69	**0.0755**	**0.0592**	**0.0638**	<0.0538	>28.74	**0.686**	**0.648**	**0.601**	<0.0300	>95.63
Phenanthrene	<0.0500	<0.0510	<0.0500	<0.0500	ND	**0.0281 J**	**0.0239 J**	**0.0251 J**	<0.0538	ND	**0.774**	**0.723**	**0.663**	<0.0300	>96.12
Anthracene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	**0.0240 J**	<0.0300	ND
Fluoranthene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Pyrene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Benzo(a)Anthracene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Chrysene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Benzo[b]Fluoranthene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Benzo[k]fluoranthene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Benzo[a]pyrene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Indeno[1,2,3-c,d] pyrene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Dibenzo[a,h]anthracene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
Benzo[g,h,i]perylene	<0.0500	<0.0510	<0.0500	<0.0500	ND	<0.0556	<0.0532	<0.0500	<0.0538	ND	<0.0300	<0.0300	<0.0300	<0.0300	ND
EPA 1625B with Isotope Dilution - Sulfolane															
Sulfolane	**169**	**120**	**94.7**	<10.0	>94.08	**139 JL**	--	--	<10.0	>92.81	**18.5 JL**	--	--	<10.0	>45.95

Notes: Sample not analyzed for analyte
µg/L micrograms per liter
JL Result biased low due high recovery of internal standard used to correct data.
J Estimated result below the laboratory limit of quantitation (LOQ)
Bold Result or LOQ exceeds ADEC interim remediation goal (sulfolane), or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).

Table 59
Remediation System Operation-Air Stripper Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method / Analyte	OCTOBER 2011 Combined Influent (µg/L)	Air Stripper Effluent (A Tower) (µg/L)	Air Stripper Effluent (B Tower) (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Trmt Sys Effluent (µg/L)	Percent Removal (%)	MW-106 (µg/L)	MW-141 (µg/L)	NOVEMBER 2011 Combined Influent (µg/L)	Air Stripper Effluent (A Tower) (µg/L)	Air Stripper Effluent (B Tower) (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Trmt Sys Effluent (µg/L)	Percent Removal (%)
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes																
Benzene	**89.0**	0.480	0.540	< 0.240	< 0.240	< 0.240	>99.73	< 0.240	< 0.240	**93.5**	1.09	0.620	< 0.240	0.190 J	< 0.240	>99.74
Toluene	**49.5**	0.350 J	0.360 J	< 0.620	< 0.620	< 0.620	>98.74	< 0.620	< 0.620	**57.7**	1.05	0.620 J	< 0.620	< 0.620	< 0.620	>98.92
Ethylbenzene	**21.3**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	>97.08	< 0.620	< 0.620	**28.8**	0.400 J	< 0.620	< 0.620	< 0.620	< 0.620	>97.84
P & M -Xylene	**93.6**	0.690 J	0.680 J	< 1.24	< 1.24	< 1.24	>98.67	< 1.24	< 1.24	**118**	1.99 J	1.10 J	< 1.24	< 1.24	< 1.24	>98.94
o-Xylene	**28.4**	0.550 J	0.410 J	< 0.620	< 0.620	< 0.620	>97.82	< 0.620	< 0.620	**36.1**	1.40	0.580 J	< 0.620	< 0.620	< 0.620	>98.28
EPA 625M-SIMS - Polyaromatic Hydrocarbons																
Naphthalene	**4.59**	0.0351 J	0.183	< 0.0620	< 0.0620	<0.0640	>99.12	< 0.0646	<0.0640	**7.28**	0.168	< 0.0632	< 0.0620	< 0.0620	<0.0640	>99.45
Acenaphthylene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Acenaphthene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Fluorene	**0.158**	0.0698	0.114	0.0901	0.100	<0.0310	>80.37	< 0.0312	<0.0310	**0.542**	0.161	0.121	< 0.0300	0.0438 J	<0.0310	>94.28
Phenanthrene	**0.152**	< 0.0306	0.0574	0.0226 J	0.0365 J	<0.0310	>79.60	< 0.0312	<0.0310	**0.361**	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	>91.41
Anthracene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Fluoranthene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Pyrene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Benzo(a)Anthracene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Chrysene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Benzo[b]Fluoranthene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Benzo[k]fluoranthene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Benzo[a]pyrene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Indeno[1,2,3-c,d] pyrene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Dibenzo[a,h]anthracene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
Benzo[g,h,i]perylene	< 0.0304	< 0.0306	< 0.0300	< 0.0300	< 0.0300	<0.0310	ND	< 0.0312	<0.0310	< 0.0306	< 0.0310	< 0.0306	< 0.0300	< 0.0300	<0.0310	ND
EPA 1625B with Isotope Dilution - Sulfolane																
Sulfolane	**144**	--	--	--	--	< 6.40	>95.55	< 6.20[A]	< 6.20[B]	**141**	--	--	--	--	< 6.40	>95.54

Notes:

--	Sample not analyzed for analyte
<	Analyte not detected; LOD listed
Bold	Result or LOQ exceeds ADEC interim remediation goal (sulfolane), or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
µg/L	micrograms per liter
Trmt Sys Effluent	Treatment System Effluent - formerly "Combined Effluent"
J	analyte was detected between the detection limit (DL) and the limit of quantitation (LOQ) and is considered an estimate

Table 59
Remediation System Operation-Air Stripper Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method / Analyte	DECEMBER 2011 Combined Influent (µg/L)	Air Stripper Effluent (A Tower) (µg/L)	Air Stripper Effluent (B Tower) (µg/L)	Air Stripper Effluent (C Tower) (µg/L)	Air Stripper Effluent (D Tower) (µg/L)	Trmt Sys Effluent (µg/L)	Percent Removal (%)
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes							
Benzene	**67.3**	0.890	0.390 J	< 0.240	0.210 J	< 0.240	>99.64
Toluene	**14.9**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	>95.83
Ethylbenzene	**20.6**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	>96.99
P & M -Xylene	**74.7**	1.12 J	< 1.24	< 1.24	< 1.24	< 1.24	>98.30
o-Xylene	**17.3**	0.530 J	< 0.620	< 0.620	< 0.620	< 0.620	>96.41
EPA 625M-SIMS - Polyaromatic Hydrocarbons							
Naphthalene	**2.87**	< 0.0640	< 0.0620	< 0.0640	< 0.0632	< 0.0646	>97.74
Acenaphthylene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Acenaphthene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Fluorene	**0.132**	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	>76.36
Phenanthrene	**0.0921**	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	>66.12
Anthracene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Fluoranthene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Pyrene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Benzo(a)Anthracene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Chrysene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Benzo[b]Fluoranthene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Benzo[k]fluoranthene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Benzo[a]pyrene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Indeno[1,2,3-c,d] pyrene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Dibenzo[a,h]anthracene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
Benzo[g,h,i]perylene	< 0.0310	< 0.0310	< 0.0300	< 0.0310	< 0.0306	<0.0312	ND
EPA 1625B with Isotope Dilution - Sulfolane							
Sulfolane	**115**	--	--	--	--	< 6.46	>94.38

Notes:

--	Sample not analyzed for analyte
<	Analyte not detected; limit of detection (LOD) listed
Bold	Result or LOQ exceeds ADEC interim remediation goal (sulfolane), or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
µg/L	micrograms per liter
Trmt Sys Effluent	Treatment System Effluent
J	analyte was detected between the detection limit (DL) and the limit of quantitation (LOQ) and is considered an estimate

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

		1,000,000 gallons (June 12, 2011)					2,500,000 gallons (June 16, 2011)										5,000,000 gallons (June 23, 2011)					
Method/Analyte	Units	Combined Influent	Air Stripper C Tower	Air Stripper D Tower	GAC Vessel A-Inlet	GAC Vessel A-Outlet	R-21	R-35R	R-39	R-40	Combined Influent	Air Stripper C Tower	Air Stripper D Tower	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	Combined Influent	Air Stripper C Tower	Air Stripper D Tower	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes																						
Benzene	µg/L	**61.9**	<0.400	<0.400	<0.400	<0.400	**63.4**	**54.7**	**45.2**	**69.8**	**57.6**	<0.400	<0.400	<0.400	<0.400	<0.400	**73.4 JL**	< 0.400 UJ	< 0.400 UJ	< 0.400 UJ	< 0.400 UJ	< 0.400 UJ
Toluene	µg/L	**44.8**	1.69	1.74	<1.00	<1.00	**37.0**	**55.7**	**33.6**	**143**	**48.1**	<1.00	<1.00	<1.00	<1.00	<1.00	**56.8 JL**	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ
Ethyl-benzene	µg/L	**29.9**	<1.00	<1.00	<1.00	<1.00	**21.6**	**54.1**	**17.6**	**19.5**	**30.5**	<1.00	<1.00	<1.00	<1.00	<1.00	**36.5 JL**	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ
P & M -Xylene	µg/L	**99.9**	<2.00	<2.00	<2.00	<2.00	**108**	**132**	**64.3**	**82.0**	**99.0**	<2.00	<2.00	<2.00	<2.00	<2.00	**121 JL**	< 2.00 UJ	< 2.00 UJ	< 2.00 UJ	< 2.00 UJ	< 2.00 UJ
o-Xylene	µg/L	**27.3**	<1.00	<1.00	<1.00	<1.00	**28.9**	**38.3**	**20.2**	**34.8**	**29.8**	<1.00	<1.00	<1.00	<1.00	<1.00	**35.4 JL**	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ
Xylenes (total)	µg/L	**127**	<2.00	<2.00	<2.00	<2.00	**137**	**170**	**84.5**	**117**	**129**	<3.00	<3.00	<3.00	<3.00	<3.00	**157 JL**	< 3.00 UJ	< 3.00 UJ	< 3.00 UJ	< 3.00 UJ	< 3.00 UJ
1,2,4-Trimethyl-benzene	µg/L	**19.6**	<1.00	<1.00	<1.00	<1.00	**27.6**	**22.8**	**9.02**	**12.7**	**18.6**	<1.00	<1.00	<1.00	<1.00	<1.00	**24.0 JL**	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ	< 1.00 UJ
EP200.8 - Iron																						
Dissolved Iron	µg/L	3030	438	746	<250	<250	3720	3300	2460	3400	3230	1720	2430	570	<250	<250	3300	2260	1930	< 250	< 250	< 250
SM 5310B - Total Organic Carbon																						
Total Organic Carbon	mg/L	2.20	2.38	2.11	1.99	1.02	2.67	2.68	1.50	1.91	2.34	2.23	2.08	2.03	<0.500 UJ	<0.500	2.69	2.50	2.58	2.19	< 0.510 UB	0.961
SM20 2320B - Alkalinity																						
Alkalinity	mg/L	142	142	142	142	143	145	149	136	138	143	142	142	141	145	148	141	142	142	141	155	162
HCO_3 Alkalinity	mg/L	142	142	142	142	143	145	149	136	138	143	142	142	141	145	148	141	142	142	141	155	162
CO_3 Alkalinity	mg/L	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 4500-H B - pH																						
pH	pH units	7.50	7.90	7.90	7.90	8.00	7.40	7.40	7.50	7.40	7.30	7.80	7.80	7.80	7.80	7.80	7.40	7.90	7.90	7.90	7.40	7.50
EPA1625B w/Iso Dil-W - Sulfolane																						
Sulfolane	µg/L	**188**	**183**	**181**	**186**	<10.8	**401**	**166**	<10.5	**186**	**183**	**180**	**176**	**152**	<10.8	NA	**201**	**189**	**184**	**33.8**	<10.6	NA

UJ	Due to high pH level in sample upon arrival to the laboratory, the sample is potentially biased low.
JL	Result is biased low due to elevated sample temperature upon arrival to the laboratory
UB	Result flagged as not detected due to the presence of the analyte in the associated method blank
µg/L	micrograms per liter
mg/L	milligrams per liter
Bold	Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
NA	Not analyzed - no sulfolane detected in A-Outlet
--	Sample not analyzed for analyte

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

		7,500,000 gallons (July 2, 2011)									12,500,000 gallons (July 15, 2011)							20,000,000 gallons (August 3, 2011)					
Method/Analyte	Units	Combined Influent	Air Stripper C Tower	Air Stripper D Tower	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet	GAC Vessel D-Outlet	Final Effluent	Combined Influent	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Inlet During	GAC Vessel A-Outlet	Combined Influent	Air Stripper A Tower	Air Stripper B Tower	Sand Filter Influent	GAC Vessel A-Inlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes																							
Benzene	µg/L	**72.7**	< 0.400	0.610	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	**73.4**	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	**63.8**	**3.54**	1.14	**3.02**	0.780	< 0.400
Toluene	µg/L	**61.2**	< 1.00	2.83	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**56.9**	1.05	<1.00	<1.00	<1.00	<1.00	<1.00	**35.4**	**2.79**	0.890 J	**1.96**	0.410 J	< 1.00
Ethyl-benzene	µg/L	**38.7**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**39.2**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**27.4**	**1.54**	0.460 J	**1.26**	< 1.00	< 1.00
P & M -Xylene	µg/L	**131**	< 2.00	2.28	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	**129**	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**99.2**	**6.49**	2.01	**5.01**	0.890 J	< 2.00
o-Xylene	µg/L	**38.6**	< 1.00	1.24	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**38.9**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**25.4**	**3.40**	0.860 J	**2.60**	0.580 J	< 1.00
Xylenes (total)	µg/L	**169**	< 3.00	3.52	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00													
1,2,4-Trimethyl-benzene	µg/L	**27.6**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**26.8**	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**21.1**	**2.93**	0.730 J	**2.04**	< 1.00	< 1.00
EP200.8 - Iron																							
Total Iron	µg/L	3090	4930	1760	577	< 250	< 250	< 250	< 250	< 250	3410	1020	26800	1210	<250	2740	<250	3430	3110	3090	4380	639	< 250
Dissolved Iron	µg/L	3330	1250	NA	< 250	< 250	< 250	< 250	< 250	< 250	3790	254	262	<250	<250	829	<250	3260	1800	1150	504	98.0 J	< 250
SM 5310B - Total Organic Carbon																							
Total Organic Carbon	mg/L	2.38	2.26 JL	2.11	1.93	1.56	1.15	0.965	0.764	0.688	2.31	1.93	2.14	2.05	1.71	2.27	1.47	2.46	2.52	2.62	2.70	2.24	1.29
SM20 2320B - Alkalinity																							
Alkalinity	mg/L	139	139	139	139	139	139	139	139	141	140	137	139	140	139	135	139	141	141	141	141	141	138
HCO_3 Alkalinity	mg/L	139	139	139	139	139	139	139	139	141	140	137	139	140	139	135	139	141	141	141	141	141	138
CO_3 Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 2540D - TSS																							
Total Suspended Solids	mg/L	7.00	5.03	6.29	4.77	< 1.16	< 0.562	< 0.562	0.575	< 0.538	7.38	<2.94	82.3	3.04	<2.27	29.0	<2.13	5.47	1.00 J	2.00 J1	9.27	0.914	0.400 J
SM20 4500-H B - pH																							
pH	pH units	7.40	7.90	7.90	8.00	7.90	8.00	7.90	8.00	8.00	7.40	8.00	8.00	8.10	8.00	8.00	8.00	7.20	7.70	7.80	7.80	7.80	7.70
EPA1625B w/Iso Dil-W - Sulfolane																							
Sulfolane	µg/L	**207**	**137**	**98.3**	18.1	< 10.8	< 10.1	< 10.9	< 11.1	< 10.1	**169**	**120**	**94.7**	**77.5**	<10.5	<10.3	<10.2	**101**	**113**	**127**	**137**	**31.2**	< 10.5

JL Result is biased low due to inadequate preservative
NA Not analyzed - sample was not field-filtered

J Concentration is estimated; analyte was detected below the limit of quantitation
J[1] Result flagged as an estimate due to laboratory-duplicate RPD failure

µg/L micrograms per liter
mg/L milligrams per liter
Bold Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
NA Not analyzed - no sulfolane detected in A-Outlet
-- Sample not analyzed for analyte

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method/Analyte	Units	30,000,000 gallons (August 26, 2011)								
		R-42	Combined Influent	Air Stripper A Tower	Air Stripper B Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes										
Benzene	µg/L	0.990	**132**	**9.62**	**6.81**	**9.83**	**7.39**	< 0.400	< 0.400	< 0.400
Toluene	µg/L	< 1.00	**149**	**11.8**	**8.96**	**10.7**	**7.67**	< 1.00	< 1.00	< 1.00
Ethyl-benzene	µg/L	< 1.00	**41.4**	**2.88**	**2.36**	**2.87**	**2.00**	< 1.00	< 1.00	< 1.00
P & M -Xylene	µg/L	< 2.00	**130**	**13.1**	**9.45**	**11.5**	**7.69**	< 2.00	< 2.00	< 2.00
o-Xylene	µg/L	< 1.00	**53.3**	**8.59**	**4.77**	**6.51**	**4.48**	< 1.00	< 1.00	< 1.00
1,2,4-Trimethyl-benzene	µg/L	< 1.00	**33.5**	**5.67**	**4.04**	**4.11**	**2.59**	< 1.00	< 1.00	< 1.00
EP200.8 - Iron										
Total Iron	µg/L	3400	3,860	6130	3,850	25,800	1400	< 250	< 250	< 250
Dissolved Iron	µg/L	191 J	< 250 UJ	279 J	568 J	< 250 UJ	< 250 UJ	< 250 UJ	< 250 UJ	< 250 UJ
SM 5310B - Total Organic Carbon										
Total Organic Carbon	mg/L	2.63	3.49 JL	3.08	2.76	3.72	2.37	1.57	1.91	1.71
SM20 2320B - Alkalinity										
Alkalinity	mg/L	145	138	138	138	137	138	133	135	132
HCO_3 Alkalinity	mg/L	145	138	138	138	137	138	133	135	132
CO_3 Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 2540D - TSS										
Total Suspended Solids	mg/L	6.00	8.96	20.5	9.60	28.0	1.90	< 0.495	< 0.500	< 0.490
SM20 4500-H B - pH										
pH	pH units	7.70	7.90	7.90	8.10	7.90	8.00	8.00	8.00	7.80
EPA1625B w/Iso Dil-W - Sulfolane										
Sulfolane	µg/L	**51.9**	**30.6 JL**	**36.1 JL**	**80.7**	**49.1**	**55.3**	< 10.2	7.52 J	< 10.2

Method/Analyte	Units	39,000,000 gallons (September 13, 2011)							
		Combined Influent	Air Stripper A Tower	Air Stripper B Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes									
Benzene	µg/L	**119**	**14.0**	**3.12**	**14.0**	**10.2**	0.960	< 0.400	< 0.400
Toluene	µg/L	**290**	**28.2**	**7.74**	**25.0**	**23.9**	1.71	< 1.00	< 1.00
Ethyl-benzene	µg/L	**64.0**	**5.65**	**1.59**	**4.99**	**4.64**	< 1.00	< 1.00	< 1.00
P & M -Xylene	µg/L	**279**	**38.1**	**9.41**	**32.0**	**31.7**	1.60 J	< 2.00	< 2.00
o-Xylene	µg/L	**128**	**25.8**	**5.61**	**20.1**	**19.3**	2.04	< 1.00	< 1.00
1,2,4-Trimethyl-benzene	µg/L	**98.5**	**24.2**	**5.16**	**18.6**	**19.1**	0.97 J	< 1.00	< 1.00
EP200.8 - Iron									
Total Iron	µg/L	3670	3060	2950	3900	2160	93.4 J	275	< 250
Dissolved Iron	µg/L	3490	1660	1650	484	372	< 250	< 250	< 250
SM 5310B - Total Organic Carbon									
Total Organic Carbon	mg/L	3.39	3.09	2.48	2.92	3.17	2.63	2.49	6.75
SM20 2320B - Alkalinity									
Alkalinity	mg/L	139	139	139	140	139	138	136	134
HCO_3 Alkalinity	mg/L	139	139	139	140	139	138	136	134
CO_3 Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 2540D - TSS									
Total Suspended Solids	mg/L	7.76	7.88	9.34	10.3	5.42	< 1.11	0.440 J	< 1.06
SM20 4500-H B - pH									
pH	pH units	7.40	7.80	7.80	7.80	7.80	7.80	7.70	7.60
EPA1625B w/Iso Dil-W - Sulfolane									
Sulfolane	µg/L	**142**	**141**	**116**	**133**	**122**	**22.4**	< 10.0	< 10.0

Method/Analyte	Units	46,000,000 gallons (September 29, 2011)							
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper D Tower	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes									
Benzene	µg/L	**82.0**	1.88	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400
Toluene	µg/L	**65.6**	< 1.72 UB	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Ethyl-benzene	µg/L	**20.0**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
P & M -Xylene	µg/L	**87.5**	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
o-Xylene	µg/L	**28.5**	1.47	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2,4-Trimethyl-benzene	µg/L	**18.7**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
EP200.8 - Iron									
Total Iron	µg/L	3480	1180	3910	1950	953	< 250	< 250	< 250
Dissolved Iron	µg/L	3300	< 250	959	1020	< 250	309	< 250	< 250
SM 5310B - Total Organic Carbon									
Total Organic Carbon	mg/L	2.50	2.20 JL	2.98	2.26	2.20	2.08	2.12 JL	1.85
SM20 2320B - Alkalinity									
Alkalinity	mg/L	137	135	137	137	136	135	133	130
HCO_3 Alkalinity	mg/L	137	135	137	137	136	135	133	130
CO_3 Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 2540D - TSS									
Total Suspended Solids	mg/L	23.0	2.56	23.6	5.80	1.44	< 0.559	< 0.559	< 1.16
SM20 4500-H B - pH									
pH	pH units	7.40	7.90	7.80	7.80	7.80	7.80	7.60	7.60
EPA1625B w/Iso Dil-W - Sulfolane									
Sulfolane	µg/L	**120**	**103**	**106**	**119**	**65.4**	< 10.0	< 10.0	< 10.0

J Concentration is estimated; analyte was detected below the limit of quantitation or in the case of dissolved iron, due to lack of field filtering

JL Result is estimated, biased low, due to naphthalene interference (sulfolane) or inadequate preservation (TOC)

UJ Non-detect dissolved iron results may be due to bias from lack of field filtering

J Concentration is estimated; analyte was detected below the limit of quantitation.

JL Concentration is estimated, biased low, due to inadequate sample preservation

UB Result flagged as not detected, due to a method blank detection

µg/L micrograms per liter

mg/L milligrams per liter

Bold Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).

NA Not analyzed - no sulfolane detected in A-Outlet

-- Sample not analyzed for analyte

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method/Analyte	Units	53,000,000 gallons (October 13, 2011)									
		Combined Influent	Air Stripper A Tower	Air Stripper B Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes											
Benzene	µg/L	**86.0**	0.480	0.540	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400
Toluene	µg/L	**53.9**	0.350 J	0.360 J	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Ethyl-benzene	µg/L	**22.0**	< 0.620	< 0.620	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
P & M -Xylene	µg/L	**90.2**	0.690 J	0.680 J	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
o-Xylene	µg/L	**30.2**	0.550 J	0.410 J	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
EP200.8 - Iron											
Total Iron	µg/L	3360	1070	1930	532	597	6140	1490	< 250	94.2 J	92.1 J
Dissolved Iron	µg/L	3400	253	380	265	353	586	273	248 J	< 250	< 250
SM 5310B - Total Organic Carbon											
Total Organic Carbon	mg/L	2.68	2.19	2.20	2.23	1.89	2.16	1.98	1.77	1.67	1.57
SM20 2320B - Alkalinity											
Alkalinity	mg/L	136	136	136	136	136	136	136	135	133	130
HCO_3 Alkalinity	mg/L	136	136	136	136	136	136	136	135	133	130
CO_3 Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
OH Alkalinity	mg/L	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
SM20 2540D - TSS											
Total Suspended Solids	mg/L	6.00	2.32	2.07	3.26	6.52	9.73	3.44	0.430 J	< 0.549	0.652 J
SM20 4500-H B - pH											
pH	pH units	7.50	8.00	8.00	8.00	8.00	8.00	8.00	7.90	7.90	7.70
EPA1625B w/Iso Dil-W - Sulfolane											
Sulfolane	µg/L	**139**	**62**	**111**	**129**	**110**	**46.6**	**28.6**	< 10.4	< 10.0	< 10.3

J Concentration is estimated; analyte was detected below the limit of quantitation.

Method/Analyte	Units	60,000,000 gallons (October 27, 2011)									
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes												
Benzene	µg/L	**70.0**	0.390 J	0.380 J	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240
Toluene	µg/L	**38.9**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
Ethyl-benzene	µg/L	**25.1**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
P & M -Xylene	µg/L	**103**	0.830 J	0.750 J	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24
o-Xylene	µg/L	**31.3**	0.530 J	0.370 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
EP200.8 - Iron												
Total Iron	µg/L	3220	714	948	810	1870	3580	673	118 J	< 156	< 156	< 156
Dissolved Iron	µg/L	3360	184 J	289	155 J	207 J	174 J	< 156	< 156	< 156	< 156	< 156
SM 5310B - Total Organic Carbon												
Total Organic Carbon	mg/L	2.12	1.89	1.95	1.90	1.95	2.92	2.63	0.206 J	2.29	1.97	2.14
SM20 2320B - Alkalinity												
Alkalinity	mg/L	--	--	--	--	--	--	--	--	--	--	--
HCO_3 Alkalinity	mg/L	--	--	--	--	--	--	--	--	--	--	--
CO_3 Alkalinity	mg/L	--	--	--	--	--	--	--	--	--	--	--
OH Alkalinity	mg/L	--	--	--	--	--	--	--	--	--	--	--
SM20 2540D - TSS												
Total Suspended Solids	mg/L	6.67	1.40	13.3	1.43	6.00	22.0	0.707	1.01	< 0.304	< 0.308	< 0.618
SM20 4500-H B - pH												
pH	pH units	--	--	--	--	--	--	--	--	--	--	--
EPA1625B w/Iso Dil-W - Sulfolane												
Sulfolane	µg/L	**123**	**63.2**	**73.6**	**80.1**	**45.8**	**21.0**	14.8	< 6.20	< 6.20	< 6.20	< 6.46

J Concentration is estimated; analyte was detected below the limit of quantitation.

< Analyte not detected above listed Limit of Detection (LOD)

µg/L micrograms per liter

mg/L milligrams per liter

Bold Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).

NA Not analyzed - no sulfolane detected in A-Outlet

-- Sample not analyzed for analyte

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method/Analyte	Units	67,000,000 gallons (November 9, 2011)										
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes												
Benzene	µg/L	**93.5**	1.09	0.62	< 0.240	0.190 J	0.290 J	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240
Toluene	µg/L	**57.7**	1.05	0.620 J	< 0.620	< 0.620	0.330 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
Ethyl-benzene	µg/L	**28.8**	0.400 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
P & M -Xylene	µg/L	**118**	1.99 J	1.10 J	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24
o-Xylene	µg/L	**36.1**	1.4	0.580 J	< 0.620	< 0.620	0.370 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
EP200.8 - Iron												
Total Iron	µg/L	3770	992	2450	1210	1160	5780	2900	481	134 J	< 156	149 J
Dissolved Iron	µg/L	463 JH*	99.4 J*	137 J*	286 J*	127 J*	418 J*	229 J*	< 156 UJ	< 156 UJ	< 156 UJ	< 156 UJ
SM 5310B - Total Organic Carbon												
Total Organic Carbon	mg/L	2.45	2.16	2.16	2.02	2.09	2.54	2.19	1.94	1.89	1.77	1.79
SM20 2540D - TSS												
Total Suspended Solids	mg/L	5.26	2.27	6.63	10.2	6.44	10.2	9.34	1.49	0.718	< 0.294	0.718
EPA1625B w/Iso Dil-W - Sulfolane												
Sulfolane	µg/L	**141**	**77**	**80.8**	**82.6**	**81.3**	15.7	6.71 J	< 6.32	< 6.46	< 6.2	< 6.40

Method/Analyte	Units	74,000,000 gallons (November 21, 2011)									
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes											
Benzene	µg/L	**71.0**	0.710	0.410	< 0.240	< 0.240	0.280 J	< 0.240	< 0.240	< 0.240	< 0.240
Toluene	µg/L	**15.6**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
Ethyl-benzene	µg/L	**21.5**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
P & M -Xylene	µg/L	**78.2**	1.11 J	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24
o-Xylene	µg/L	**20.1**	0.650 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
EP200.8 - Iron											
Total Iron	µg/L	3450	901	1300	1090	2240	6970	398	94.0 J	< 156	< 156
Dissolved Iron	µg/L	3380	181 J	307	168 J	211 J	1050	< 156	< 156	< 156	< 156
SM 5310B - Total Organic Carbon											
Total Organic Carbon	mg/L	2.34	1.99	2.05	1.95	2.10	2.16	1.88	1.80	1.85	1.66
SM20 2540D - TSS											
Total Suspended Solids	mg/L	5.29	1.92	2.46	3.45	2.40	2.76	0.812	0.300 J	0.201 J	< 0.300
EPA1625B w/Iso Dil-W - Sulfolane											
Sulfolane	µg/L	**119**	**64.9**	**75.3**	**57.4**	**73.5**	**38.2**	19.4	< 6.20	< 6.20	< 6.20

J Concentration is estimated; analyte was detected below the limit of quantitation
* Concentration is estimated; some samples for dissolved iron analysis were filtered in the lab
UJ Limit of detection (LOD) affected by lack of field-filtering; analyte may have been present in sample upon collection
JH Concentration is estimated, biased high, due to MS recovery failure
< Analyte not detected above listed Limit of Detection (LOD)

J Concentration is estimated; analyte was detected below the limit of quantitation (LOQ).
< Analyte not detected above listed limit of detection (LOD)

µg/L micrograms per liter
mg/L milligrams per liter
Bold Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
NA Not analyzed - no sulfolane detected in A-Outlet

Table 60
GAC System Performance
North Pole Refinery
Flint Hills Resources Alaska, LLC

Method/Analyte	Units	78,900,000 gallons (December 1, 2011)										
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes												
Benzene	µg/L	**67.3**	0.890	0.390 J	< 0.240	0.210 J	0.310 J	< 0.240	< 0.240	< 0.240	< 0.240	< 0.240
Toluene	µg/L	**14.9**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
Ethyl-benzene	µg/L	**20.6**	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
P & M -Xylene	µg/L	**74.7**	1.12 J	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24	< 1.24
o-Xylene	µg/L	**17.3**	0.530 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
EP200.8 - Iron												
Total Iron	µg/L	4300	1060	1360	1790	932	34800	549	142 J	88.7 J	< 156	< 156
Dissolved Iron	µg/L	3550	146 J	222 J	154 J	180 J	151 J	104 J	< 156	< 156	92.5 J	< 156
SM 5310B - Total Organic Carbon												
Total Organic Carbon	mg/L	2.14	1.82	1.82	1.97	1.82	3.42	1.72	1.64	1.68	1.58	1.54
SM20 2540D - TSS												
Total Suspended Solids	mg/L	6.67	2.20	3.33	2.10	2.30	43.0	0.900	< 0.300	0.392 J	< 0.300	< 0.306
EPA1625B w/Iso Dil-W - Sulfolane												
Sulfolane	µg/L	**115**	**44**	**47.2**	**33.4**	**41.8**	3.49 J	< 6.74	< 6.40	< 6.20	< 6.32	< 6.46

Method/Analyte	Units	86,100,000 gallons (December 14, 2011)										
		Combined Influent	Air Stripper A Tower	Air Stripper C Tower	Air Stripper C Tower	Air Stripper D Tower	Sand Filter Influent	GAC Vessel A-Inlet	GAC Vessel A-Outlet	GAC Vessel B-Outlet	GAC Vessel C-Outlet	Final Effluent
EPA 624 - Benzene, Toluene, Ethylbenzene, Xylenes												
Benzene	µg/L	61.3	3.89	0.410	< 0.240	0.450	0.860	0.140 J	< 0.240	< 0.240	< 0.240	< 0.240
Toluene	µg/L	9.02	0.730 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
Ethyl-benzene	µg/L	19.5	1.03	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
P & M -Xylene	µg/L	72.7	5.38	< 0.620	< 0.620	< 0.620	1.01 J	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
o-Xylene	µg/L	11.9	1.50	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620	< 0.620
EP200.8 - Iron												
Total Iron	µg/L	8620	1180	1280	1300	1080	2760	727	260	< 156	< 156	< 156
Dissolved Iron	µg/L	3680	< 156	< 156	83.3 J	198 J	98.4 J	< 156	< 156	< 156	< 156	< 156
SM 5310B - Total Organic Carbon												
Total Organic Carbon	mg/L	2.21	1.95	1.79	1.89	1.76	1.91	1.74	1.55	2.13	1.77	1.68
SM20 2540D - TSS												
Total Suspended Solids	mg/L	6.80	4.24	2.70	12.6	2.53	12.6	1.41	< 0.600	< 0.304	< 0.304	< 0.308
EPA1625B w/Iso Dil-W - Sulfolane												
Sulfolane	µg/L	**105**	**51.6**	**39.4**	**38**	**45.6**	16.3	9.13 J	< 6.32	< 6.32	< 6.20	< 6.46

J Concentration is estimated; analyte was detected below the limit of quantitation (LOQ).
< Analyte not detected above listed limit of detection (LOD)

J Concentration is estimated; analyte was detected below the limit of quantitation (LOQ).
< Analyte not detected above listed limit of detection (LOD)

µg/L micrograms per liter
mg/L milligrams per liter
Bold Result or limit of quantitation (LOQ) exceeds ADEC interim remediation goal (sulfolane) or wastewater disposal permit limit (benzene and total aromatic hydrocarbons).
NA Not analyzed - no sulfolane detected in A-Outlet

Table 61A
Point-Of-Entry Treatment System
In-Home Testing Results-Location A
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date Collected	Sample location	Sulfolane (µg/L)	Total Organic Carbon (mg/L)	Flow Rate For Sample (gpm)	Totalized Flow (gal.)	Last carbon re-bed date since sample collection	Installation date of the second carbon tank	Notes:
11/17/2010	Pre-treatment	353	--	5.6	1,365	11/10/2010	--	--
11/17/2010	Pre-treatment	355 JL	--	5.6	1,365	11/10/2010	--	--
12/1/2010	Pre-treatment	364	--	5.4	2,955	11/10/2010	--	--
12/7/2010	Pre-treatment	370	--	5.3	3,480	11/10/2010 †	--	--
12/15/2010	Pre-treatment	339	4.29 JH	5.9	4,374	11/10/2010	--	--
12/21/2010	Pre-treatment	376	--	6.0	5,050	11/10/2010	--	--
12/28/2010	Pre-treatment	356	--	5.6	5,897	11/10/2010	--	--
1/5/2011	Pre-treatment	307 JH	--	6.2	6,878	11/10/2010	12/29/2010	--
1/12/2011	Pre-treatment	312	--	3.0	7,740	11/10/2010	12/29/2010	--
1/19/2011	Pre-treatment	317	--	5.8	8,550	11/10/2010	12/29/2010	--
1/26/2011	Pre-treatment	282	--	6.1	9,469	11/10/2010	12/29/2010	--
2/2/2011	Pre-treatment	248.0	--	6.4	10,419	11/10/2010	12/27/2010	--
2/9/2011	Pre-treatment	403 JH	--	6.2	11,173	11/10/2010	12/27/2010	--
2/16/2011	Pre-treatment	382 JH	1.590	6.5	12,059	11/10/2010	12/27/2010	‡
2/23/2011	Pre-treatment	401	1.970	6.0	13,064	11/10/2010	12/27/2010	--
3/2/2011	Pre-treatment	280	2.570	6.0	13,963	11/10/2010	12/27/2010	--
3/9/2011	Pre-treatment	415	1.840	6.1	14,762	11/10/2010	12/27/2010	--
3/16/2011	Pre-treatment	395	2.620	6.1	15,681	11/10/2010	12/27/2010	--
3/23/2011	Pre-treatment	396	3.190	6.1	16,473	11/10/2010	12/27/2010	--
3/30/2011	Pre-treatment	401	3.000	6.0	17,350	11/10/2010	12/27/2010	--
4/6/2011	Pre-treatment	375	2.730	6.2	18,348	11/10/2010	12/27/2010	--
4/13/2011	Pre-treatment	334	2.550	6.0	19,280	11/10/2010	12/27/2010	--
4/20/2011	Pre-treatment	353	2.440	6.0	20,148	11/10/2010	12/27/2010	--
4/27/2011	Pre-treatment	335	2.670	6.1	20,852	11/10/2010	12/27/2010	--
5/4/2011	Pre-treatment	352	2.510	6.1	21,731	11/10/2010	12/27/2010	--
5/11/2011	Pre-treatment	318	2.590	6.2	22,619	11/10/2010	12/27/2010	--
6/8/2011	Pre-treatment	342	2.140	6.0	25,910	11/10/2010	12/27/2010	--
7/11/2011	Pre-treatment	378	3.050	6.1	30,253	11/10/2010	12/27/2010	System was moved to outbuilding and totalizer gallons reset after treatment of 28,782 gallons
8/9/2011	Pre-treatment	353 J	3.060	3.5	34,524	11/10/2010	12/27/2010	--
9/12/2011	Pre-treatment	309	--	5.5	38,789	11/10/2010	12/27/2010	--
10/12/2011	Pre-treatment	302	2.280	6.2	42,120	11/10/2010	12/27/2010	--
11/14/2011	Pre-treatment	322	3.040	5.5	45,706	11/10/2010	12/27/2010	--
12/12/2011	Pre-treatment	336	2.4	5	48,770	11/10/2010	12/27/2010	--
11/17/2010	First vessel effluent	360	--	5.6	1,365	11/10/2010	--	Result is qualified based on suspected sample colelction from the effluent location
11/17/2010	First vessel effluent	344 JL	--	5.6	1,365	11/10/2010	--	Laboratory Re-analysis
12/1/2010	First vessel effluent	361	--	5.4	2,955	11/10/2010	--	Result is qualified based on suspected sample colelction from the effluent location
12/7/2010	First vessel effluent	16.8	--	5.3	3,480	11/10/2010 †	--	Result is qualified based on sample being collected following backwashing of the carbon tank with potential improper purging of the sample line.
12/15/2010	First vessel effluent	<10.0	2.84 JH	5.9	4,374	11/10/2010	--	--
12/21/2010	First vessel effluent	<10.0	--	6.0	5,050	11/10/2010	--	--
12/28/2010	First vessel effluent	<10.0	--	5.6	5,897	11/10/2010	--	--
1/5/2011	First vessel effluent	<10.0	--	6.2	6,878	11/10/2010	12/29/2010	--
1/12/2011	First vessel effluent	<10.0	--	6.1	7,740	11/10/2010	12/29/2010	--
1/19/2011	First vessel effluent	<10.0	--	5.8	8,550	11/10/2010	12/29/2010	--
1/26/2011	First vessel effluent	<10.0	--	6.1	9,469	11/10/2010	12/29/2010	--
2/2/2011	First vessel effluent	<10.0	--	6.4	10,419	11/10/2010	12/27/2010	--
2/9/2011	First vessel effluent	16.7 JH	--	6.2	11,173	11/10/2010	12/27/2010	--
2/9/2011	First vessel effluent	18.2 JH	--	3.1	11,173	11/10/2010	12/27/2010	--
2/16/2011	First vessel effluent	17.7 JH	--	6.5	12,059	11/10/2010	12/27/2010	‡
2/16/2011	First vessel effluent	16.9 JH	--	3.2	12,059	11/10/2010	12/27/2010	‡
2/23/2011	First vessel effluent	18.3	--	6.0	13,064	11/10/2010	12/27/2010	--
2/23/2011	First vessel effluent	20.8	--	3.0	13,064	11/10/2010	12/27/2010	--
3/2/2011	First vessel effluent	15.8	--	6.0	13,963	11/10/2010	12/27/2010	--
3/2/2011	First vessel effluent	14.4	--	3.0	13,963	11/10/2010	12/27/2010	--
3/9/2011	First vessel effluent	24.6	--	6.1	14,762	11/10/2010	12/27/2010	--
3/9/2011	First vessel effluent	24.0	--	3.0	14,762	11/10/2010	12/27/2010	--
3/16/2011	First vessel effluent	25.0	--	6.1	15,681	11/10/2010	12/27/2010	--
3/16/2011	First vessel effluent	23.8	--	3.2	15,681	11/10/2010	12/27/2010	--
3/23/2011	First vessel effluent	24.5	--	6.1	16,473	11/10/2010	12/27/2010	--
3/23/2011	First vessel effluent	24.2	--	3.2	16,473	11/10/2010	12/27/2010	--
3/30/2011	First vessel effluent	28.9	--	6.0	17,350	11/10/2010	12/27/2010	--
3/30/2011	First vessel effluent	26.8	--	3.0	17,350	11/10/2010	12/27/2010	--
4/6/2011	First vessel effluent	28.5	--	6.2	18,348	11/10/2010	12/27/2010	--
4/6/2011	First vessel effluent	29.1	--	3.1	18,348	11/10/2010	12/27/2010	--
4/13/2011	First vessel effluent	27.7	--	6.0	19,280	11/10/2010	12/27/2010	--
4/20/2011	First vessel effluent	32.7	--	6.0	20,148	11/10/2010	12/27/2010	--
4/27/2011	First vessel effluent	31.9	--	6.1	20,852	11/10/2010	12/27/2010	--
5/4/2011	First vessel effluent	34.2	--	6.1	21,731	11/10/2010	12/27/2010	--
5/11/2011	First vessel effluent	30.5	--	6.2	22,619	11/10/2010	12/27/2010	--
6/8/2011	First vessel effluent	42.8	--	6.0	25,910	11/10/2010	12/27/2010	--
9/12/2011	First vessel effluent	71.7	--	5.5	38,789	11/10/2010	12/27/2010	System was moved to outbuilding and totalizer gallons reset after treatment of 28,782 gallons
10/12/2011	First vessel effluent	71.6	--	6.2	42,120	11/10/2010	12/27/2010	--

Table 61A
Point-Of-Entry Treatment System
In-Home Testing Results-Location A
North Pole Refinery
Flint Hills Resources Alaska, LLC

11/14/2011	First vessel effluent	83.0	--	5.5	45,706	11/10/2010	12/27/2010	--
12/12/2011	First vessel effluent	92.7	--	5.4	48,770	11/10/2010	12/27/2010	--

3/2/2011	Second vessel effluent	<10.0	--	6.0	13,963	11/10/2010	12/27/2010	--
3/9/2011	Second vessel effluent	<10.0	--	6.1	14,762	11/10/2010	12/27/2010	--
3/16/2011	Second vessel effluent	<10.0	--	6.1	15,681	11/10/2010	12/27/2010	--
3/23/2011	Second vessel effluent	<10.0	--	6.1	16,473	11/10/2010	12/27/2010	--
3/30/2011	Second vessel effluent	<10.0	--	6.0	17,350	11/10/2010	12/27/2010	--
4/6/2011	Second vessel effluent	<10.0	--	6.2	18,348	11/10/2010	12/27/2010	--
4/13/2011	Second vessel effluent	<10.0	--	6.0	19,280	11/10/2010	12/27/2010	--
4/20/2011	Second vessel effluent	<10.0	--	6.0	20,148	11/10/2010	12/27/2010	--
4/27/2011	Second vessel effluent	<10.0	--	6.1	20,852	11/10/2010	12/27/2010	--
5/4/2011	Second vessel effluent	<10.0	--	6.1	21,731	11/10/2010	12/27/2010	--
5/11/2011	Second vessel effluent	<10.0	--	6.2	22,619	11/10/2010	12/27/2010	--
6/8/2011	Second vessel effluent	<10.0	--	6.0	25,910	11/10/2010	12/27/2010	--
7/11/2011	Second vessel effluent	ND	--	6.1	30,253	11/10/2010	12/27/2010	System was moved to outbuilding and totalizer gallons reset after treatment of 28,782 gallons
8/9/2011	Second vessel effluent	ND	--	3.5	34,524	11/10/2010	12/27/2010	--
9/12/2011	Second vessel effluent	ND	--	5.5	38,789	11/10/2010	12/27/2010	--
10/12/2011	Second vessel effluent	ND	--	6.2	42,120	11/10/2010	12/27/2010	--
11/14/2011	Second vessel effluent	ND	--	5.5	45,706	11/10/2010	12/27/2010	--
12/12/2011	Second vessel effluent	ND	--	5	48,770	11/10/2010	12/27/2010	--

Notes: Prior to 7/11/11, non detect results are presented as less than (<) practical quantitation limit (PQL).
presented as estimated (J-flagged), where applicable.
Samples collected on 8/9/2011 and after are presented with J-flagged results, where applicable. J-flagged results are estimated concentrations below the PQL, where detected.
Totalized flow is collected prior to purging.

µg/L micrograms per liter
JL Estimated result, biased low due to extraction outside hold time.
JH Estimated result, biased high due to quality control sample failures.
† Carbon tank was backwashed two extra cycles before collection of post-treatment sample. Equipment was also double checked at time of sample collection.
‡ Original results confirmed by re-analysis outside of hold time. Pace Report 10149946 shows re-analysis results that are not tabulated in this table.
-- not applicable

Table 61B
Point-Of-Entry Treatment System
In-Home Testing Results-Location B
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date Collected	Sample location	Sulfolane (µg/L)	Total Organic Carbon (mg/L)	Flow Rate For Sample (gpm)	Totalized Flow (gal.)	Last carbon re-bed date since sample collection	Installation date of the second carbon tank	Notes:
11/17/2010	Pre-treatment	56.0	--	5.7	1,951	11/10/2010	--	--
12/1/2010	Pre-treatment	55.9	--	4.9	6,184	11/10/2010	--	--
12/8/2010	Pre-treatment	51.6	--	5.5	8,399	11/10/2010	--	--
12/15/2010	Pre-treatment	50.6	--	5.9	10,694	11/10/2010	--	--
12/21/2010	Pre-treatment	52.4	--	6.0	12,349	11/10/2010	--	--
12/28/2010	Pre-treatment	55.0	--	5.8	14,229	11/10/2010	--	--
1/5/2011	Pre-treatment	46.3 JH	--	5.2	16,640	11/10/2010	--	--
1/12/2011	Pre-treatment	53.2	--	6.0	18,653	11/10/2010	--	--
1/19/2011	Pre-treatment	54.3	--	5.0	20,846	11/10/2010	--	--
1/26/2011	Pre-treatment	51.3	--	5.8	22,756	11/10/2010	--	--
2/2/2011	Pre-treatment	44.6	--	5.1	24,260	11/10/2010	--	--
2/9/2011	Pre-treatment	61.5 JH	--	4.2	25,744	11/10/2010	--	--
2/16/2011	Pre-treatment	58.6 JH	3.630	6.0	27,084	11/10/2010	--	‡
2/23/2011	Pre-treatment	56.0	3.920	5.0	28,401	11/10/2010	--	--
3/2/2011	Pre-treatment	44.5	4.880	4.1	29,807	11/10/2010	--	--
3/9/2011	Pre-treatment	62.7	4.930	6.0	31,760	11/10/2010	3/3/2011	--
3/16/2011	Pre-treatment	56.8	5.060	6.2	33,967	11/10/2010	3/3/2011	--
3/23/2011	Pre-treatment	58.0	5.670	6.0	35,976	11/10/2010	3/3/2011	--
3/30/2011	Pre-treatment	60.5	5.610	6.0	38,251	11/10/2010	3/3/2011	--
4/6/2011	Pre-treatment	60.0	4.930	4.6	40,053	11/10/2010	3/3/2011	low water pressure
4/13/2011	Pre-treatment	50.0	4.920	6.0	41,833	11/10/2010	3/3/2011	--
4/20/2011	Pre-treatment	58.1	4.760	6.4	43,974	11/10/2010	3/3/2011	--
4/27/2011	Pre-treatment	53.3	5.230	6.2	45,916	11/10/2010	3/3/2011	--
5/4/2011	Pre-treatment	51.4	5.520	6.2	48,024	11/10/2010	3/3/2011	--
5/11/2011	Pre-treatment	47.2	5.140	6.2	49,577	11/10/2010	3/3/2011	--
6/8/2011	Pre-treatment	56.1	4.810	6.1	56,051	11/10/2010	3/3/2011	--
7/11/2011	Pre-treatment	52.1	4.990	6.0	64,120	11/10/2010	3/3/2011	--
8/9/2011	Pre-treatment	61.8 J	4.930	6.1	71,118	11/10/2010	3/3/2011	--
9/12/2011	Pre-treatment	57.7	--	6.2	78,169	11/10/2010	3/3/2011	--
10/12/2011	Pre-treatment	51.2	5.700	6.1	83,707	11/10/2010	3/3/2011	--
11/14/2011	Pre-treatment	62.6 JH	4.630	5.2	91,120	11/10/2010	3/3/2011	--
12/12/2011	Pre-treatment	59.0	4.690	6.0	96,427	11/10/2010	3/3/2011	--
11/17/2010	First vessel effluent	<10.0	--	5.7	1,951	11/10/2010	--	--
12/1/2010	First vessel effluent	<10.0	--	4.9	6,184	11/10/2010	--	--
12/8/2010	First vessel effluent	<10.0	--	5.5	8,399	11/10/2010	--	--
12/15/2010	First vessel effluent	<10.0	--	5.9	10,694	11/10/2010	--	--
12/21/2010	First vessel effluent	<10.0	--	6.0	12,349	11/10/2010	--	--
12/28/2010	First vessel effluent	<10.0	--	5.8	14,229	11/10/2010	--	--
1/5/2011	First vessel effluent	<10.0	--	5.2	16,640	11/10/2010	--	--
1/12/2011	First vessel effluent	<10.0	--	6.0	18,653	11/10/2010	--	--
1/19/2011	First vessel effluent	<10.0	--	5.0	20,846	11/10/2010	--	--
1/26/2011	First vessel effluent	<10.0	--	5.8	22,756	11/10/2010	--	--
2/2/2011	First vessel effluent	<10.0 JL	--	5.1	24,260	11/10/2010	--	--
2/9/2011	First vessel effluent	<10.0	--	4.2	25,744	11/10/2010	--	
2/16/2011	First vessel effluent	10.2 JH	--	6.0	27,084	11/10/2010	--	‡
2/23/2011	First vessel effluent	10.4	--	5.0	28,401	11/10/2010	--	--
3/2/2011	First vessel effluent	<10.0	--	4.1	29,807	11/10/2010	--	
3/9/2011	First vessel effluent	10.2	--	6.0	31,760	11/10/2010	3/3/2011	--
3/16/2011	First vessel effluent	<10.0	--	6.2	33,967	11/10/2010	3/3/2011	--
3/23/2011	First vessel effluent	10.8	--	6.0	35,976	11/10/2010	3/3/2011	--
3/30/2011	First vessel effluent	11.9	--	6.0	38,251	11/10/2010	3/3/2011	--
4/6/2011	First vessel effluent	12.0	--	4.6	40,053	11/10/2010	3/3/2011	low water pressure
4/13/2011	First vessel effluent	15.2	--	6.0	41,833	11/10/2010	3/3/2011	--
4/20/2011	First vessel effluent	14.3	--	6.4	43,974	11/10/2010	3/3/2011	--
4/27/2011	First vessel effluent	13.6	--	6.2	45,916	11/10/2010	3/3/2011	--
5/4/2011	First vessel effluent	15.3	--	6.2	48,024	11/10/2010	3/3/2011	--
5/11/2011	First vessel effluent	13.7	--	6.2	49,577	11/10/2010	3/3/2011	--
6/8/2011	First vessel effluent	16.6	--	6.1	56,051	11/10/2010	3/3/2011	--
7/11/2011	First vessel effluent	19.4	--	6.0	64,120	11/10/2010	3/3/2011	--
8/9/2011	First vessel effluent	25.0 J	--	6.1	71,118	11/10/2010	3/3/2011	--
9/12/2011	First vessel effluent	22.0	--	6.2	78,169	11/10/2010	3/3/2011	--
10/12/2011	First vessel effluent	21.4	--	6.1	83,707	11/10/2010	3/3/2011	--
11/14/2011	First vessel effluent	25.3	--	5.2	91,120	11/10/2010	3/3/2011	--
12/12/2011	First vessel effluent	25.2	--	6.0	96,427	11/10/2010	3/3/2011	--
3/9/2011	Second vessel effluent	<10.0	--	6.0	31,760	11/10/2010	3/3/2011	--
3/16/2011	Second vessel effluent	<10.0	--	6.2	33,967	11/10/2010	3/3/2011	--
3/23/2011	Second vessel effluent	<10.0	--	6.0	35,976	11/10/2010	3/3/2011	--
3/30/2011	Second vessel effluent	<10.0	--	6.0	38,251	11/10/2010	3/3/2011	--
4/6/2011	Second vessel effluent	<10.0	--	4.6	40,053	11/10/2010	3/3/2011	low water pressure
4/13/2011	Second vessel effluent	<10.0	--	6.0	41,833	11/10/2010	3/3/2011	--
4/20/2011	Second vessel effluent	<10.0	--	6.4	43,974	11/10/2010	3/3/2011	--
4/27/2011	Second vessel effluent	<10.0	--	6.2	45,916	11/10/2010	3/3/2011	--
5/4/2011	Second vessel effluent	<10.0	--	6.2	48,024	11/10/2010	3/3/2011	--
5/11/2011	Second vessel effluent	<10.0	--	6.2	49,577	11/10/2010	3/3/2011	--
6/8/2011	Second vessel effluent	<10.0	--	6.1	56,051	11/10/2010	3/3/2011	--
7/11/2011	Second vessel effluent	ND	--	6.0	64,120	11/10/2010	3/3/2011	--
8/9/2011	Second vessel effluent	ND	--	6.1	71,118	11/10/2010	3/3/2011	--
9/12/2011	Second vessel effluent	ND	--	6.2	78,169	11/10/2010	3/3/2011	--
10/12/2011	Second vessel effluent	ND	--	6.1	83,707	11/10/2010	3/3/2011	--
11/14/2011	Second vessel effluent	ND	--	5.2	91,120	11/10/2010	3/3/2011	--
12/12/2011	Second vessel effluent	3.5 J	--	6.0	96,427	11/10/2010	3/3/2011	--

Notes: Prior to 7/11/11, non detect results are presented as less than (<) practical quantitation limit (PQL).
10.0 µg/L and detection limit (3.1 µg/L) are presented as estimated (J-flagged), where applicable.
the PQL, where detected.
Totalized flow is collected prior to purging.

µg/L micrograms per liter
JL Estimated result, biased low due to extraction outside hold time.
JH Estimated result, biased high due to quality control sample failures.
† Carbon tank was backwashed two extra cycles before collection of post-treatment sample. Equipment was also double checked at time of sample collection.
‡ Original results confirmed by re-analysis outside of hold time. Pace Report 10149946 shows re-analysis results that are not tabulated in this table.
-- not applicable

Table 61C
Point-Of-Entry Treatment System
In-Home Testing Results-Location C
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date Collected	Sample location	Sulfolane (µg/L)	Total Organic Carbon (mg/L)	Flow Rate For Sample (gpm)	Totalized Flow (gal.)	Last carbon re-bed date since sample collection	Installation date of the second carbon tank	Notes:
11/17/2010	Pre-treatment	161	--	5.5	1,643	11/10/2010	--	--
12/1/2010	Pre-treatment	164	--	5.5	3,983	11/10/2010	--	--
12/8/2010	Pre-treatment	142	--	3	5,148	11/10/2010	--	--
12/15/2010	Pre-treatment	154	--	5.6	6,384	11/10/2010	--	--
12/21/2010	Pre-treatment	157	--	5.8	7,219	11/10/2010	--	
12/28/2010	Pre-treatment	164	--	6.7	8,631	11/10/2010	12/27/2010	--
1/5/2011	Pre-treatment	137 JH	--	6.0	10,026	11/10/2010	12/27/2010	--
1/12/2011	Pre-treatment	136	--	6.0	11,303	11/10/2010	12/27/2010	--
1/19/2011	Pre-treatment	138	--	6.0	12,527	11/10/2010	12/27/2010	--
1/26/2011	Pre-treatment	127	--	6.0	13,780	11/10/2010	12/27/2010	--
2/2/2011	Pre-treatment	111.0	--	6.1	14,944	11/10/2010	12/29/2010	--
2/9/2011	Pre-treatment	180 JH	--	6.0	16,187	11/10/2010	12/29/2010	--
2/16/2011	Pre-treatment	171 JH	1.620	5.9	17,375	11/10/2010	12/29/2010	‡
2/23/2011	Pre-treatment	174	1.650	6.0	18,739	11/10/2010	12/29/2010	--
3/2/2011	Pre-treatment	128	2.020	6.2	19,959	11/10/2010	12/29/2010	--
3/9/2011	Pre-treatment	183	1.970	6.4	21,440	11/10/2010	12/29/2010	--
3/16/2011	Pre-treatment	162	2.030	6.1	22,853	11/10/2010	12/29/2010	--
3/23/2011	Pre-treatment	172	2.380	6.1	24,429	11/10/2010	12/29/2010	--
3/30/2011	Pre-treatment	180	2.780	6.2	25,782	11/10/2010	12/29/2010	--
4/6/2011	Pre-treatment	171	2.200	6.1	27,324	11/10/2010	12/29/2010	--
4/13/2011	Pre-treatment	155	2.150	6.1	29,023	11/10/2010	12/29/2010	--
4/20/2011	Pre-treatment	161	2.000	6.2	30,568	11/10/2010	12/29/2010	--
4/27/2011	Pre-treatment	154	2.180	6.0	32,008	11/10/2010	12/29/2010	--
5/4/2011	Pre-treatment	159	2.090	6.0	33,401	11/10/2010	12/29/2010	--
5/11/2011	Pre-treatment	139	2.140	6.0	34,856	11/10/2010	12/29/2010	--
6/8/2011	Pre-treatment	141	1.770	6.0	40,274	11/10/2010	12/29/2010	--
7/11/2011	Pre-treatment	161	2.020	6.1	46,274	11/10/2010	12/29/2010	--
8/9/2011	Pre-treatment	141 J	2.210	6.1	51,130	11/10/2010	12/29/2010	--
9/12/2011	Pre-treatment	124	--	5.7	58,349	11/10/2010	12/29/2010	--
10/12/2011	Pre-treatment	109	2.810	6.3	64,685	11/10/2010	12/29/2010	--
11/14/2011	Pre-treatment	114 JH	2.100	5.4	70,213	11/10/2010	12/29/2010	--
11/17/2010	First vessel effluent	<10.0	--	5.5	1,643	11/10/2010	--	--
12/1/2010	First vessel effluent	<10.0	--	5.5	3,983	11/10/2010	--	--
12/8/2010	First vessel effluent	15.9	--	3	5,148	11/10/2010	--	Result is qualified based on sample being collected following backwashing of the carbon tank with potential improper purging of the sample line.
12/15/2010	First vessel effluent	<10.0	--	5.6	6,384	11/10/2010	--	--
12/21/2010	First vessel effluent	<10.0	--	5.8	7,219	11/10/2010	--	
12/28/2010	First vessel effluent	<10.0	--	6.7	8,631	11/10/2010	12/27/2010	--
1/5/2011	First vessel effluent	<10.0	--	6.0	10,026	11/10/2010	12/27/2010	--
1/12/2011	First vessel effluent	<10.0	--	6.0	11,303	11/10/2010	12/27/2010	--
1/19/2011	First vessel effluent	<10.0	--	6.0	12,527	11/10/2010	12/27/2010	--
1/26/2011	First vessel effluent	<10.0	--	6.0	13,780	11/10/2010	12/27/2010	--
2/2/2011	First vessel effluent	<10.0	--	6.1	14,944	11/10/2010	12/29/2010	--
2/9/2011	First vessel effluent	11.9 JH	--	6.0	16,187	11/10/2010	12/29/2010	--
2/16/2011	First vessel effluent	12.1 JH	--	5.9	17,375	11/10/2010	12/29/2010	‡
2/23/2011	First vessel effluent	13.0	--	6.0	18,739	11/10/2010	12/29/2010	--
3/2/2011	First vessel effluent	11.5	--	6.2	19,959	11/10/2010	12/29/2010	--
3/9/2011	First vessel effluent	17.7	--	6.4	21,440	11/10/2010	12/29/2010	--
3/16/2011	First vessel effluent	15.0	--	6.1	22,853	11/10/2010	12/29/2010	--
3/23/2011	First vessel effluent	17.5	--	6.1	24,429	11/10/2010	12/29/2010	--

Table 61C
Point-Of-Entry Treatment System
In-Home Testing Results-Location C
North Pole Refinery
Flint Hills Resources Alaska, LLC

3/30/2011	First vessel effluent	18.8	--	6.2	25,782	11/10/2010	12/29/2010	--
4/6/2011	First vessel effluent	19.2	--	6.1	27,324	11/10/2010	12/29/2010	--
4/13/2011	First vessel effluent	18.2	--	6.1	29,023	11/10/2010	12/29/2010	--
4/20/2011	First vessel effluent	23.9	--	6.2	30,568	11/10/2010	12/29/2010	--
4/27/2011	First vessel effluent	22.4	--	6.0	32,008	11/10/2010	12/29/2010	--
5/4/2011	First vessel effluent	23.3	--	6.0	33,401	11/10/2010	12/29/2010	--
5/11/2011	First vessel effluent	23.4	--	6.0	34,856	11/10/2010	12/29/2010	--
6/8/2011	First vessel effluent	30.1	--	6.0	40,274	11/10/2010	12/29/2010	--
7/11/2011	First vessel effluent	36.8	--	6.1	46,274	11/10/2010	12/29/2010	--
8/9/2011	First vessel effluent	42.4 J	--	6.1	51,130	11/10/2010	12/29/2010	--
9/12/2011	First vessel effluent	42.2	--	5.7	58,349	11/10/2010	12/29/2010	--
10/12/2011	First vessel effluent	43.2	--	6.3	64,685	11/10/2010	12/29/2010	--
11/14/2011	First vessel effluent	49.3	--	5.4	70,213	11/10/2010	12/29/2010	--

3/2/2011	Second vessel effluent	<10.0	--	6.2	19,959	11/10/2010	12/29/2010	--
3/9/2011	Second vessel effluent	<10.0	--	6.4	21,440	11/10/2010	12/29/2010	--
3/16/2011	Second vessel effluent	<10.0	--	6.1	22,853	11/10/2010	12/29/2010	--
3/23/2011	Second vessel effluent	<10.0	--	6.1	24,429	11/10/2010	12/29/2010	--
3/30/2011	Second vessel effluent	<10.0	--	6.2	25,782	11/10/2010	12/29/2010	--
4/6/2011	Second vessel effluent	<10.0	--	6.1	27,324	11/10/2010	12/29/2010	--
4/13/2011	Second vessel effluent	<10.0	--	6.1	29,023	11/10/2010	12/29/2010	--
4/20/2011	Second vessel effluent	<10.0	--	6.2	30,568	11/10/2010	12/29/2010	--
4/27/2011	Second vessel effluent	<10.0	--	6.0	32,008	11/10/2010	12/29/2010	--
5/4/2011	Second vessel effluent	<10.0	--	6.0	33,401	11/10/2010	12/29/2010	--
5/11/2011	Second vessel effluent	<10.0	--	6.0	34,856	11/10/2010	12/29/2010	--
6/8/2011	Second vessel effluent	<10.0	--	6.0	40,274	11/10/2010	12/29/2010	--
7/11/2011	Second vessel effluent	ND	--	6.1	46,274	11/10/2010	12/29/2010	--
9/12/2011	Second vessel effluent	ND	--	5.7	58,349	11/10/2010	12/29/2010	--
10/12/2011	Second vessel effluent	4.3 J	--	6.3	64,685	11/10/2010	12/29/2010	--
11/14/2011	Second vessel effluent	4.5 J	--	5.4	70,213	11/10/2010	12/29/2010	--

Notes: Prior to 7/11/11, non detect results are presented as less than (<) practical quantitation limit (PQL).

For samples collected after 7/11/11, Non detect results are presented as ND. MDL reports were issued; therefore, results between the reporting limit 10.0 µg/L and detection limit (3.1 µg/L) are presented as estimated (J-flagged), where applicable.

Samples collected on 8/9/2011 and after are presented with J-flagged results, where applicable. J-flagged results are estimated concentrations below the PQL, where detected.

Totalized flow is collected prior to purging.

µg/L micrograms per liter

JL Estimated result, biased low due to extraction outside hold time.

JH Estimated result, biased high due to quality control sample failures.

† Carbon tank was backwashed two extra cycles before collection of post-treatment sample. Equipment was also double checked at time of sample collection.

‡ Original results confirmed by re-analysis outside of hold time. Pace Report 10149946 shows re-analysis results that are not tabulated in this table.

-- not applicable

Table 61D
Point-Of-Entry Treatment System
In-Home Testing Results-Location D
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date Collected	Sample location	Sulfolane (µg/L)	Total Organic Carbon (mg/L)	Flow Rate For Sample (gpm)	Totalized Flow (gal.)	Last carbon re-bed date since sample collection	Installation date of the second carbon tank	Notes:
11/17/2010	Pre-treatment	57.1	--	5.6	1,718	11/10/2010	--	--
12/1/2010	Pre-treatment	55.6	--	5.7	3,337	11/10/2010	--	--
12/8/2010	Pre-treatment	49.5	--	5.6	4,003	11/10/2010	--	--
12/15/2010	Pre-treatment	50.4	--	5.6	4,809	11/10/2010	--	--
12/21/2010	Pre-treatment	49.3	--	4.7	5,384	11/10/2010	--	--
12/28/2010	Pre-treatment	51.8	--	5.3	6,361	11/10/2010	--	--
1/5/2011	Pre-treatment	44.6 JH	--	6.3	7,314	11/10/2010	12/29/2010	--
1/12/2011	Pre-treatment	46.2 JL	--	6.1	8,278	11/10/2010	12/29/2010	†Lab analyzed post-treatment twice and originally reported as two separate samples. Pre-treatment originally reported as ND.
1/19/2011	Pre-treatment	51.8	--	6.0	9,186	11/10/2010	12/29/2010	--
1/26/2011	Pre-treatment	45.2	--	6.1	9,932	11/10/2010	12/29/2010	--
2/2/2011	Pre-treatment	40.7	--	6.1	10,803	11/10/2010	12/29/2010	--
2/9/2011	Pre-treatment	58.6 JH	--	6.1	11,466	11/10/2010	12/29/2010	--
2/16/2011	Pre-treatment	54.3 JH	1.560	6.3	12,954	11/10/2010	12/29/2010	‡
2/23/2011	Pre-treatment	49.1	1.700	6.2	13,877	11/10/2010	12/29/2010	Submitted to lab as 1523-022311-011
3/2/2011	Pre-treatment	38.6	2.100	6.1	14,841	11/10/2010	12/29/2010	--
3/9/2011	Pre-treatment	57.6	1.970	6.1	15,556	11/10/2010	12/29/2010	--
3/16/2011	Pre-treatment	49.2	2.090	6.0	16,293	11/10/2010	12/29/2010	--
3/23/2011	Pre-treatment	49.9	3.040	6.1	17,074	11/10/2010	12/29/2010	--
3/30/2011	Pre-treatment	51.6	--	6.3	18,323	11/10/2010	12/29/2010	TOC sample was lost by laboratory
4/6/2011	Pre-treatment	47.7	2.200	6.0	18,930	11/10/2010	12/29/2010	--
4/13/2011	Pre-treatment	36.3	2.110	5.7	19,781	11/10/2010	12/29/2010	--
4/20/2011	Pre-treatment	48.0	2.060	6.0	20,738	11/10/2010	12/29/2010	--
4/27/2011	Pre-treatment	45.2	2.450	6.0	21,198	11/10/2010	12/29/2010	--
5/4/2011	Pre-treatment	46.0	1.950	6.0	22,127	11/10/2010	12/29/2010	--
5/11/2011	Pre-treatment	40.3	2.250	6.1	22,941	11/10/2010	12/29/2010	--
6/8/2011	Pre-treatment	45.2	1.890	6.0	25,079	11/10/2010	12/29/2010	--
11/17/2010	First vessel effluent	<10.0	--	5.6	1,718	11/10/2010	--	--
12/1/2010	First vessel effluent	<10.0	--	5.7	3,337	11/10/2010	--	--
12/8/2010	First vessel effluent	<10.0	--	5.6	4,003	11/10/2010	--	--
12/15/2010	First vessel effluent	<10.0	--	5.6	4,809	11/10/2010	--	--
12/21/2010	First vessel effluent	<10.0	--	4.7	5,384	11/10/2010	--	--
12/28/2010	First vessel effluent	<10.0	--	5.3	6,361	11/10/2010	--	--
1/5/2011	First vessel effluent	<10.0	--	6.3	7,314	11/10/2010	12/29/2010	--
1/12/2011	First vessel effluent	<10.0	--	6.1	8,278	11/10/2010	12/29/2010	--
1/12/2011	First vessel effluent	<10.0	--	6.1	8,278	11/10/2010	12/29/2010	†Lab analyzed post-treatment twice and originally reported as two separate samples. Pre-treatment originally reported as ND.
1/19/2011	First vessel effluent	50.5	--	6.0	9,186	11/10/2010	12/29/2010	Results qualified based on suspected sample collection from the pre-treatment location.
1/19/2011	First vessel effluent	47.4 JL	--	6.0	9,186	11/10/2010	12/29/2010	Reanalysis of qualified sample.
1/26/2011	First vessel effluent	<10.0	--	6.1	9,932	11/10/2010	12/29/2010	--
2/2/2011	First vessel effluent	<10.0	--	6.1	10,803	11/10/2010	12/29/2010	--
2/9/2011	First vessel effluent	<10.0	--	6.1	11,466	11/10/2010	12/29/2010	--
2/16/2011	First vessel effluent	<10.0	--	6.3	12,954	11/10/2010	12/29/2010	‡
2/23/2011	First vessel effluent	<10.0	--	6.2	13,877	11/10/2010	12/29/2010	--
3/2/2011	First vessel effluent	<10.0	--	6.1	14,841	11/10/2010	12/29/2010	--
3/9/2011	First vessel effluent	<10.0	--	6.1	15,556	11/10/2010	12/29/2010	--
3/16/2011	First vessel effluent	<10.0	--	6.0	16,293	11/10/2010	12/29/2010	--
3/23/2011	First vessel effluent	<10.0	--	6.1	17,074	11/10/2010	12/29/2010	--
3/30/2011	First vessel effluent	<10.0	--	6.3	18,323	11/10/2010	12/29/2010	--
4/6/2011	First vessel effluent	<10.0	--	6.0	18,930	11/10/2010	12/29/2010	--
4/13/2011	First vessel effluent	<10.0	--	5.7	19,781	11/10/2010	12/29/2010	--
4/20/2011	First vessel effluent	<10.0	--	6.0	20,738	11/10/2010	12/29/2010	--
4/27/2011	First vessel effluent	<10.0	--	6.0	21,198	11/10/2010	12/29/2010	--
5/4/2011	First vessel effluent	<10.0	--	6.0	22,127	11/10/2010	12/29/2010	--
5/11/2011	First vessel effluent	<10.0	--	6.1	22,941	11/10/2010	12/29/2010	--
6/8/2011	First vessel effluent	<10.0	--	6.0	25,079	11/10/2010	12/29/2010	--

Notes: Non detect results are presented as less than (<) practical quantitation limit (PQL).
Totalized flow is collected prior to purging.

µg/L micrograms per liter
JL Estimated result, biased low due to extraction outside hold time.
JH Estimated result, biased high due to quality control sample failures.
† Carbon tank was backwashed two extra cycles before collection of post-treatment sample. Equipment was also double checked at time of sample collection.
‡ Original results confirmed by re-analysis outside of hold time. Pace Report 10149946 shows re-analysis results that are not tabulated in this table.
-- not applicable

Table 61E
Point-Of-Entry Treatment System
In-Home Testing Results-Location E
North Pole Refinery
Flint Hills Resources Alaska, LLC

Date Collected	Sample location	Sulfolane (µg/L)	Total Organic Carbon (mg/L)	Flow Rate For Sample (gpm)	Totalized Flow (gal.)	Last carbon re-bed date since sample collection	Installation date of the second carbon tank	Notes:
11/17/2010	Pre-treatment	141	--	6.2	579	11/10/2010	--	--
12/1/2010	Pre-treatment	135	--	7.4	1,915	11/10/2010	--	--
12/8/2010	Pre-treatment	127.0	--	7.5	2,591	11/10/2010	--	--
12/15/2010	Pre-treatment	130	--	6.1	3,161	11/10/2010	--	--
12/21/2010	Pre-treatment	123	--	6.0	3,667	11/10/2010	--	--
12/28/2010	Pre-treatment	124	--	6.2	4,488	11/10/2010	12/28/2010	--
1/5/2011	Pre-treatment	108 JH	--	5.8	5,360	11/10/2010	12/28/2010	--
1/12/2011	Pre-treatment	108	--	6.1	5,884	11/10/2010	12/28/2010	--
1/19/2011	Pre-treatment	100	--	6.1	6,523	11/10/2010	12/28/2010	--
1/26/2011	Pre-treatment	93.7	--	6.0	7,158	11/10/2010	12/28/2010	--
2/2/2011	Pre-treatment	85.4	--	6.1	7,849	11/10/2010	12/28/2010	--
2/9/2011	Pre-treatment	131 JH	--	6.2	8,525	11/10/2010	12/28/2010	--
2/16/2011	Pre-treatment	131 JH	1.470	6.1	9,132	11/10/2010	12/28/2010	‡
2/23/2011	Pre-treatment	123	1.440	6.5	9,732	11/10/2010	12/28/2010	--
3/2/2011	Pre-treatment	83.1		6.1	10,464	11/10/2010	12/28/2010	--
3/9/2011	Pre-treatment	122		6.1	10,941	11/10/2010	12/28/2010	--
3/16/2011	Pre-treatment	113	1.860	6.2	11,870	11/10/2010	12/28/2010	--
3/23/2011	Pre-treatment	111	2.170	6.1	12,385	11/10/2010	12/28/2010	--
3/30/2011	Pre-treatment	110	2.200	6.0	13,111	11/10/2010	12/28/2010	--
4/6/2011	Pre-treatment	105	2.030	6.0	13,714	11/10/2010	12/28/2010	--
4/13/2011	Pre-treatment	85	1.960	6.2	15,254	11/10/2010	12/28/2010	--
4/20/2011	Pre-treatment	105	1.860	7.5	15,254	11/10/2010	12/28/2010	Flow rate high due to septic system testing
4/27/2011	Pre-treatment	99	1.990	6.1	16,673	11/10/2010	12/28/2010	--
5/4/2011	Pre-treatment	95	1.890	6.1	16,673	11/10/2010	12/28/2010	--
5/11/2011	Pre-treatment	85	1.880	6.0	17,934	11/10/2010	12/28/2010	--
11/17/2010	First vessel effluent	<10.0	--	6.2	579	11/10/2010	--	--
12/1/2010	First vessel effluent	<10.0	--	7.4	1,915	11/10/2010	--	--
12/8/2010	First vessel effluent	<10.0	--	7.5	2,591	11/10/2010	--	--
12/15/2010	First vessel effluent	<10.0	--	6.1	3,161	11/10/2010	--	--
12/21/2010	First vessel effluent	<10.0	--	6.0	3,667	11/10/2010	--	--
12/28/2010	First vessel effluent	<10.0	--	6.2	4,488	11/10/2010	12/28/2010	--
1/5/2011	First vessel effluent	<10.0	--	5.8	5,360	11/10/2010	12/28/2010	--
1/12/2011	First vessel effluent	<10.0	--	6.1	5,884	11/10/2010	12/28/2010	--
1/19/2011	First vessel effluent	<10.0	--	6.1	6,523	11/10/2010	12/28/2010	--
1/26/2011	First vessel effluent	<10.0	--	6.0	7,158	11/10/2010	12/28/2010	--
2/2/2011	First vessel effluent	<10.0	--	6.1	7,849	11/10/2010	12/28/2010	--
2/9/2011	First vessel effluent	<10.0	--	6.2	8,525	11/10/2010	12/28/2010	--
2/16/2011	First vessel effluent	<10.0	--	6.1	9,132	11/10/2010	12/28/2010	‡
2/23/2011	First vessel effluent	<10.0	--	6.5	9,732	11/10/2010	12/28/2010	--
3/2/2011	First vessel effluent	<10.0	--	6.1	10,464	11/10/2010	12/28/2010	--
3/9/2011	First vessel effluent	<10.0	--	6.1	10,941	11/10/2010	12/28/2010	--
3/16/2011	First vessel effluent	<10.0	--	6.2	11,870	11/10/2010	12/28/2010	--
3/23/2011	First vessel effluent	<10.0	--	6.1	12,385	11/10/2010	12/28/2010	--
3/30/2011	First vessel effluent	<10.0	--	6.0	13,111	11/10/2010	12/28/2010	--
4/6/2011	First vessel effluent	<10.0	--	6.0	13,714	11/10/2010	12/28/2010	--
4/13/2011	First vessel effluent	<10.0	--	6.2	15,254	11/10/2010	12/28/2010	--
4/20/2011	First vessel effluent	<10.0	--	7.5	15,254	11/10/2010	12/28/2010	Flow rate high due to septic system testing
4/27/2011	First vessel effluent	<10.0	--	6.1	16,673	11/10/2010	12/28/2010	--
5/4/2011	First vessel effluent	<10.0	--	6.1	16,673	11/10/2010	12/28/2010	--
5/11/2011	First vessel effluent	<10.0	--	6.0	17,934	11/10/2010	12/28/2010	--

Notes: Non detect results are presented as less than (<) practical quantitation limit (PQL).
Totalized flow is collected prior to purging.

µg/L micrograms per liter
JL Estimated result, biased low due to extraction outside hold time.
JH Estimated result, biased high due to quality control sample failures.
† Carbon tank was backwashed two extra cycles before collection of post-treatment sample. Equipment was also double checked at time of sample collection.
‡ Original results confirmed by re-analysis outside of hold time. Pace Report 10149946 shows re-analysis results that are not tabulated in this table.
-- not applicable

Table 62
Point-Of-Entry Treatment System
Accelerated Pilot Testing-Trial 1
North Pole Refinery
Flint Hills Resources Alaska, LLC

Flow Scenario: Constant Flow

Sampling Event #	Hours of Run Time	Date	Time	Totalized Flow (gal)	Sulfolane Effluent (A)	Sulfolane Influent (B)	TOC Influent	IRON Influent	Manganese Influent	TSS Influent	Turbidity Influent
1	0	1/26/2011	18:00:00	0		235 ppb	2.5 mg/L	1210 ug/L	2240 ug/L	<10 mg/L	
2	6	1/27/2011	0:00:00	1053		224 ppb	3.2 mg/L	642 ug/L	2250 ug/L	<10 mg/L	
3	14	1/27/2011	8:00:00	2478	<10 ppb	231 ppb	2.3 mg/L	492 ug/L	2090 ug/L	<10 mg/L	
4	22	1/27/2011	16:00:00	3910		216 ppb	2.5 mg/L	371 ug/L	2200 ug/L	<10 mg/L	1.3 NTU
5	30	1/28/2011	0:00:00	5196		213 ppb	2.6 mg/L	335 ug/L	2150 ug/L	<10 mg/L	1.4 NTU
6	38	1/28/2011	8:00:00	6685	<10 ppb	215 ppb	2.3 mg/L	250 ug/L	2190 ug/L	<10 mg/L	1.4 NTU
7	46	1/28/2011	16:00:00	7972		203 ppb	2.3 mg/L	304 ug/L	2170 ug/L	<10 mg/L	
8	54	1/29/2011	0:00:00	9384		210 ppb	2.2 mg/L	315 ug/L	2110 ug/L	<10 mg/L	
9	62	1/29/2011	8:00:00	10739	26.1 ppb	205 ppb	2.2 mg/L	280 ug/L	2250 ug/L	<10 mg/L	
10	70	1/29/2011	16:00:00	12130		202 ppb	3.4 mg/L	262 ug/L	2200 ug/L	<10 mg/L	
11	78	1/30/2011	0:00:00	13504		205 ppb	2.4 mg/L	385 ug/L	2190 ug/L	<10 mg/L	
12	86	1/30/2011	8:00:00	14789	31.7 ppb	204 ppb	2.1 mg/L	284 ug/L	2210 ug/L	<10 mg/L	
13	94	1/30/2011	16:00:00	16213		207 ppb	2.1 mg/L	234 ug/L	2150 ug/L	<10 mg/L	
14	102	1/31/2011	0:00:00	17468			2.1 mg/L	259 ug/L	2210 ug/L	<10 mg/L	
15	110	1/31/2011	8:00:00	18814	39.6 ppb	205 ppb	2.1 mg/L	211 ug/L	2030 ug/L	<10 mg/L	
16	118	1/31/2011	16:00:00	20187		169 ppb	2.5 mg/L	196 ug/L	2110 ug/L	<10 mg/L	
17	126	2/1/2011	0:00:00	21569		167 ppb	2.4 mg/L	246 ug/L	2150 ug/L	<10 mg/L	
18	134	2/1/2011	8:00:00	22869	38.5 ppb	172 ppb	3.6 mg/L	154 ug/L	2260 ug/L	<10 mg/L	
19	142	2/1/2011	16:00:00	24175	38.5 ppb	158 ppb	2.5 mg/L	170 ug/L	2090 ug/L	<10 mg/L	
20	150	2/2/2011	0:00:00	25532		168 ppb	2.7 mg/L	176 ug/L	2090 ug/L	<10 mg/L	
21	158	2/2/2011	8:00:00	26950	48.4 ppb	156 ppb	2.6 mg/L	174 ug/L	2000 ug/L	<10 mg/L	

Additional Results

Finished Water Storage Tank (Sample ID T-001)	<10 ppb
Secondary Tank Effluent at 26,950 gallons Sample ID P-001)	<10 ppb
Softener Effluent/Carbon Influent (Sample ID 20-152 C)	198 ppb

Table 63
Point-Of-Entry Treatment System
Accelerated Pilot Testing-Trial 2
North Pole Refinery
Flint Hills Resources Alaska, LLC

Flow Scenario: 20 minutes On and 20 minutes Off for 16 hours, followed by 8 hours completely Off

Event #	Hours of Run Time	Date	Time	Total Flow	Polishing Effluent (C)	Sulfolane Effluent (A)	Sulfolane Infulent (B)	TOC Influent	IRON Influent	Manganese Influent	TSS Influent
1	0	16-Feb	8:00	0		<10 ppb	290 ppb	3.2 mg/L	1160 ug/L	2320 ug/L	<10 mg/L
2	16	17-Feb	8:00	1433		<10 ppb	282 ppb	2.7 mg/L	326 ug/L	2240 ug/L	<10 mg/L
3	32	18-Feb	8:00	2865		<10 ppb	241 ppb	2.3 mg/L	302 ug/L	2400 ug/L	<10 mg/L
4	48	19-Feb	8:00	4299		<10 ppb	236 ppb	2.2 mg/L	296 ug/L	2380 ug/L	<10 mg/L
5	64	20-Feb	8:00	5683		<10 ppb	231 ppb	2.2 mg/L	383 ug/L	2310 ug/L	<10 mg/L
6	80	21-Feb	8:00	7272		<10 ppb	244 ppb	2.5 mg/L	314 ug/L	2390 ug/L	<10 mg/L
7	96	22-Feb	8:00	8707		<10 ppb	262 ppb	2.1 mg/L	256 ug/L	2370 ug/L	<10 mg/L
8	112	23-Feb	8:00	10102		<10 ppb	252 ppb	2.7 mg/L	247 ug/L	2230 ug/L	<10 mg/L
9	128	24-Feb	8:00	11794		13.0 ppb	242 ppb	2.7 mg/L	226 ug/L	2130 ug/L	<10 mg/L
10	144	25-Feb	8:00	13336		14.7 ppb	258 ppb	2.9 mg/L	224 ug/L	2230 ug/L	<10 mg/L
11	160	26-Feb	8:00	14866		15.6 ppb	234 ppb	2.8 mg/L	230 ug/L	2200 ug/L	<10 mg/L
12	176	27-Feb	8:00	16375		19.3 ppb	235 ppb	2.6 mg/L	316 ug/L	2240 ug/L	<10 mg/L
13	192	28-Feb	8:00	18002		18.9 ppb	240 ppb	2.6 mg/L	263 ug/L	2240 ug/L	<10 mg/L
14	208	1-Mar	8:00	22565	<10 ppb	17.8 ppb	194 ppb	2.4 mg/L	230 ug/L	2170 ug/L	<10 mg/L
15	224	2-Mar	8:00	24092		26.6 ppb	197 ppb	2.4 mg/L	777 ug/L	2190 ug/L	<10 mg/L
16	240	3-Mar	8:00	25619	<10 ppb	31.7 ppb	205 ppb	2.3 mg/L	232 ug/L	2120 ug/L	<10 mg/L
17	256	4-Mar	8:00	27140		39.0 ppb	195 ppb	2.4 mg/L	370 ug/L	2290 ug/L	<10 mg/L
18	272	5-Mar	8:00	28672	<10 ppb	44.9 ppb	193 ppb	2.6 mg/L	320 ug/L	2260 ug/L	<10 mg/L
19	288	6-Mar	8:00	31402		50.7 ppb	188 ppb	2.4 mg/L	281 ug/L	2260 ug/L	<10 mg/L
20	304	7-Mar			<10 ppb	47.3 ppb	192 ppb	2.6 mg/L	227 ug/L	2180 ug/L	<10 mg/L

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118846	SB-103 (5-6.7)	AK103	Residual Range Organics	16.1	J	6.34	12.68	20.5	mg/Kg	20.5	UB	none	instrument blank
1118846	SB-104 (5.0-6.7)	AK103	Residual Range Organics	12.2	J	6.57	13.14	21.2	mg/Kg	21.2	UB	none	instrument blank
1118856	SB-105 (0.0-2.0)	SW6020	Antimony	0.129	=	0.0348	0.0696	0.112	mg/Kg	0.129	J	none	MS/MSD recovery
1118856	SB-105 (0.0-2.0)	SW6020	Copper	26.3	=	0.202	0.404	0.674	mg/Kg	26.3	J	none	MS/MSD recovery
1118856	SB-105 (5.0-6.2)	AK101	Gasoline Range Organics	0	ND	0.831	1.662	2.77	mg/Kg	1.662	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	1,1-Dichloroethene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	1,2,4-Trimethylbenzene	0	ND	16.6	33.2	55.4	ug/Kg	33.2	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	1,3,5-Trimethylbenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	4-Isopropyltoluene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Benzene	0	ND	4.32	8.64	13.9	ug/Kg	8.64	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Chlorobenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	cis-1,2-Dichloroethene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Cyclohexane	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Ethylbenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Isopropylbenzene (Cumene)	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Methylene chloride	0	ND	34.4	68.8	111	ug/Kg	68.8	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Methyl-t-butyl ether	0	ND	34.4	68.8	111	ug/Kg	68.8	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	n-Butylbenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	n-hexane	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	n-Propylbenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	o-Xylene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	P & M -Xylene	0	ND	16.6	33.2	55.4	ug/Kg	33.2	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	tert-Butylbenzene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Toluene	0	ND	8.64	17.28	27.7	ug/Kg	17.28	UJ	low	leaking methanol
1118856	SB-105 (5.0-6.2)	SW8260B	Xylenes (total)	0	ND	34.4	68.8	111	ug/Kg	68.8	UJ	low	leaking methanol
1118856	SB-119 (5.0-6.4)	SW8021B	Benzene	0	ND	5.36	10.72	16.8	ug/Kg	10.72	UJ	low	leaking methanol
1118856	SB-119 (5.0-6.4)	SW8021B	Ethylbenzene	0	ND	10.5	21	33.5	ug/Kg	21	UJ	low	leaking methanol
1118856	SB-119 (5.0-6.4)	SW8021B	o-Xylene	0	ND	10.5	21	33.5	ug/Kg	21	UJ	low	leaking methanol
1118856	SB-119 (5.0-6.4)	SW8021B	P & M -Xylene	0	ND	20.1	40.2	67.1	ug/Kg	40.2	UJ	low	leaking methanol
1118856	SB-119 (5.0-6.4)	SW8021B	Toluene	0	ND	10.5	21	33.5	ug/Kg	21	UJ	low	leaking methanol
1118856	SB-124 (0-2.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00336	0.00672	0.0109	mg/Kg	R	R	none	matrix interference
1118856	SB-124 (10.0-11.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00346	0.00692	0.0112	mg/Kg	R	R	none	matrix interference
1118856	SB-124 (5.0-6.3)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0032	0.0064	0.0103	mg/Kg	R	R	none	matrix interference
1118856	SB-124 (5.0-6.3)	SW8021B	Benzene	0	ND	4.77	9.54	14.9	ug/Kg	9.54	UJ	low	leaking methanol
1118856	SB-124 (5.0-6.3)	SW8021B	Ethylbenzene	46.2	=	9.31	18.62	29.8	ug/Kg	46.2	JL	low	leaking methanol
1118856	SB-124 (5.0-6.3)	SW8021B	o-Xylene	26.8	J	9.31	18.62	29.8	ug/Kg	26.8	JL	low	leaking methanol
1118856	SB-124 (5.0-6.3)	SW8021B	P & M -Xylene	104	=	17.9	35.8	59.7	ug/Kg	104	JL	low	leaking methanol
1118856	SB-124 (5.0-6.3)	SW8021B	Toluene	17.9	J	9.31	18.62	29.8	ug/Kg	17.9	JL	low	leaking methanol
1118856	SD-124 (0-2.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00327	0.00654	0.0106	mg/Kg	R	R	none	matrix interference
1118861	SB-108(0.0-2.0)	AK101	Gasoline Range Organics	5.35	=	1.01	2.02	3.37	mg/Kg	5.35	JH	high	missing trip blank
1118861	SB-108(0.0-2.0)	AK102	Diesel Range Organics	869	=	41.9	83.8	135	mg/Kg	869	JH	high	contribution from heavier hydrocarbons
1118861	SB-108(0.0-2.0)	AK103	Residual Range Organics	8450	=	41.9	83.8	135	mg/Kg	8450	J	none	outside calibration range
1118861	SB-108(0.0-2.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0261	0.0522	0.0842	mg/Kg	R	R	none	matrix interference
1118861	SB-108(0.0-2.0)	SW8260B	n-hexane	13.1	J	10.5	21	33.7	ug/Kg	13.1	JH	high	missing trip blank
1118861	SB-108(6.5-7.5)	AK101	Gasoline Range Organics	0.899	J	0.894	1.788	2.98	mg/Kg	0.899	JH	high	missing trip blank
1118861	SB-108(6.5-7.5)	SW8260B	Isopropylbenzene (Cumene)	29.5	J	9.29	18.58	29.8	ug/Kg	29.5	JH	high	missing trip blank
1118861	SB-110(5.0-6.9)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00319	0.00638	0.0103	mg/Kg	R	R	none	matrix interference
1118861	SB-110(7.0-8.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00334	0.00668	0.0108	mg/Kg	R	R	none	matrix interference
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	1-Methylnaphthalene	21400	=	630	1260	2100	ug/Kg	21400	JH	high	surrogate recovery
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	2-Methylnaphthalene	27600	=	630	1260	2100	ug/Kg	27600	JH	high	surrogate recovery

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	Anthracene	35.5	J	31.5	63	105	ug/Kg	35.5	JH	high	surrogate recovery
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	Fluorene	799	=	31.5	63	105	ug/Kg	799	JH	high	surrogate recovery
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	Naphthalene	10000	=	630	1260	2100	ug/Kg	10000	JH	high	surrogate recovery
1118862	SB-109 (7.5-8.5)	8270D SIMS (PAH)	Phenanthrene	434	=	31.5	63	105	ug/Kg	434	JH	high	surrogate recovery
1118862	SB-109 (7.5-8.5)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00326	0.00652	0.0105	mg/Kg	R	R	none	matrix interference
1118862	SB-111 (4.0-6.0)	8270D SIMS (PAH)	1-Methylnaphthalene	3440	=	77.9	155.8	260	ug/Kg	3440	JH	high	MS/MSD, surrogate recovery
1118862	SB-111 (4.0-6.0)	8270D SIMS (PAH)	2-Methylnaphthalene	4150	=	77.9	155.8	260	ug/Kg	4150	JH	high	MS/MSD, surrogate recovery
1118862	SB-111 (4.0-6.0)	8270D SIMS (PAH)	Anthracene	13.8	J	7.79	15.58	26	ug/Kg	13.8	JH	high	surrogate recovery
1118862	SB-111 (4.0-6.0)	8270D SIMS (PAH)	Naphthalene	1580	=	77.9	155.8	260	ug/Kg	1580	JH	high	surrogate recovery, MS/MSD RPD
1118862	SB-111 (4.0-6.0)	8270D SIMS (PAH)	Phenanthrene	199	=	7.79	15.58	26	ug/Kg	199	JH	high	surrogate recovery
1118862	SB-111 (4.0-6.0)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00324	0.00648	0.0105	mg/Kg	R	R	none	matrix interference
1118862	SB-111 (8-9.2)	8270D SIMS (PAH)	1-Methylnaphthalene	10	=	1.9	3.8	6.33	ug/Kg	10	JH	high	MS/MSD recovery
1118862	SB-111 (8-9.2)	8270D SIMS (PAH)	2-Methylnaphthalene	14.2	=	1.9	3.8	6.33	ug/Kg	14.2	JH	high	MS/MSD recovery
1118862	SB-111 (8-9.2)	8270D SIMS (PAH)	Naphthalene	8.23	=	1.9	3.8	6.33	ug/Kg	8.23	J	none	MS/MSD RPD
1118862	SB-143 (0.0-2.0)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00353	0.00706	0.0114	mg/Kg	R	R	none	matrix interference
1118875	SB-122(5.0-6.2)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00348	0.00696	0.0112	mg/Kg	R	R	none	matrix interference
1118875	SB-122(6.5-7.5)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00332	0.00664	0.0107	mg/Kg	R	R	none	matrix interference
1118875	SB-130(4.0-5.6)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00319	0.00638	0.0103	mg/Kg	R	R	none	matrix interference
1118875	SB-130(7.0-8.4)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00335	0.0067	0.0108	mg/Kg	R	R	none	matrix interference
1118875	SD-130(11.5-12.5)	SW8021B	Toluene	35	=	8.95	17.9	28.7	ug/Kg	35	UB	none	method blank
1118877	SB-139(0.0-2.0)	SW8021B	Toluene	9.79	J	6.94	13.88	22.2	ug/Kg	22.2	UB	none	method blank
1118877	SB-147(3.0-5.0)	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.133	=	0.00387	0.00774	0.0125	mg/Kg	R	R	none	matrix interference
1118878	SB-132 (0.0-2.0)	SW8260B	1,3,5-Trimethylbenzene	15.7	J	12.2	24.4	39.1	ug/Kg	39.1	UB	none	method blank
1118896	SB-128 5.0-6.6	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00316	0.00632	0.0102	mg/Kg	R	R	none	matrix interference
1118896	SB-128 5.0-6.6	SW8021B	Benzene	5430	=	26.2	52.4	81.8	ug/Kg	5430	JH	high	surrogate recovery
1118896	SB-128 5.0-6.6	SW8021B	Ethylbenzene	23700	=	51	102	164	ug/Kg	23700	JH	high	surrogate recovery
1118896	SB-128 5.0-6.6	SW8021B	o-Xylene	26100	=	51	102	164	ug/Kg	26100	JH	high	surrogate recovery
1118896	SB-128 5.0-6.6	SW8021B	P & M -Xylene	69400	=	98.1	196.2	327	ug/Kg	69400	JH	high	surrogate recovery
1118896	SB-128 5.0-6.6	SW8021B	Toluene	10100	=	51	102	164	ug/Kg	10100	JH	high	surrogate recovery
1118896	SB-158 0.0-2.0	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00327	0.00654	0.0106	mg/Kg	R	R	none	matrix interference
1118896	SB-158 7.0-8.4	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0	J	0.00326	0.00652	0.0105	mg/Kg	R	R	none	matrix interference
1118899	SB-113 11.0-12.3	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.109	=	0.00348	0.00696	0.0112	mg/Kg	0.109	JH	high	LCS/LCSD recovery
1118899	SB-113 5.0-7.0	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.0125	=	0.00324	0.00648	0.0104	mg/Kg	R	R	none	matrix interference
1118900	SB-157 0.0-2.0	AK103	Residual Range Organics	19.8	J	6.37	12.74	20.5	mg/Kg	20.5	UB	none	method blank
1118900	SB-157 6.0-8.0	AK103	Residual Range Organics	8.74	J	6.46	12.92	20.9	mg/Kg	20.9	UB	none	method blank
1118900	SB-181 2.5-4.1	AK103	Residual Range Organics	13.6	J	6.92	13.84	22.3	mg/Kg	22.3	UB	none	method blank
1118904	SB-118 2.0-3.7	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.0083	J	0.00386	0.00772	0.0125	mg/Kg	R	R	none	matrix interference
1118905	SB-115 15.0-17.0	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.0161	=	0.00374	0.00748	0.0121	mg/Kg	0.0161	JH	high	LCS/LCSD recovery
1118905	SB-115 6.0-7.3	Sulfolane-SW8270D M w/IsoDI SI	Sulfolane	0.197	=	0.00322	0.00644	0.0104	mg/Kg	0.197	JH	high	LCS/LCSD recovery
1118917	SB-129 (7.5-8.7)	AK101	Gasoline Range Organics	127	=	4.68	9.36	15.6	mg/Kg	127	JH	high	surrogate recovery
1118923	SB-120(0.0-2.0)	AK101	Gasoline Range Organics	2.87	J	1.01	2.02	3.36	mg/Kg	3.36	UB	none	method blank
1118923	SB-120(12.0-13.1)	AK101	Gasoline Range Organics	2.11	J	0.788	1.576	2.63	mg/Kg	2.63	UB	none	method blank
1118923	SB-120(12.0-13.1)	SW8260B	1,1-Dichloroethene	0	ND	8.19	16.38	26.3	ug/Kg	16.38	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	1,2,4-Trimethylbenzene	72	=	15.8	31.6	52.5	ug/Kg	72	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	1,3,5-Trimethylbenzene	20.5	J	8.19	16.38	26.3	ug/Kg	26.3	UB	none	trip blank
1118923	SB-120(12.0-13.1)	SW8260B	4-Isopropyltoluene	0	ND	8.19	16.38	26.3	ug/Kg	16.38	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Benzene	0	ND	4.1	8.2	13.1	ug/Kg	8.2	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Chlorobenzene	0	ND	8.19	16.38	26.3	ug/Kg	16.38	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	cis-1,2-Dichloroethene	0	ND	8.19	16.38	26.3	ug/Kg	16.38	UJ	low	delayed extraction

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118923	SB-120(12.0-13.1)	SW8260B	Cyclohexane	14.2	J	8.19	16.38	26.3	ug/Kg	14.2	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Ethylbenzene	33.4	=	8.19	16.38	26.3	ug/Kg	33.4	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Isopropylbenzene (Cumene)	10.2	J	8.19	16.38	26.3	ug/Kg	10.2	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Methylene chloride	55.1	J	32.6	65.2	105	ug/Kg	55.1	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Methyl-t-butyl ether	0	ND	32.6	65.2	105	ug/Kg	65.2	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	n-Butylbenzene	9.98	J	8.19	16.38	26.3	ug/Kg	9.98	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	n-hexane	12.6	J	8.19	16.38	26.3	ug/Kg	12.6	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	n-Propylbenzene	19.7	J	8.19	16.38	26.3	ug/Kg	19.7	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	o-Xylene	53.8	=	8.19	16.38	26.3	ug/Kg	53.8	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	P & M -Xylene	137	=	15.8	31.6	52.5	ug/Kg	137	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	tert-Butylbenzene	0	ND	8.19	16.38	26.3	ug/Kg	16.38	UJ	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Toluene	10.8	J	8.19	16.38	26.3	ug/Kg	10.8	JL	low	delayed extraction
1118923	SB-120(12.0-13.1)	SW8260B	Xylenes (total)	190	=	32.6	65.2	105	ug/Kg	190	JL	low	delayed extraction
1118923	SB-120(7.2-9.2)	AK101	Gasoline Range Organics	254	=	5.96	11.92	19.9	mg/Kg	254	JH	high	surrogate recovery
1118923	SB-120(7.2-9.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0032	0.0064	0.0103	mg/Kg	R	R	none	matrix interference
1118923	SB-120(7.2-9.2)	SW8260B	Benzene	16.5	=	3.1	6.2	9.93	ug/Kg	16.5	J	none	field-duplicate RPD
1118923	SB-120(7.2-9.2)	SW8260B	Toluene	97.2	=	6.2	12.4	19.9	ug/Kg	97.2	J	none	field-duplicate RPD
1118923	SB-120(7.2-9.2)	SW8260B	Xylenes (total)	11200	=	493	986	1590	ug/Kg	11200	J	none	field-duplicate RPD
1118923	SD-120(7.2-9.2)	AK101	Gasoline Range Organics	408	=	6.28	12.56	20.9	mg/Kg	408	JH	high	surrogate recovery
1118923	SD-120(7.2-9.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0032	0.0064	0.0103	mg/Kg	R	R	none	matrix interference
1118923	SD-120(7.2-9.2)	SW8260B	Benzene	28.5	=	3.27	6.54	10.5	ug/Kg	28.5	J	none	field-duplicate RPD
1118923	SD-120(7.2-9.2)	SW8260B	Toluene	223	=	6.53	13.06	20.9	ug/Kg	223	J	none	field-duplicate RPD
1118923	SD-120(7.2-9.2)	SW8260B	Xylenes (total)	19700	=	519	1038	1670	ug/Kg	19700	J	none	field-duplicate RPD
1118924	SB-126(0.0-2.0)	SW8021B	Toluene	11.2	J	7.59	15.18	24.3	ug/Kg	24.3	UB	none	method blank
1118924	SB-126(6.0-7.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00317	0.00634	0.0102	mg/Kg	R	R	none	matrix interference
1118924	SB-127(5.0-7.0)	SW8021B	Toluene	10.3	J	5.72	11.44	18.3	ug/Kg	18.3	UB	none	method blank
1118929	SB-117(11.0-12.0)	8270D SIMS (PAH)	1-Methylnaphthalene	2.85	J	1.73	3.46	5.77	ug/Kg	5.77	UB	none	method blank
1118929	SB-117(11.0-12.0)	8270D SIMS (PAH)	2-Methylnaphthalene	3.08	J	1.73	3.46	5.77	ug/Kg	5.77	UB	none	method blank
1118929	SB-117(11.0-12.0)	8270D SIMS (PAH)	Naphthalene	2.22	J	1.73	3.46	5.77	ug/Kg	5.77	UB	none	method blank
1118929	SB-117(5.0-7.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0032	0.0064	0.0103	mg/Kg	R	R	none	matrix interference
1118929	SB-117(5.0-7.0)	SW8021B	Benzene	368	=	2.91	5.82	9.09	ug/Kg	368	J	none	field-duplicate RPD
1118929	SB-117(5.0-7.0)	SW8021B	Ethylbenzene	1300	=	5.67	11.34	18.2	ug/Kg	1300	J	none	field-duplicate RPD
1118929	SB-117(5.0-7.0)	SW8021B	o-Xylene	1880	=	5.67	11.34	18.2	ug/Kg	1880	J	none	field-duplicate RPD
1118929	SB-117(5.0-7.0)	SW8021B	P & M -Xylene	4480	=	10.9	21.8	36.4	ug/Kg	4480	J	none	field-duplicate RPD
1118929	SB-117(5.0-7.0)	SW8021B	Toluene	2170	=	5.67	11.34	18.2	ug/Kg	2170	J	none	field-duplicate RPD
1118929	SB-153A(0.0-2.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00318	0.00636	0.0102	mg/Kg	0.00636	UJ	low	holding time
1118929	SB-155(0.0-2.0)	8270D SIMS (PAH)	1-Methylnaphthalene	8.31	J	7.66	15.32	25.5	ug/Kg	25.5	UB	none	method blank
1118929	SB-155(0.0-2.0)	8270D SIMS (PAH)	2-Methylnaphthalene	9.19	J	7.66	15.32	25.5	ug/Kg	25.5	UB	none	method blank
1118929	SB-155(0.0-2.0)	8270D SIMS (PAH)	Naphthalene	7.81	J	7.66	15.32	25.5	ug/Kg	25.5	UB	none	method blank
1118929	SB-155(12.0-13.0)	8270D SIMS (PAH)	1-Methylnaphthalene	9.9	=	1.64	3.28	5.46	ug/Kg	9.9	UB	none	method blank
1118929	SB-155(12.0-13.0)	8270D SIMS (PAH)	2-Methylnaphthalene	11.7	=	1.64	3.28	5.46	ug/Kg	11.7	UB	none	method blank
1118929	SB-155(12.0-13.0)	8270D SIMS (PAH)	Naphthalene	5.51	=	1.64	3.28	5.46	ug/Kg	5.51	UB	none	method blank
1118929	SB-155(5.0-6.3)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00316	0.00632	0.0102	mg/Kg	R	R	none	matrix interference
1118929	SD-117(5.0-7.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00318	0.00636	0.0102	mg/Kg	R	R	none	matrix interference
1118929	SD-117(5.0-7.0)	SW8021B	Benzene	3010	=	35.1	70.2	110	ug/Kg	3010	J	none	field-duplicate RPD
1118929	SD-117(5.0-7.0)	SW8021B	Ethylbenzene	12400	=	68.5	137	219	ug/Kg	12400	J	none	field-duplicate RPD
1118929	SD-117(5.0-7.0)	SW8021B	o-Xylene	17100	=	68.5	137	219	ug/Kg	17100	J	none	field-duplicate RPD
1118929	SD-117(5.0-7.0)	SW8021B	P & M -Xylene	40700	=	132	264	439	ug/Kg	40700	J	none	field-duplicate RPD
1118929	SD-117(5.0-7.0)	SW8021B	Toluene	19100	=	68.5	137	219	ug/Kg	19100	J	none	field-duplicate RPD
1118934	SB-123 (0.0-2.0)	AK101	Gasoline Range Organics	2.28	J	0.943	1.886	3.14	mg/Kg	3.14	UB	none	method blank
1118934	SB-123 (0.0-2.0)	SW6020	Antimony	0.113	=	0.0308	0.0616	0.0992	mg/Kg	0.113	J	none	MS/MSD recovery
1118934	SB-123 (0.0-2.0)	SW8260B	1,2,4-Trimethylbenzene	21.7	J	18.9	37.8	62.9	ug/Kg	62.9	UB	none	method blank

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118934	SB-123 (0.0-2.0)	SW8260B	1,3,5-Trimethylbenzene	22.3	J	9.81	19.62	31.4	ug/Kg	22.3	JH	high	no trip blank
1118934	SB-123 (0.0-2.0)	SW8260B	4-Isopropyltoluene	18.2	J	9.81	19.62	31.4	ug/Kg	18.2	JH	high	no trip blank
1118934	SB-123 (0.0-2.0)	SW8260B	Methylene chloride	60.4	J	39	78	126	ug/Kg	60.4	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	AK101	Gasoline Range Organics	2.69	=	0.577	1.154	1.92	mg/Kg	2.69	UB	none	method blank
1118934	SB-123 (11.5-13.0)	SW8260B	1,2,4-Trimethylbenzene	76.2	=	11.5	23	38.5	ug/Kg	76.2	UB	none	method blank
1118934	SB-123 (11.5-13.0)	SW8260B	1,3,5-Trimethylbenzene	36.2	=	6	12	19.2	ug/Kg	36.2	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	4-Isopropyltoluene	17.9	J	6	12	19.2	ug/Kg	17.9	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	Benzene	6.16	J	3	6	9.62	ug/Kg	6.16	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	Cyclohexane	34.6	=	6	12	19.2	ug/Kg	34.6	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	Ethylbenzene	34.2	=	6	12	19.2	ug/Kg	34.2	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	Isopropylbenzene (Cumene)	16.9	J	6	12	19.2	ug/Kg	16.9	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	n-Butylbenzene	30.2	=	6	12	19.2	ug/Kg	30.2	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	n-hexane	38.5	=	6	12	19.2	ug/Kg	38.5	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	n-Propylbenzene	32.7	=	6	12	19.2	ug/Kg	32.7	UB	none	method blank
1118934	SB-123 (11.5-13.0)	SW8260B	o-Xylene	36.2	=	6	12	19.2	ug/Kg	36.2	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	P & M -Xylene	99.8	=	11.5	23	38.5	ug/Kg	99.8	JH	high	no trip blank
1118934	SB-123 (11.5-13.0)	SW8260B	Toluene	15	J	6	12	19.2	ug/Kg	19.2	UB	none	method blank
1118934	SB-123 (11.5-13.0)	SW8260B	Xylenes (total)	136	=	23.9	47.8	76.9	ug/Kg	136	JH	high	no trip blank
1118934	SB-123 (3.5-5.2)	AK101	Gasoline Range Organics	1.57	J	1.07	2.14	3.55	mg/Kg	3.55	UB	none	method blank
1118934	SB-123 (3.5-5.2)	SW8260B	1,2,4-Trimethylbenzene	25.6	J	21.3	42.6	71.1	ug/Kg	71.1	UB	none	method blank
1118934	SB-123 (3.5-5.2)	SW8260B	1,3,5-Trimethylbenzene	25.9	J	11.1	22.2	35.5	ug/Kg	25.9	JH	high	no trip blank
1118934	SB-123 (3.5-5.2)	SW8260B	Methylene chloride	188	=	44.1	88.2	142	ug/Kg	188	JH	high	no trip blank
1118934	SB-123 (3.5-5.2)	SW8260B	n-Propylbenzene	12.4	J	11.1	22.2	35.5	ug/Kg	35.5	UB	none	method blank
1118934	SB-123 (6.0-8.0)	AK101	Gasoline Range Organics	1110	=	15.2	30.4	50.6	mg/Kg	1110	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00343	0.00686	0.0111	mg/Kg	R	R	none	matrix interference
1118934	SB-123 (6.0-8.0)	SW8260B	1,2,4-Trimethylbenzene	38200	=	1520	3040	5060	ug/Kg	38200	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	1,3,5-Trimethylbenzene	15300	=	79	158	253	ug/Kg	15300	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	4-Isopropyltoluene	10100	=	79	158	253	ug/Kg	10100	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Benzene	2340	=	39.5	79	127	ug/Kg	2340	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Cyclohexane	17200	=	790	1580	2530	ug/Kg	17200	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Ethylbenzene	23200	=	790	1580	2530	ug/Kg	23200	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Isopropylbenzene (Cumene)	8120	=	79	158	253	ug/Kg	8120	JH	high	LCS/LCSD recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	n-Butylbenzene	7760	=	79	158	253	ug/Kg	7760	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	n-hexane	13000	=	790	1580	2530	ug/Kg	13000	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	n-Propylbenzene	14200	=	79	158	253	ug/Kg	14200	JH	high	surrogate recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	o-Xylene	36100	=	790	1580	2530	ug/Kg	36100	JH	high	LCS/LCSD recovery, no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	P & M -Xylene	87400	=	1520	3040	5060	ug/Kg	87400	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Toluene	12400	=	79	158	253	ug/Kg	12400	JH	high	no trip blank
1118934	SB-123 (6.0-8.0)	SW8260B	Xylenes (total)	124000	=	3140	6280	10100	ug/Kg	124000	JH	high	no trip blank
1118934	SD-123 (3.5-5.2)	8270D SIMS (PAH)	2-Methylnaphthalene	13.4	J	8.35	16.7	27.8	ug/Kg	13.4	J	none	MS/MSD RPD
1118934	SD-123 (3.5-5.2)	AK101	Gasoline Range Organics	1.39	J	1.02	2.04	3.4	mg/Kg	3.4	UB	none	method blank
1118934	SD-123 (3.5-5.2)	SW8260B	1,2,4-Trimethylbenzene	24.2	J	20.4	40.8	68.1	ug/Kg	68.1	UB	none	method blank
1118934	SD-123 (3.5-5.2)	SW8260B	1,3,5-Trimethylbenzene	24.5	J	10.6	21.2	34	ug/Kg	24.5	JH	high	no trip blank
1118934	SD-123 (3.5-5.2)	SW8260B	n-Propylbenzene	11.9	J	10.6	21.2	34	ug/Kg	34	UB	none	method blank

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118955	SB-114(0.0-2.0)	SW8021B	Benzene	231	=	2.5	5	7.8	ug/Kg	231	JH	high	surrogate recovery
1118955	SB-114(0.0-2.0)	SW8021B	Ethylbenzene	1760	=	4.87	9.74	15.6	ug/Kg	1760	JH	high	surrogate recovery
1118955	SB-114(0.0-2.0)	SW8021B	o-Xylene	2980	=	4.87	9.74	15.6	ug/Kg	2980	JH	high	surrogate recovery
1118955	SB-114(0.0-2.0)	SW8021B	P & M -Xylene	2390	=	9.36	18.72	31.2	ug/Kg	2390	JH	high	surrogate recovery
1118955	SB-114(0.0-2.0)	SW8021B	Toluene	534	=	4.87	9.74	15.6	ug/Kg	534	JH	high	surrogate recovery
1118955	SB-114(16-18.0)	SW8021B	Benzene	37.3	=	3.12	6.24	9.76	ug/Kg	37.3	UB	none	trip blank
1118955	SB-114(16-18.0)	SW8021B	Toluene	25.4	=	6.09	12.18	19.5	ug/Kg	25.4	UB	none	trip blank
1118955	SB-114(5.0-6.8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00343	0.00686	0.0111	mg/Kg	R	R	none	matrix interference
1118955	SB-114(7.0-8.6)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00673	J	0.0033	0.0066	0.0106	mg/Kg	R	R	none	matrix interference
1118955	SB-163(0.0-2.0)	SW8021B	Benzene	14.1	=	3.05	6.1	9.53	ug/Kg	14.1	UB	none	trip blank
1118955	SB-163(0.0-2.0)	SW8021B	Toluene	25.1	=	5.94	11.88	19.1	ug/Kg	25.1	UB	none	method & trip blank
1118955	SB-163(5.0-6.8)	SW8021B	Benzene	8.4	J	3.28	6.56	10.2	ug/Kg	10.2	UB	none	trip blank
1118955	SB-163(5.0-6.8)	SW8021B	Toluene	11.1	J	6.39	12.78	20.5	ug/Kg	20.5	UB	none	method & trip blank
1118955	SB-168(0.0-2.0)	SW8021B	Benzene	4.38	J	2.8	5.6	8.76	ug/Kg	8.76	UB	none	trip blank
1118955	SB-168(0.0-2.0)	SW8021B	Toluene	11.2	J	5.47	10.94	17.5	ug/Kg	17.5	UB	none	trip blank
1118955	SB-168(11.0-12.0)	SW8021B	Benzene	8.53	J	3.59	7.18	11.2	ug/Kg	11.2	UB	none	trip blank
1118955	SB-168(11.0-12.0)	SW8021B	Toluene	29	=	7	14	22.4	ug/Kg	29	UB	none	trip blank
1118955	SB-168(3.5-5.1)	8270D SIMS (PAH)	Phenanthrene	7.23	=	1.96	3.92	6.53	ug/Kg	7.23	J	none	field-duplicate RPD
1118955	SB-168(3.5-5.1)	SW8021B	Benzene	12.4	J	6.63	13.26	20.7	ug/Kg	20.7	UB	none	trip blank
1118955	SB-168(3.5-5.1)	SW8021B	Toluene	24.8	J	12.9	25.8	41.4	ug/Kg	41.4	UB	none	trip blank
1118955	SB-170(0.0-2.0)	SW8021B	Benzene	14.3	=	4.16	8.32	13	ug/Kg	14.3	UB	none	trip blank
1118955	SB-170(0.0-2.0)	SW8021B	Toluene	26.8	=	8.12	16.24	26	ug/Kg	26.8	UB	none	method & trip blank
1118955	SB-170(6.0-7.6)	SW8021B	Benzene	19.6	=	3.65	7.3	11.4	ug/Kg	19.6	UB	none	trip blank
1118955	SB-170(6.0-7.6)	SW8021B	Toluene	28	=	7.11	14.22	22.8	ug/Kg	28	UB	none	trip blank
1118955	SB-174(12.0-13.3)	SW8021B	Benzene	18	=	3.39	6.78	10.6	ug/Kg	18	UB	none	trip blank
1118955	SB-174(12.0-13.3)	SW8021B	Toluene	117	=	6.62	13.24	21.2	ug/Kg	117	UB	none	trip blank
1118955	SB-174(5.5-7.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0032	0.0064	0.0103	mg/Kg	R	R	none	matrix interference
1118955	SB-174(7.5-9.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00332	0.00664	0.0107	mg/Kg	R	R	none	matrix interference
1118955	SD-114(7.0-8.6)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00687	J	0.00337	0.00674	0.0109	mg/Kg	R	R	none	matrix interference
1118955	SD-168(3.5-5.1)	8270D SIMS (PAH)	Phenanthrene	2.98	J	1.94	3.88	6.46	ug/Kg	2.98	J	none	field-duplicate RPD
1118955	SD-168(3.5-5.1)	SW8021B	Benzene	17.2	J	7.06	14.12	22	ug/Kg	22	UB	none	trip blank
1118955	SD-168(3.5-5.1)	SW8021B	o-Xylene	0	ND	13.8	27.6	44.1	ug/Kg	27.6	UJ	low	delayed extraction
1118955	SD-168(3.5-5.1)	SW8021B	P & M -Xylene	28.2	J	26.5	53	88.2	ug/Kg	28.2	JL	low	delayed extraction
1118955	SD-168(3.5-5.1)	SW8021B	Toluene	52	=	13.8	27.6	44.1	ug/Kg	52	UB	none	trip blank
1118956	SB-167 (0.0-2.0)	SW8260B	1,2,4-Trimethylbenzene	15.5	J	11.6	23.2	38.8	ug/Kg	38.8	UB	none	method blank
1118956	SB-167 (0.0-2.0)	SW8260B	1,3,5-Trimethylbenzene	14.7	J	6.05	12.1	19.4	ug/Kg	19.4	UB	none	trip blank
1118956	SB-167 (0.0-2.0)	SW8260B	n-Butylbenzene	14.3	J	6.05	12.1	19.4	ug/Kg	19.4	UB	none	trip blank
1118956	SB-167 (0.0-2.0)	SW8260B	n-Propylbenzene	7.17	J	6.05	12.1	19.4	ug/Kg	19.4	UB	none	method blank
1118956	SB-167 (0.0-2.0)	SW8260B	Toluene	17.1	J	6.05	12.1	19.4	ug/Kg	19.4	UB	none	method blank
1118956	SB-167 (5.0-6.2)	SW6020	Antimony	0.1	=	0.031	0.062	0.1	mg/Kg	0.1	J	none	MS/MSD recovery
1118956	SB-167 (5.0-6.2)	SW8260B	1,2,4-Trimethylbenzene	35.6	J	11	22	36.6	ug/Kg	36.6	UB	none	method blank
1118956	SB-167 (5.0-6.2)	SW8260B	1,3,5-Trimethylbenzene	20.3	=	5.7	11.4	18.3	ug/Kg	20.3	UB	none	trip blank
1118956	SB-167 (5.0-6.2)	SW8260B	n-Propylbenzene	13.9	J	5.7	11.4	18.3	ug/Kg	18.3	UB	none	method blank
1118956	SB-167 (5.0-6.2)	SW8260B	Xylenes (total)	40.9	J	22.7	45.4	73.1	ug/Kg	40.9	JH	high	CCV recovery
1118959	SB-164 3.0-4.5	SW9013/SW9014-Cyanide	Cyanide	0.044	J	0.03	0.06	0.099	mg/Kg	0.044	JH	high	LCS/LCSD recovery
1118960	SB-112 10.-12.0	SW8021B	Benzene	27.9	=	5.02	10.04	15.7	ug/Kg	27.9	UB	none	trip blank
1118960	SB-112 10.-12.0	SW8021B	Toluene	11	J	9.79	19.58	31.4	ug/Kg	31.4	UB	none	method blank
1118960	SB-112 5.5-7.3	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.0136	=	0.00317	0.00634	0.0102	mg/Kg	R	R	none	matrix interference
1118960	SB-134 0.0-2.0	SW8021B	Toluene	8.88	J	8.39	16.78	26.9	ug/Kg	26.9	UB	none	method blank
1118960	SB-134 5.0-6.8	8270D SIMS (PAH)	Fluoranthene	0	ND	387	774	1290	ug/Kg	774	UJ	low	MS/MSD recovery
1118960	SB-134 5.0-6.8	8270D SIMS (PAH)	Pyrene	0	ND	387	774	1290	ug/Kg	774	UJ	low	MS/MSD recovery
1118960	SB-134 5.0-6.8	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00583	J	0.00319	0.00638	0.0103	mg/Kg	R	R	none	matrix interference

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1118960	SB-134 5.0-6.8	SW8021B	Benzene	4050	=	26.8	53.6	83.7	ug/Kg	4050	JH	high	surrogate recovery
1118960	SB-134 5.0-6.8	SW8021B	Ethylbenzene	30000	=	52.2	104.4	167	ug/Kg	30000	JH	high	surrogate recovery
1118960	SB-134 5.0-6.8	SW8021B	o-Xylene	81700	=	261	522	837	ug/Kg	81700	JH	high	surrogate recovery
1118960	SB-134 5.0-6.8	SW8021B	P & M -Xylene	173000	=	502	1004	1670	ug/Kg	173000	JH	high	surrogate recovery
1118960	SB-134 5.0-6.8	SW8021B	Toluene	981	=	52.2	104.4	167	ug/Kg	981	JH	high	surrogate recovery
1118960	SB-148 0-0-2.0	SW8021B	Benzene	4.15	J	4.15	8.3	13	ug/Kg	13	UB	none	trip blank
1118960	SB-148 0-0-2.0	SW8021B	Toluene	17.1	J	8.1	16.2	26	ug/Kg	26	UB	none	method blank
1118960	SB-148 3.5-5.1	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.796	=	0.00372	0.00744	0.012	mg/Kg	R	R	none	matrix interference
1118960	SB-148 6.8-7.4	SW8021B	Toluene	8.01	J	6.76	13.52	21.7	ug/Kg	21.7	UB	none	method blank
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Acenaphthene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Fluoranthene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	8270D SIMS (PAH)	Pyrene	0	ND	34.9	69.8	116	ug/Kg	69.8	UJ	low	MS/MSD recovery
1118970	SB-149 (3.5-5.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.206	=	0.00362	0.00724	0.0117	mg/Kg	R	R	none	matrix interference
1118970	SB-149 (3.5-5.2)	SW8021B	Benzene	5.55	J	4.68	9.36	14.6	ug/Kg	5.55	J	none	field-duplicate RPD
1118970	SB-149 (3.5-5.2)	SW8021B	Ethylbenzene	443	=	9.12	18.24	29.2	ug/Kg	443	J	none	field-duplicate RPD
1118970	SB-149 (3.5-5.2)	SW8021B	o-Xylene	252	=	9.12	18.24	29.2	ug/Kg	252	J	none	field-duplicate RPD
1118970	SB-149 (3.5-5.2)	SW8021B	P & M -Xylene	587	=	17.5	35	58.5	ug/Kg	587	J	none	field-duplicate RPD
1118970	SB-149 (3.5-5.2)	SW8021B	Toluene	43	=	9.12	18.24	29.2	ug/Kg	43	J	none	field-duplicate RPD
1118970	SB-156 (6.0-8.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00522	J	0.00324	0.00648	0.0104	mg/Kg	R	R	none	matrix interference
1118970	SB-165 (5.0-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00329	0.00658	0.0106	mg/Kg	R	R	none	matrix interference
1118970	SB-165 (6.5-8.3)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00335	0.0067	0.0108	mg/Kg	R	R	none	matrix interference
1118970	SD-149 (3.5-5.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.0149	=	0.00364	0.00728	0.0118	mg/Kg	R	R	none	matrix interference
1118970	SD-149 (3.5-5.2)	SW8021B	Benzene	16	=	5.02	10.04	15.7	ug/Kg	16	J	none	field-duplicate RPD
1118970	SD-149 (3.5-5.2)	SW8021B	Ethylbenzene	1010	=	9.79	19.58	31.4	ug/Kg	1010	J	none	field-duplicate RPD
1118970	SD-149 (3.5-5.2)	SW8021B	o-Xylene	600	=	9.79	19.58	31.4	ug/Kg	600	J	none	field-duplicate RPD
1118970	SD-149 (3.5-5.2)	SW8021B	P & M -Xylene	1200	=	18.8	37.6	62.8	ug/Kg	1200	J	none	field-duplicate RPD
1118970	SD-149 (3.5-5.2)	SW8021B	Toluene	117	=	9.79	19.58	31.4	ug/Kg	117	J	none	field-duplicate RPD
1118970	SD-165 (5.0-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00325	0.0065	0.0105	mg/Kg	R	R	none	matrix interference
1118980	SB-138(3.0-5.2)	SW9013/SW9014-Cyanide	Cyanide	0.06	J	0.03	0.06	0.099	mg/Kg	0.06	JH	high	LCS/LCSD recovery
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Acenaphthene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Acenaphthylene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Anthracene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Chrysene	8.97	J	7.7	15.4	25.7	ug/Kg	8.97	JL	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Fluoranthene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Fluorene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Naphthalene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Phenanthrene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-166(0.0-2.0)	8270D SIMS (PAH)	Pyrene	0	ND	7.7	15.4	25.7	ug/Kg	15.4	UJ	low	holding time
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	1-Methylnaphthalene	7290	=	305	610	1020	ug/Kg	7290	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	2-Methylnaphthalene	8630	=	305	610	1020	ug/Kg	8630	J	none	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Anthracene	62.1	=	15.2	30.4	50.8	ug/Kg	62.1	JL	low	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Benzo(a)Anthracene	36.1	=	1.52	3.04	5.08	ug/Kg	36.1	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Benzo[a]pyrene	27.2	=	1.52	3.04	5.08	ug/Kg	27.2	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	36.1	=	1.52	3.04	5.08	ug/Kg	36.1	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	22.7	=	1.52	3.04	5.08	ug/Kg	22.7	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Chrysene	47.9	=	1.52	3.04	5.08	ug/Kg	47.9	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Fluoranthene	111	=	15.2	30.4	50.8	ug/Kg	111	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Fluorene	413	=	15.2	30.4	50.8	ug/Kg	413	J	none	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	18.3	=	1.52	3.04	5.08	ug/Kg	18.3	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Naphthalene	3950	=	305	610	1020	ug/Kg	3950	J	none	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Phenanthrene	623	=	15.2	30.4	50.8	ug/Kg	623	J	none	MS/MSD recovery
1118995	SB-173(3.0-4.5)	8270D SIMS (PAH)	Pyrene	115	=	15.2	30.4	50.8	ug/Kg	115	JH	high	MS/MSD recovery
1118995	SB-173(3.0-4.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00418	0.00836	0.0135	mg/Kg	R	R	none	matrix interference
1118995	SB-173(5.0-6.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0044	0.0088	0.0142	mg/Kg	R	R	none	matrix interference
1118995	SB-180(5.5-7.2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00425	0.0085	0.0137	mg/Kg	R	R	none	matrix interference
1118995	SB-180(7.5-9.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00448	0.00896	0.0145	mg/Kg	R	R	none	matrix interference
1118996	SB-151 (0.0-2.0)	SW8260B	Chlorobenzene	0	ND	5.96	11.92	19.1	ug/Kg	11.92	UJ	low	surrogate recovery
1118996	SB-151 (0.0-2.0)	SW8260B	Ethylbenzene	0	ND	5.96	11.92	19.1	ug/Kg	11.92	UJ	low	surrogate recovery
1118996	SB-151 (0.0-2.0)	SW8260B	Isopropylbenzene (Cumene)	0	ND	5.96	11.92	19.1	ug/Kg	11.92	UJ	low	surrogate recovery
1118996	SB-151 (0.0-2.0)	SW8260B	o-Xylene	0	ND	5.96	11.92	19.1	ug/Kg	11.92	UJ	low	surrogate recovery
1118996	SB-151 (0.0-2.0)	SW8260B	P & M -Xylene	0	ND	11.5	23	38.2	ug/Kg	23	UJ	low	surrogate recovery
1118996	SB-151 (0.0-2.0)	SW8260B	Toluene	0	ND	5.96	11.92	19.1	ug/Kg	11.92	UJ	low	surrogate recovery
1118996	SB-151 (5.0-6.7)	AK101	Gasoline Range Organics	409	=	5.14	10.28	17.1	mg/Kg	409	JH	high	surrogate recovery
1118996	SB-151 (5.0-6.7)	AK102	Diesel Range Organics	1740	=	37.3	74.6	120	mg/Kg	1740	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	AK103	Residual Range Organics	132	=	7.46	14.92	24.1	mg/Kg	132	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00374	0.00748	0.012	mg/Kg	R	R	none	matrix interference
1118996	SB-151 (5.0-6.7)	SW8260B	1,2,4-Trimethylbenzene	6740	=	206	412	686	ug/Kg	6740	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	SW8260B	1,3,5-Trimethylbenzene	2640	=	107	214	343	ug/Kg	2640	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	SW8260B	4-Isopropyltoluene	696	=	107	214	343	ug/Kg	696	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	SW8260B	n-Propylbenzene	2550	=	107	214	343	ug/Kg	2550	J	none	field-duplicate RPD
1118996	SB-151 (5.0-6.7)	SW8260B	Toluene	30400	=	1070	2140	3430	ug/Kg	30400	J	none	field-duplicate RPD
1118996	SB-151 (6.7-8.4)	AK101	Gasoline Range Organics	1520	=	32.6	65.2	109	mg/Kg	1520	JH	high	surrogate recovery
1118996	SB-151 (6.7-8.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00369	0.00738	0.0119	mg/Kg	R	R	none	matrix interference
1118996	SB-172 (0.0-2.0)	AK102	Diesel Range Organics	74.2	=	6.48	12.96	20.9	mg/Kg	74.2	JH	high	contribution from heavier hydrocarbons
1118996	SB-175 (0.0-2.0)	SW8260B	Benzene	5.73	J	2.55	5.1	8.19	ug/Kg	8.19	UB	none	method blank
1118996	SB-175 (0.0-2.0)	SW8260B	Toluene	9.01	J	5.11	10.22	16.4	ug/Kg	16.4	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	Benzene	5.22	J	3.88	7.76	12.4	ug/Kg	12.4	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	Isopropylbenzene (Cumene)	8.71	J	7.76	15.52	24.9	ug/Kg	24.9	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	n-Propylbenzene	8.96	J	7.76	15.52	24.9	ug/Kg	24.9	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	o-Xylene	12.9	J	7.76	15.52	24.9	ug/Kg	24.9	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	P & M -Xylene	17.4	J	14.9	29.8	49.8	ug/Kg	49.8	UB	none	method blank
1118996	SB-175 (10.5-12.5)	SW8260B	Toluene	12.2	J	7.76	15.52	24.9	ug/Kg	24.9	UB	none	method blank
1118996	SB-175 (5.0-7.0)	SW8260B	1,3,5-Trimethylbenzene	67	=	6.22	12.44	19.9	ug/Kg	67	UB	none	method blank
1118996	SB-175 (5.0-7.0)	SW8260B	4-Isopropyltoluene	17.5	J	6.22	12.44	19.9	ug/Kg	19.9	UB	none	method blank
1118996	SB-175 (5.0-7.0)	SW8260B	Benzene	21.5	=	3.11	6.22	9.97	ug/Kg	21.5	UB	none	method blank
1118996	SB-175 (5.0-7.0)	SW8260B	Isopropylbenzene (Cumene)	26.5	=	6.22	12.44	19.9	ug/Kg	26.5	UB	none	method blank

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118996	SB-175 (5.0-7.0)	SW8260B	n-Propylbenzene	39.3	=	6.22	12.44	19.9	ug/Kg	39.3	UB	none	method blank
1118996	SB-175 (5.0-7.0)	SW8260B	tert-Butylbenzene	11.2	J	6.22	12.44	19.9	ug/Kg	19.9	UB	none	method blank
1118996	SB-175 (7.0-9.0)	AK101	Gasoline Range Organics	314	=	8.55	17.1	28.5	mg/Kg	314	JH	high	surrogate recovery
1118996	SB-175 (7.0-9.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00336	0.00672	0.0108	mg/Kg	R	R	none	matrix interference
1118996	SD-151 (5.0-6.7)	AK101	Gasoline Range Organics	269	=	10.7	21.4	35.7	mg/Kg	269	JH	high	surrogate recovery
1118996	SD-151 (5.0-6.7)	AK102	Diesel Range Organics	209	=	7.65	15.3	24.7	mg/Kg	209	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	AK103	Residual Range Organics	42.9	=	7.65	15.3	24.7	mg/Kg	42.9	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.0038	0.0076	0.0123	mg/Kg	R	R	none	matrix interference
1118996	SD-151 (5.0-6.7)	SW8260B	1,2,4-Trimethylbenzene	3160	=	214	428	714	ug/Kg	3160	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	SW8260B	1,3,5-Trimethylbenzene	1340	=	111	222	357	ug/Kg	1340	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	SW8260B	4-Isopropyltoluene	403	=	111	222	357	ug/Kg	403	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	SW8260B	n-Propylbenzene	1340	=	111	222	357	ug/Kg	1340	J	none	field-duplicate RPD
1118996	SD-151 (5.0-6.7)	SW8260B	Toluene	18000	=	111	222	357	ug/Kg	18000	J	none	field-duplicate RPD
1118997	SB-150(0.0-2.0)	8270D SIMS (PAH)	Naphthalene	13.8	=	1.57	3.14	5.22	ug/Kg	13.8	UB	none	method blank
1118997	SB-150(0.0-2.0)	SW8021B	Benzene	16.1	=	3.18	6.36	9.95	ug/Kg	16.1	UB	none	trip blank
1118997	SB-150(0.0-2.0)	SW8021B	Toluene	19.1	J	6.21	12.42	19.9	ug/Kg	19.9	UB	none	trip blank
1118997	SB-150(10.5-12.0)	8270D SIMS (PAH)	2-Methylnaphthalene	13.8	=	1.62	3.24	5.4	ug/Kg	13.8	UB	none	method blank
1118997	SB-150(10.5-12.0)	8270D SIMS (PAH)	Naphthalene	4.2	J	1.62	3.24	5.4	ug/Kg	5.4	UB	none	method blank
1118997	SB-150(10.5-12.0)	SW8021B	Toluene	79.9	=	4.75	9.5	15.2	ug/Kg	79.9	UB	none	trip blank
1118997	SB-150(5.0-6.1)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00323	0.00646	0.0104	mg/Kg	R	R	none	matrix interference
1118997	SB-150(6.5-8.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00329	0.00658	0.0106	mg/Kg	R	R	none	matrix interference
1118998	SB-136(0.0-2.0)	8270D SIMS (PAH)	1-Methylnaphthalene	6.96	=	1.56	3.12	5.21	ug/Kg	6.96	UB	none	method blank
1118998	SB-136(0.0-2.0)	8270D SIMS (PAH)	2-Methylnaphthalene	5.09	J	1.56	3.12	5.21	ug/Kg	5.21	UB	none	method blank
1118998	SB-136(0.0-2.0)	8270D SIMS (PAH)	Naphthalene	1.67	J	1.56	3.12	5.21	ug/Kg	5.21	UB	none	method blank
1118998	SB-136(0.0-2.0)	SW8021B	Toluene	20.7	=	6.46	12.92	20.7	ug/Kg	20.7	UB	none	trip blank
1118998	SB-136(4.0-6.0)	8270D SIMS (PAH)	2-Methylnaphthalene	1.57	J	1.54	3.08	5.13	ug/Kg	5.13	UB	none	method blank
1118998	SB-136(4.0-6.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00613	J	0.00336	0.00672	0.0108	mg/Kg	0.00613	JH	high	LCS/LCSD recovery
1118998	SB-136(4.0-6.0)	SW8021B	Toluene	14.5	J	6.27	12.54	20.1	ug/Kg	20.1	UB	none	trip blank
1118998	SB-145(0.0-2.0)	8270D SIMS (PAH)	2-Methylnaphthalene	1.97	J	1.55	3.1	5.16	ug/Kg	5.16	UB	none	method blank
1118998	SB-145(0.0-2.0)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	3	J	1.55	3.1	5.16	ug/Kg	3	JH	high	CCV recovery
1118998	SB-145(0.0-2.0)	SW8021B	Toluene	26.1	=	6.58	13.16	21.1	ug/Kg	26.1	UB	none	trip blank
1118998	SB-145(3.5-5.6)	8270D SIMS (PAH)	1-Methylnaphthalene	2.04	J	1.83	3.66	6.1	ug/Kg	6.1	UB	none	method blank
1118998	SB-145(3.5-5.6)	8270D SIMS (PAH)	2-Methylnaphthalene	2.02	J	1.83	3.66	6.1	ug/Kg	6.1	UB	none	method blank
1118998	SB-145(3.5-5.6)	8270D SIMS (PAH)	Naphthalene	2.47	J	1.83	3.66	6.1	ug/Kg	6.1	UB	none	method blank
1118998	SB-145(3.5-5.6)	SW8021B	Toluene	22.4	J	11.5	23	36.7	ug/Kg	36.7	UB	none	trip blank
1118998	SB-146(0.0-2.0)	8270D SIMS (PAH)	2-Methylnaphthalene	14.5	J	7.77	15.54	25.9	ug/Kg	25.9	UB	none	method blank
1118998	SB-146(16.0-17.0)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.145	=	0.0036	0.0072	0.0116	mg/Kg	0.145	JH	high	LCS/LCSD recovery
1118998	SB-146(5.0-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.0043	0.0086	0.0139	mg/Kg	R	R	none	matrix interference
1118998	SD-146(5.0-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00281	0.00562	########	mg/Kg	R	R	none	matrix interference
1119603	SB-160(0.0-2.0)	SW9013/SW9014-Cyanide	Cyanide	0.058	J	0.03	0.06	0.1	mg/Kg	0.058	JH	high	LCS/LCSD recovery
1119603	SB-160(4.5-6.4)	AK101	Gasoline Range Organics	734	=	27	54	90.1	mg/Kg	734	JH	high	surrogate recovery, field-duplicate RPD
1119603	SB-160(4.5-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00318	0.00636	0.0103	mg/Kg	R	R	none	matrix interference
1119603	SB-160(6.4-8.4)	AK101	Gasoline Range Organics	939	=	29.8	59.6	99.2	mg/Kg	939	JH	high	surrogate recovery
1119603	SB-162(0.0-2.0)	SW8260B	Isopropylbenzene (Cumene)	5.36	J	5.07	10.14	16.3	ug/Kg	16.3	UB	none	trip blank
1119603	SB-162(0.0-2.0)	SW8260B	n-Propylbenzene	5.2	J	5.07	10.14	16.3	ug/Kg	16.3	UB	none	trip blank
1119603	SB-176(0.0-2.0)	SW8270D	1,2-Dichlorobenzene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	1,3-Dichlorobenzene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2,4,6-Trichlorophenol	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2,4-Dichlorophenol	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2,4-Dimethylphenol	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2,4-Dinitrophenol	0	ND	0.991	1.982	3.16	mg/Kg	1.982	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1119603	SB-176(0.0-2.0)	SW8270D	2,4-Dinitrotoluene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2,6-Dinitrotoluene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2-Chlorophenol	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	2-Methylphenol (o-Cresol)	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	3&4-Methylphenol (p&m-Cresol)	0	ND	0.327	0.654	1.05	mg/Kg	0.654	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	3,3-Dichlorobenzidine	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	4-Chloroaniline	0	ND	0.158	0.316	0.527	mg/Kg	0.316	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Bis(2-Chloroethyl)ether	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	bis(2-Ethylhexyl)phthalate	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Dibenzofuran	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Hexachlorobenzene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Hexachlorobutadiene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Hexachlorocyclopentadiene	0	ND	0.211	0.422	0.738	mg/Kg	0.422	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Hexachloroethane	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Isophorone	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Nitrobenzene	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	N-Nitrosodimethylamine	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	N-Nitroso-di-n-propylamine	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	N-Nitrosodiphenylamine	0	ND	0.0822	0.1644	0.264	mg/Kg	0.1644	UJ	low	holding time
1119603	SB-176(0.0-2.0)	SW8270D	Pentachlorophenol	0	ND	0.654	1.308	2.11	mg/Kg	1.308	UJ	low	holding time
1119603	SB-176(6.0-7.1)	SW8260B	Cyclohexane	14	J	9.48	18.96	30.4	ug/Kg	30.4	UB	none	trip blank
1119603	SB-183(0.0-2.0)	SW9013/SW9014-Cyanide	Cyanide	0.042	J	0.03	0.06	0.099	mg/Kg	0.042	JH	high	LCS/LCSD recovery
1119603	SB-183(5.0-6.1)	SW8260B	Cyclohexane	42.2	=	4.31	8.62	13.8	ug/Kg	42.2	UB	none	trip blank
1119603	SD-160(4.5-6.4)	AK101	Gasoline Range Organics	10.3	=	0.538	1.076	1.79	mg/Kg	10.3	J	none	field-duplicate RPD
1119603	SD-160(4.5-6.4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00316	0.00632	0.0102	mg/Kg	R	R	none	matrix interference
1119604	SB-161(0.0-2.0)	SW8021B	Benzene	13.8	=	2.88	5.76	8.99	ug/Kg	13.8	UB	none	trip blank
1119604	SB-161(0.0-2.0)	SW8021B	Toluene	12.9	J	5.61	11.22	18	ug/Kg	18	UB	none	trip blank
1119604	SB-161(6.0-7.4)	SW8021B	Benzene	13.5	=	2.64	5.28	8.24	ug/Kg	13.5	UB	none	trip blank
1119604	SB-161(6.0-7.4)	SW8021B	Toluene	9.4	J	5.14	10.28	16.5	ug/Kg	16.5	UB	none	trip blank
1119604	SD-161(0.0-2.0)	SW8021B	Toluene	5.37	J	5.08	10.16	16.3	ug/Kg	16.3	UB	none	trip blank
1118955	SB-168(3.5-5.1)	8270D SIMS (PAH)	Benzo[a]pyrene	2.94	J	1.96	3.92	6.53	ug/Kg	2.94	JH	high	CCV recovery
1118955	SB-168(3.5-5.1)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	1.97	J	1.96	3.92	6.53	ug/Kg	1.97	JH	high	CCV recovery
1118955	SB-170(0.0-2.0)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	1.61	J	1.57	3.14	5.23	ug/Kg	1.61	JH	high	CCV recovery
1118764	MW-192A	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00378	0.00756	0.0122	mg/kg	0.00756	UJ	Low	Hold time
1118764	MW-192B	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00348	0.00696	0.0112	mg/kg	0.00696	UJ	Low	Hold time
1118764	MW-192A	AK103	Residual Range Organics	21.2	J	7.48	14.96	24.1	mg/kg	24.1	UB	None	Method blank hit
1118863	DO-10 (8-10)	8270D SIMS (PAH)	1-Methylnaphthalene	35,300	=	1,690	3,380	5,640	µg/kg	35,300	JH	high	surrogate recovery
1118863	DO-10 (8-10)	8270D SIMS (PAH)	2-Methylnaphthalene	45,200	=	1,690	3,380	5,640	µg/kg	45,200	JH	high	surrogate recovery
1118863	DO-10 (8-10)	8270D SIMS (PAH)	Fluorene	1,170	=	84.5	169	282	µg/kg	1,170	JH	high	surrogate recovery
1118863	DO-10 (8-10)	8270D SIMS (PAH)	Naphthalene	22,500	=	1,690	3,380	5,640	µg/kg	22,500	JH	high	surrogate recovery
1118863	DO-10 (8-10)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00350	0.00700	0.0113	mg/kg	R	R	none	matrix interference
1118863	DO-10 (8-10)	SW8021B	Benzene	468	=	33.6	67.2	105	µg/kg	468	J	none	field-duplicate RPD
1118863	DO-10 (8-10)	SW8021B	Ethylbenzene	17,800	=	65.6	131	210	µg/kg	17,800	J	none	field-duplicate RPD
1118863	DO-10 (8-10)	SW8021B	o-Xylene	29,700	=	65.6	131	210	µg/kg	29,700	J	none	field-duplicate RPD
1118863	DO-10 (8-10)	SW8021B	P & M -Xylene	60,700	=	126	252	420	µg/kg	60,700	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	8270D SIMS (PAH)	1-Methylnaphthalene	9,890	=	170	340	567	µg/kg	9,890	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	8270D SIMS (PAH)	2-Methylnaphthalene	12,800	=	340	680	1,130	µg/kg	12,800	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	8270D SIMS (PAH)	Fluorene	349	=	8.51	17.0	28.4	µg/kg	349	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	8270D SIMS (PAH)	Naphthalene	4,930	=	170	340	567	µg/kg	4,930	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	8270D SIMS (PAH)	Phenanthrene	344	=	8.51	17.0	28.4	µg/kg	344	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00358	0.00716	0.0115	mg/kg	R	R	none	matrix interference

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118891	DO-13 (8.0-9.1)	SW8021B	Benzene	101	=	4.48	8.96	14.0	µg/kg	101	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	SW8021B	Ethylbenzene	568	=	8.73	17.5	28.0	µg/kg	568	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	SW8021B	o-Xylene	797	=	8.73	17.5	28.0	µg/kg	797	J	none	field-duplicate RPD
1118891	DO-13 (8.0-9.1)	SW8021B	P & M -Xylene	1,760	=	16.8	33.6	55.9	µg/kg	1,760	J	none	field-duplicate RPD
1119650	DO-19 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Phenanthrene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	25.7	51.4	85.5	µg/kg	51.4	UJ	low	holding time
1119650	DO-19 (0-2)	SW8021B	Toluene	16.6	J	10.4	20.8	33.3	µg/kg	33.3	UB	none	method blank
1119650	DO-19 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	154	308	514	µg/kg	308	UJ	low	MS/MSD recovery
1119650	DO-19 (6-8)	8270D SIMS (PAH)	Anthracene	0	ND	154	308	514	µg/kg	308	UJ	low	MS/MSD recovery
1119650	DO-21 (0-2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00366	0.00732	0.0118	mg/kg	R	R	none	matrix interference
1119650	DO-21 (0-2)	SW8021B	Toluene	15.4	J	13.7	27.4	44	µg/kg	44	UB	none	method blank
1119650	DO-21 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	16200	=	454	908	1510	µg/kg	16200	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	21600	=	454	908	1510	µg/kg	21600	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	9.08	18.16	30.3	µg/kg	18.16	UJ	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	9.08	18.16	30.3	µg/kg	18.16	UJ	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Anthracene	106	=	9.08	18.16	30.3	µg/kg	106	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	98.8	=	9.08	18.16	30.3	µg/kg	98.8	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	95.2	=	9.08	18.16	30.3	µg/kg	95.2	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	454	908	1510	µg/kg	908	UJ	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	79.9	=	9.08	18.16	30.3	µg/kg	79.9	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	454	908	1510	µg/kg	908	UJ	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Chrysene	150	=	9.08	18.16	30.3	µg/kg	150	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	18	J	9.08	18.16	30.3	µg/kg	18	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Fluoranthene	258	=	9.08	18.16	30.3	µg/kg	258	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Fluorene	1070	J	454	908	1510	µg/kg	1070	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	51.6	=	9.08	18.16	30.3	µg/kg	51.6	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Naphthalene	11800	=	454	908	1510	µg/kg	11800	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Phenanthrene	1800	=	454	908	1510	µg/kg	1800	JL	low	holding time
1119650	DO-21 (6-8)	8270D SIMS (PAH)	Pyrene	278	=	9.08	18.16	30.3	µg/kg	278	JL	low	holding time
1119650	DO-21 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00379	0.00758	0.0122	mg/kg	R	R	none	matrix interference
1118849	DO-7 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	1,820	=	31.3	62.6	104	µg/kg	1,820	J	none	field-duplicate RPD
1118849	DO-7 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	2,050	=	31.3	62.6	104	µg/kg	2,050	J	none	field-duplicate RPD
1118849	DO-7 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00650	0.0130	0.0210	mg/kg	R	R	none	matrix interference
1118849	DO-7 (6-8)	SW8021B	Benzene	809	=	58.8	118	184	µg/kg	809	J	none	field-duplicate RPD
1118849	DO-7 (6-8)	SW8021B	Ethylbenzene	5,180	=	115	230	368	µg/kg	5,180	J	none	field-duplicate RPD
1118849	DO-7 (6-8)	SW8021B	o-Xylene	6,070	=	115	230	368	µg/kg	6,070	J	none	field-duplicate RPD

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118849	DO-7 (6-8)	SW8021B	P & M -Xylene	29,000	=	221	442	735	µg/kg	29,000	J	none	field-duplicate RPD
1118849	DO-7 (6-8)	SW8021B	Toluene	2,070	=	115	230	368	µg/kg	2,070	J	none	field-duplicate RPD
1119610	MW-195 (0-2)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00347	0.00694	0.0112	mg/kg	R	R	none	matrix interference
1119610	MW-195 (14-16)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.0319	=	0.00386	0.00772	0.0124	mg/kg	0.0319	JH	high	LCS recovery
1119610	MW-195 (14-16)	SW8021B	Toluene	15.3	J	10.8	21.6	34.7	µg/kg	34.7	UB	none	method blank
1119610	MW-195 (2-4)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00363	0.00726	0.0117	mg/kg	R	R	none	matrix interference
1119610	MW-195 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.017	=	0.00324	0.00648	0.0104	mg/kg	0.017	JH	high	LCS recovery
1119610	MW-196 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	1.56	3.12	5.2	µg/kg	3.12	UJ	low	holding time
1119610	MW-196 (0-2)	SW8021B	Toluene	7.63	J	6.61	13.22	21.2	µg/kg	21.2	UB	none	method blank
1119610	MW-196 (14-16)	8270D SIMS (PAH)	1-Methylnaphthalene	6.92	=	1.89	3.78	6.29	µg/kg	6.92	JL	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	2-Methylnaphthalene	9.02	=	1.89	3.78	6.29	µg/kg	9.02	JL	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Anthracene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Chrysene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Fluorene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Naphthalene	8.21	=	1.89	3.78	6.29	µg/kg	8.21	JL	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (14-16)	8270D SIMS (PAH)	Pyrene	0	ND	1.89	3.78	6.29	µg/kg	3.78	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Anthracene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Chrysene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Fluorene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Naphthalene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	8270D SIMS (PAH)	Pyrene	0	ND	1.6	3.2	5.33	µg/kg	3.2	UJ	low	holding time
1119610	MW-196 (6-8)	SW8021B	Toluene	9.35	J	6.48	12.96	20.8	µg/kg	20.8	UB	none	method blank
1118863	O-10 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00418	0.00836	0.0135	mg/kg	R	R	none	matrix interference
1118863	O-10 (8-10)	8270D SIMS (PAH)	1-Methylnaphthalene	24,700	=	1,640	3,280	5,460	µg/kg	24,700	JH	high	surrogate recovery
1118863	O-10 (8-10)	8270D SIMS (PAH)	2-Methylnaphthalene	31,600	=	1,640	3,280	5,460	µg/kg	31,600	JH	high	surrogate recovery
1118863	O-10 (8-10)	8270D SIMS (PAH)	Fluorene	939	=	82.0	164	273	µg/kg	939	JH	high	surrogate recovery
1118863	O-10 (8-10)	8270D SIMS (PAH)	Naphthalene	15,200	=	1,640	3,280	5,460	µg/kg	15,200	JH	high	surrogate recovery
1118863	O-10 (8-10)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00334	0.00668	0.0108	mg/kg	R	R	none	matrix interference
1118863	O-10 (8-10)	SW8021B	Benzene	807	=	35.2	70.4	110	µg/kg	807	J	none	field-duplicate RPD
1118863	O-10 (8-10)	SW8021B	Ethylbenzene	30,200	=	68.7	137	220	µg/kg	30,200	J	none	field-duplicate RPD
1118863	O-10 (8-10)	SW8021B	o-Xylene	51,500	=	68.7	137	220	µg/kg	51,500	J	none	field-duplicate RPD
1118863	O-10 (8-10)	SW8021B	P & M -Xylene	116,000	=	661	1,320	2,200	µg/kg	116,000	J	none	field-duplicate RPD
1118885	O-11 (10-12)	8270D SIMS (PAH)	1-Methylnaphthalene	28,500	=	1,570	3,140	5,250	µg/kg	28,500	JH	high	surrogate recovery
1118885	O-11 (10-12)	8270D SIMS (PAH)	2-Methylnaphthalene	35,200	=	1,570	3,140	5,250	µg/kg	35,200	JH	high	surrogate recovery
1118885	O-11 (10-12)	8270D SIMS (PAH)	Fluorene	1,180	=	78.7	157	262	µg/kg	1,180	JH	high	surrogate recovery
1118885	O-11 (10-12)	8270D SIMS (PAH)	Naphthalene	13,500	=	1,570	3,140	5,250	µg/kg	13,500	JH	high	surrogate recovery
1118885	O-11 (10-12)	8270D SIMS (PAH)	Phenanthrene	648	=	78.7	157	262	µg/kg	648	JH	high	surrogate recovery
1118885	O-11 (10-12)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00874	J	0.00325	0.00650	0.0105	mg/kg	R	R	none	matrix interference
1118885	O-11 (8-10)	8270D SIMS (PAH)	1-Methylnaphthalene	39,500	=	1,630	3,260	5,430	µg/kg	39,500	JH	high	surrogate recovery
1118885	O-11 (8-10)	8270D SIMS (PAH)	2-Methylnaphthalene	49,600	=	1,630	3,260	5,430	µg/kg	49,600	JH	high	surrogate recovery
1118885	O-11 (8-10)	8270D SIMS (PAH)	Fluorene	1,420	=	81.4	163	271	µg/kg	1,420	JH	high	surrogate recovery
1118885	O-11 (8-10)	8270D SIMS (PAH)	Naphthalene	20,100	=	1,630	3,260	5,430	µg/kg	20,100	JH	high	surrogate recovery
1118885	O-11 (8-10)	8270D SIMS (PAH)	Phenanthrene	785	=	81.4	163	271	µg/kg	785	JH	high	surrogate recovery
1118885	O-11 (8-10)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.00862	J	0.00334	0.00668	0.0108	mg/kg	R	R	none	matrix interference
1118891	O-13 (8.0-9.1)	8270D SIMS (PAH)	1-Methylnaphthalene	2,460	=	165	330	550	µg/kg	2,460	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	8270D SIMS (PAH)	2-Methylnaphthalene	3,020	=	165	330	550	µg/kg	3,020	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	8270D SIMS (PAH)	Fluorene	163	=	8.26	16.5	27.5	µg/kg	163	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	8270D SIMS (PAH)	Naphthalene	963	=	165	330	550	µg/kg	963	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	8270D SIMS (PAH)	Phenanthrene	171	=	8.26	16.5	27.5	µg/kg	171	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00341	0.00682	0.0110	mg/kg	R	R	none	matrix interference
1118891	O-13 (8.0-9.1)	SW8021B	Benzene	688	=	38.5	77.0	120	µg/kg	688	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	SW8021B	Ethylbenzene	2,760	=	75.1	150	241	µg/kg	2,760	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	SW8021B	o-Xylene	3,740	=	75.1	150	241	µg/kg	3,740	J	none	field-duplicate RPD
1118891	O-13 (8.0-9.1)	SW8021B	P & M -Xylene	8,380	=	144	288	481	µg/kg	8,380	J	none	field-duplicate RPD
1118942	O-14 (0.0-2.0)	SW8021B	Benzene	16.1	=	3.34	6.68	10.5	µg/kg	16.1	JL	low	leaking methanol
1118942	O-14 (0.0-2.0)	SW8021B	Ethylbenzene	140	=	6.52	13.0	20.9	µg/kg	140	JL	low	leaking methanol
1118942	O-14 (0.0-2.0)	SW8021B	o-Xylene	129	=	6.52	13.0	20.9	µg/kg	129	JL	low	leaking methanol
1118942	O-14 (0.0-2.0)	SW8021B	P & M -Xylene	464	=	12.5	25.0	41.8	µg/kg	464	JL	low	leaking methanol
1118942	O-14 (0.0-2.0)	SW8021B	Toluene	131	=	6.52	13.0	20.9	µg/kg	131	JL	low	leaking methanol
1118982	O-15 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118982	O-15 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	1.55	3.10	5.15	µg/kg	3.10	UJ	low	high temperature
1118982	O-15 (0-2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.00323	0.00646	0.0104	mg/kg	0.00646	UJ	low	high temperature
1118982	O-15 (0-2)	SW8021B	Benzene	0	ND	3.26	6.52	10.2	µg/kg	6.52	UJ	low	high temperature
1118982	O-15 (0-2)	SW8021B	Ethylbenzene	0	ND	6.37	12.7	20.4	µg/kg	12.7	UJ	low	high temperature
1118982	O-15 (0-2)	SW8021B	o-Xylene	0	ND	6.37	12.7	20.4	µg/kg	12.7	UJ	low	high temperature
1118982	O-15 (0-2)	SW8021B	P & M -Xylene	0	ND	12.2	24.4	40.8	µg/kg	24.4	UJ	low	high temperature
1118982	O-15 (0-2)	SW8021B	Toluene	0	ND	6.37	12.7	20.4	µg/kg	12.7	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Anthracene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Chrysene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Fluorene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Naphthalene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	8270D SIMS (PAH)	Pyrene	0	ND	1.70	3.40	5.67	µg/kg	3.40	UJ	low	high temperature
1118982	O-15 (14-16)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.00352	0.00704	0.0113	mg/kg	0.00704	UJ	low	high temperature
1118982	O-15 (14-16)	SW8021B	Benzene	0	ND	3.36	6.72	10.5	µg/kg	6.72	UJ	low	high temperature
1118982	O-15 (14-16)	SW8021B	Ethylbenzene	0	ND	6.54	13.1	21.0	µg/kg	13.1	UJ	low	high temperature
1118982	O-15 (14-16)	SW8021B	o-Xylene	0	ND	6.54	13.1	21.0	µg/kg	13.1	UJ	low	high temperature
1118982	O-15 (14-16)	SW8021B	P & M -Xylene	0	ND	12.6	25.2	41.9	µg/kg	25.2	UJ	low	high temperature
1118982	O-15 (14-16)	SW8021B	Toluene	0	ND	6.54	13.1	21.0	µg/kg	13.1	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Anthracene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118982	O-15 (8-10)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Chrysene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Fluorene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Naphthalene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	8270D SIMS (PAH)	Pyrene	0	ND	1.61	3.22	5.38	µg/kg	3.22	UJ	low	high temperature
1118982	O-15 (8-10)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00332	0.00664	0.0107	mg/kg	0.00664	UJ	low	high temperature
1118982	O-15 (8-10)	SW8021B	Benzene	0	ND	2.91	5.82	9.08	µg/kg	5.82	UJ	low	high temperature
1118982	O-15 (8-10)	SW8021B	Ethylbenzene	0	ND	5.67	11.3	18.2	µg/kg	11.3	UJ	low	high temperature
1118982	O-15 (8-10)	SW8021B	o-Xylene	0	ND	5.67	11.3	18.2	µg/kg	11.3	UJ	low	high temperature
1118982	O-15 (8-10)	SW8021B	P & M -Xylene	0	ND	10.9	21.8	36.3	µg/kg	21.8	UJ	low	high temperature
1118982	O-15 (8-10)	SW8021B	Toluene	0	ND	5.67	11.3	18.2	µg/kg	11.3	UJ	low	high temperature
1118994	O-16 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	9.26	J	7.69	15.4	25.6	µg/kg	9.26	JL	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Phenanthrene	13.6	J	7.69	15.4	25.6	µg/kg	13.6	JL	low	holding time
1118994	O-16 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	7.69	15.4	25.6	µg/kg	15.4	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Anthracene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Chrysene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Fluorene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Naphthalene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time
1118994	O-16 (14-16)	8270D SIMS (PAH)	Pyrene	0	ND	1.73	3.46	5.78	µg/kg	3.46	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118994	O-16 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	1.68	J	1.62	3.24	5.40	µg/kg	1.68	JL	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Anthracene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Chrysene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Fluorene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Naphthalene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1118994	O-16 (6-8)	8270D SIMS (PAH)	Pyrene	0	ND	1.62	3.24	5.40	µg/kg	3.24	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	9.66	J	7.69	15.38	25.6	µg/kg	9.66	JL	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	16.2	J	7.69	15.38	25.6	µg/kg	16.2	JL	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Phenanthrene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	7.69	15.38	25.6	µg/kg	15.38	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Anthracene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Chrysene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Fluorene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Naphthalene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1119636	O-17 (14-16)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (14-16)	8270D SIMS (PAH)	Pyrene	0	ND	1.63	3.26	5.43	µg/kg	3.26	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	1.59	J	1.51	3.02	5.04	µg/kg	1.59	JL	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Anthracene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Chrysene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Fluorene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Naphthalene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119636	O-17 (6-8)	8270D SIMS (PAH)	Pyrene	0	ND	1.51	3.02	5.04	µg/kg	3.02	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Chrysene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Phenanthrene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119620	O-18 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	1.85	3.7	6.16	µg/kg	3.7	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	111	J	35.5	71	118	µg/kg	111	JL	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Chrysene	136	=	35.5	71	118	µg/kg	136	JL	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Fluorene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1119650	O-19 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Phenanthrene	188	=	35.5	71	118	µg/kg	188	JL	low	holding time
1119650	O-19 (0-2)	8270D SIMS (PAH)	Pyrene	0	ND	35.5	71	118	µg/kg	71	UJ	low	holding time
1119650	O-19 (0-2)	SW8021B	Toluene	19.8	J	14.7	29.4	47.2	µg/kg	47.2	UB	none	method blank
1119650	O-19 (14-16)	8270D SIMS (PAH)	1-Methylnaphthalene	14.3	J	8.75	17.5	29.2	µg/kg	14.3	JL	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	2-Methylnaphthalene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Acenaphthene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Acenaphthylene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Anthracene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Chrysene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Fluoranthene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Fluorene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Naphthalene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Phenanthrene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	8270D SIMS (PAH)	Pyrene	0	ND	8.75	17.5	29.2	µg/kg	17.5	UJ	low	holding time
1119650	O-19 (14-16)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.151	=	0.00369	0.00738	0.0119	mg/kg	0.151	JH	high	LCS recovery
1119650	O-19 (14-16)	SW8021B	Toluene	28.7	J	10.8	21.6	34.5	µg/kg	34.5	UB	none	method blank
1119650	O-19 (4-6)	8270D SIMS (PAH)	1-Methylnaphthalene	1640	=	171	342	569	µg/kg	1640	JL	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	2-Methylnaphthalene	2020	=	171	342	569	µg/kg	2020	JL	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Acenaphthene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	HT, MS/MSD recovery
1119650	O-19 (4-6)	8270D SIMS (PAH)	Acenaphthylene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	HT, MS/MSD recovery
1119650	O-19 (4-6)	8270D SIMS (PAH)	Anthracene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	HT, MS/MSD recovery
1119650	O-19 (4-6)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Chrysene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Fluoranthene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Fluorene	48.5	=	1.71	3.42	5.69	µg/kg	48.5	JL	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Naphthalene	371	=	17.1	34.2	56.9	µg/kg	371	JL	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Phenanthrene	24.5	=	1.71	3.42	5.69	µg/kg	24.5	JL	low	holding time
1119650	O-19 (4-6)	8270D SIMS (PAH)	Pyrene	0	ND	1.71	3.42	5.69	µg/kg	3.42	UJ	low	holding time
1119650	O-19 (4-6)	SW8021B	Toluene	28.7	J	13	26	41.6	µg/kg	41.6	UB	none	method blank
1119650	O-19 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	4940	=	155	310	517	µg/kg	4940	JL	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	6880	=	155	310	517	µg/kg	6880	JL	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Anthracene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1119650	O-19 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Chrysene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Fluoranthene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Fluorene	182	=	7.75	15.5	25.8	µg/kg	182	JL	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Naphthalene	2190	=	155	310	517	µg/kg	2190	JL	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Phenanthrene	81.2	=	7.75	15.5	25.8	µg/kg	81.2	JL	low	holding time
1119650	O-19 (6-8)	8270D SIMS (PAH)	Pyrene	0	ND	7.75	15.5	25.8	µg/kg	15.5	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	1-Methylnaphthalene	145	=	8.35	16.7	27.8	µg/kg	145	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	2-Methylnaphthalene	113	=	8.35	16.7	27.8	µg/kg	113	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Acenaphthene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Acenaphthylene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Anthracene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Benzo(a)Anthracene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Benzo[a]pyrene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	49.1	=	8.35	16.7	27.8	µg/kg	49.1	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Chrysene	34.4	=	8.35	16.7	27.8	µg/kg	34.4	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Fluoranthene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Fluorene	11.8	J	8.35	16.7	27.8	µg/kg	11.8	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Naphthalene	0	ND	8.35	16.7	27.8	µg/kg	16.7	UJ	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Phenanthrene	28	=	8.35	16.7	27.8	µg/kg	28	JL	low	holding time
1119650	O-21 (0-2)	8270D SIMS (PAH)	Pyrene	21.7	J	8.35	16.7	27.8	µg/kg	21.7	JL	low	holding time
1119650	O-21 (0-2)	SW8021B	Toluene	17.3	J	14.2	28.4	45.6	µg/kg	45.6	UB	none	method blank
1119650	O-21 (14-16)	SW8021B	Toluene	11.7	J	10.5	21	33.5	µg/kg	33.5	UB	none	method blank
1119650	O-21 (4-6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	J	0.0037	0.0074	0.0119	mg/kg	R	R	none	matrix interference
1119650	O-21 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	13900	=	415	830	1380	µg/kg	13900	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	18000	=	415	830	1380	µg/kg	18000	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Acenaphthene	0	ND	8.3	16.6	27.7	µg/kg	16.6	UJ	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Acenaphthylene	0	ND	8.3	16.6	27.7	µg/kg	16.6	UJ	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Anthracene	92.3	=	8.3	16.6	27.7	µg/kg	92.3	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Benzo(a)Anthracene	71.7	=	8.3	16.6	27.7	µg/kg	71.7	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Benzo[a]pyrene	74	=	8.3	16.6	27.7	µg/kg	74	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	0	ND	415	830	1380	µg/kg	830	UJ	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Benzo[g,h,i]perylene	69.9	=	8.3	16.6	27.7	µg/kg	69.9	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Benzo[k]fluoranthene	0	ND	415	830	1380	µg/kg	830	UJ	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Chrysene	126	=	8.3	16.6	27.7	µg/kg	126	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Dibenzo[a,h]anthracene	15.4	J	8.3	16.6	27.7	µg/kg	15.4	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Fluoranthene	187	=	8.3	16.6	27.7	µg/kg	187	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Fluorene	805	J	415	830	1380	µg/kg	805	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Indeno[1,2,3-c,d] pyrene	41	=	8.3	16.6	27.7	µg/kg	41	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Naphthalene	9930	=	415	830	1380	µg/kg	9930	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Phenanthrene	1390	=	415	830	1380	µg/kg	1390	JL	low	holding time
1119650	O-21 (6-8)	8270D SIMS (PAH)	Pyrene	203	=	8.3	16.6	27.7	µg/kg	203	JL	low	holding time
1119650	O-21 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	J	0.00342	0.00684	0.011	mg/kg	R	R	none	matrix interference
1118849	O-7 (6-8)	8270D SIMS (PAH)	1-Methylnaphthalene	51.4	=	1.53	3.06	5.11	µg/kg	51.4	J	none	field-duplicate RPD
1118849	O-7 (6-8)	8270D SIMS (PAH)	2-Methylnaphthalene	37.4	=	1.53	3.06	5.11	µg/kg	37.4	J	none	field-duplicate RPD

Table 64
Data Validation Flags for Soil Samples Collected in 2011
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1118849	O-7 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00641	0.0128	0.0207	mg/kg	R	R	none	matrix interference
1118849	O-7 (6-8)	SW8021B	Benzene	93.8	=	3.17	6.34	9.89	µg/kg	93.8	J	none	field-duplicate RPD
1118849	O-7 (6-8)	SW8021B	Ethylbenzene	174	=	6.17	12.3	19.8	µg/kg	174	J	none	field-duplicate RPD
1118849	O-7 (6-8)	SW8021B	o-Xylene	572	=	6.17	12.3	19.8	µg/kg	572	J	none	field-duplicate RPD
1118849	O-7 (6-8)	SW8021B	P & M -Xylene	2,820	=	11.9	23.8	39.6	µg/kg	2,820	J	none	field-duplicate RPD
1118849	O-7 (6-8)	SW8021B	Toluene	212	=	6.17	12.3	19.8	µg/kg	212	J	none	field-duplicate RPD
1118855	O-9 (0-2)	SW8021B	Benzene	0	ND	4.80	9.60	15.0	µg/kg	9.60	UJ	low	leaking methanol
1118855	O-9 (0-2)	SW8021B	Ethylbenzene	0	ND	9.36	18.7	30.0	µg/kg	18.7	UJ	low	leaking methanol
1118855	O-9 (0-2)	SW8021B	o-Xylene	0	ND	9.36	18.7	30.0	µg/kg	18.7	UJ	low	leaking methanol
1118855	O-9 (0-2)	SW8021B	P & M -Xylene	0	ND	18.0	36.0	60.0	µg/kg	36.0	UJ	low	leaking methanol
1118855	O-9 (0-2)	SW8021B	Toluene	0	ND	9.36	18.7	30.0	µg/kg	18.7	UJ	low	leaking methanol
1118855	O-9 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00335	0.00670	0.0108	mg/kg	R	R	none	matrix interference
1119807	O-27 (9-9.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00318	0.00636	0.0103	mg/Kg	R	R	none	matrix interference
1119807	O-27 (10.3-11)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00346	0.00692	0.0112	mg/Kg	R	R	none	matrix interference
1119807	O-26 (6.1-6.8)	SW8021B	Toluene	9.08	J	7.87	15.74	25.2	ug/Kg	25.2	UB	none	method blank
1119807	O-25 (9.7-10.3)	SW8021B	Toluene	10.6	J	8.71	17.42	27.9	ug/Kg	27.9	UB	none	method blank
1119807	O-27 (10.3-11)	SW8021B	Toluene	16.6	=	5.08	10.16	16.3	ug/Kg	16.6	UB	none	method blank
1119807	O-25 (8-9)	SW8021B	Toluene	7.81	J	6.58	13.16	21.1	ug/Kg	21.1	UB	none	method blank
1119807	O-27 (9-9.5)	8270D SIMS (PAH)	Benzo[b]Fluoranthene	1.66	J	1.52	3.04	5.05	ug/Kg	1.66	JH	high	LCS recovery
1119822	O-28 (8-9)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00437	0.00874	0.0141	mg/Kg	R	R	none	matrix interference
1119822	O-29 (11-11.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00334	0.00668	0.0108	mg/Kg	R	R	none	matrix interference
1119822	O-28 (8-9)	8270D SIMS (PAH)	1-Methylnaphthalene	33500	=	808	1616	2690	ug/Kg	33500	JH	high	surrogate recovery
1119822	O-28 (8-9)	8270D SIMS (PAH)	2-Methylnaphthalene	42500	=	808	1616	2690	ug/Kg	42500	JH	high	surrogate recovery
1119822	O-28 (8-9)	8270D SIMS (PAH)	Fluorene	1400	=	40.4	80.8	135	ug/Kg	1400	JH	high	surrogate recovery
1119822	O-28 (8-9)	8270D SIMS (PAH)	Naphthalene	10400	=	808	1616	2690	ug/Kg	10400	JH	high	surrogate recovery
1119822	O-28 (8-9)	8270D SIMS (PAH)	Phenanthrene	82.6	J	40.4	80.8	135	ug/Kg	82.6	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	8270D SIMS (PAH)	1-Methylnaphthalene	109	=	16.1	32.2	53.7	ug/Kg	109	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	8270D SIMS (PAH)	2-Methylnaphthalene	190	=	16.1	32.2	53.7	ug/Kg	190	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	8270D SIMS (PAH)	Fluorene	93.1	=	16.1	32.2	53.7	ug/Kg	93.1	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	8270D SIMS (PAH)	Naphthalene	137	=	16.1	32.2	53.7	ug/Kg	137	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	8270D SIMS (PAH)	Phenanthrene	32.7	J	16.1	32.2	53.7	ug/Kg	32.7	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	SW8021B	Benzene	1060	=	2.19	4.38	6.86	ug/Kg	1060	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	SW8021B	Ethylbenzene	566	=	4.28	8.56	13.7	ug/Kg	566	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	SW8021B	o-Xylene	30.6	=	4.28	8.56	13.7	ug/Kg	30.6	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	SW8021B	P & M -Xylene	342	=	8.23	16.46	27.4	ug/Kg	342	JH	high	surrogate recovery
1119822	O-29 (11-11.5)	SW8021B	Toluene	1080	=	4.28	8.56	13.7	ug/Kg	1080	JH	high	surrogate recovery
1119649	MW-197B (15)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00366	0.00732	0.0118	mg/Kg	R	R	none	matrix interference
1119649	MW-197B (50-52)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	J	0.00365	0.0073	0.0118	mg/Kg	R	R	none	matrix interference
1119649	MW-197B(15)	AK101	Gasoline Range Organics	456	=	19.4	38.8	64.5	mg/Kg	456	JH	high	surrogate recovery
1119649	MW-197B(50-52)	AK101	Gasoline Range Organics	69.5	=	1.06	2.12	3.53	mg/Kg	69.5	JH	high	surrogate recovery
1119867	MW-307 (8.0-8.5)	SW8021B	Toluene	6.93	J	4.5	9	14.4	ug/Kg	14.4	UB	none	method blank

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
MW-192A	2,4-Dinitrophenol	ND	2.28	0.54
MW-192B	2,4-Dinitrophenol	ND	2.12	0.54
MW-192A	2,4-Dinitrotoluene	ND	0.1896	0.0093
MW-192B	2,4-Dinitrotoluene	ND	0.1758	0.0093
MW-192A	2,6-Dinitrotoluene	ND	0.1896	0.0094
MW-192B	2,6-Dinitrotoluene	ND	0.1758	0.0094
MW-192A	4-Chloroaniline	ND	0.364	0.057
MW-192B	4-Chloroaniline	ND	0.338	0.057
MW-192A	Bis(2-Chloroethyl)ether	ND	0.1896	0.0022
MW-192B	Bis(2-Chloroethyl)ether	ND	0.1758	0.0022
MW-192A	Hexachlorobenzene	ND	0.1896	0.047
MW-192B	Hexachlorobenzene	ND	0.1758	0.047
MW-192A	Hexachlorobutadiene	ND	0.1896	0.12
MW-192B	Hexachlorobutadiene	ND	0.1758	0.12
MW-192A	Methylene chloride	ND	0.0574	0.016
MW-192B	Methylene chloride	ND	0.0478	0.016
MW-192A	Nitrobenzene	ND	0.1896	0.094
MW-192B	Nitrobenzene	ND	0.1758	0.094
MW-192A	N-Nitrosodimethylamine	ND	0.1896	0.000053
MW-192B	N-Nitrosodimethylamine	ND	0.1758	0.000053
MW-192A	N-Nitroso-di-n-propylamine	ND	0.1896	0.0011
MW-192B	N-Nitroso-di-n-propylamine	ND	0.1758	0.0011
MW-192A	Pentachlorophenol	ND	1.508	0.047
MW-192B	Pentachlorophenol	ND	1.398	0.047
SB-101 (0-2)	Bis(2-Chloroethyl)ether	ND	0.206	0.0022
SB-101 (0-2)	4-Chloroaniline	ND	0.396	0.057
SB-101 (0-2)	3,3-Dichlorobenzidine	ND	0.206	0.19
SB-101 (0-2)	1,1-Dichloroethene	ND	0.0308	0.03
SB-101 (0-2)	2,4-Dinitrophenol	ND	2.48	0.54
SB-101 (0-2)	2,4-Dinitrotoluene	ND	0.206	0.0093
SB-101 (0-2)	2,6-Dinitrotoluene	ND	0.206	0.0094
SB-101 (0-2)	Hexachlorobenzene	ND	0.206	0.047
SB-101 (0-2)	Hexachlorobutadiene	ND	0.206	0.12
SB-101 (0-2)	Methylene chloride	ND	0.1224	0.016
SB-101 (0-2)	Nitrobenzene	ND	0.206	0.094
SB-101 (0-2)	N-Nitrosodimethylamine	ND	0.206	5.3E-05
SB-101 (0-2)	N-Nitroso-di-n-propylamine	ND	0.206	0.0011
SB-101 (0-2)	Pentachlorophenol	ND	1.632	0.047
SB-101 (4-5)	Bis(2-Chloroethyl)ether	ND	0.208	0.0022
SB-101 (4-5)	4-Chloroaniline	ND	0.398	0.057
SB-101 (4-5)	3,3-Dichlorobenzidine	ND	0.208	0.19
SB-101 (4-5)	2,4-Dinitrophenol	ND	2.5	0.54
SB-101 (4-5)	2,4-Dinitrotoluene	ND	0.208	0.0093
SB-101 (4-5)	2,6-Dinitrotoluene	ND	0.208	0.0094
SB-101 (4-5)	Hexachlorobenzene	ND	0.208	0.047
SB-101 (4-5)	Hexachlorobutadiene	ND	0.208	0.12
SB-101 (4-5)	Methylene chloride	ND	0.1144	0.016
SB-101 (4-5)	Nitrobenzene	ND	0.208	0.094
SB-101 (4-5)	N-Nitrosodimethylamine	ND	0.208	5.3E-05
SB-101 (4-5)	N-Nitroso-di-n-propylamine	ND	0.208	0.0011

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-101 (4-5)	Pentachlorophenol	ND	1.646	0.047
SB-102 (0-2)	Bis(2-Chloroethyl)ether	ND	0.1966	0.0022
SB-102 (0-2)	4-Chloroaniline	ND	0.378	0.057
SB-102 (0-2)	3,3-Dichlorobenzidine	ND	0.1966	0.19
SB-102 (0-2)	2,4-Dinitrophenol	ND	2.36	0.54
SB-102 (0-2)	2,4-Dinitrotoluene	ND	0.1966	0.0093
SB-102 (0-2)	2,6-Dinitrotoluene	ND	0.1966	0.0094
SB-102 (0-2)	Hexachlorobenzene	ND	0.1966	0.047
SB-102 (0-2)	Hexachlorobutadiene	ND	0.1966	0.12
SB-102 (0-2)	Methylene chloride	ND	0.112	0.016
SB-102 (0-2)	Nitrobenzene	ND	0.1966	0.094
SB-102 (0-2)	N-Nitrosodimethylamine	ND	0.1966	5.3E-05
SB-102 (0-2)	N-Nitroso-di-n-propylamine	ND	0.1966	0.0011
SB-102 (0-2)	Pentachlorophenol	ND	1.564	0.047
SB-102 (5-6)	Bis(2-Chloroethyl)ether	ND	0.1594	0.0022
SB-102 (5-6)	4-Chloroaniline	ND	0.306	0.057
SB-102 (5-6)	2,4-Dinitrophenol	ND	1.92	0.54
SB-102 (5-6)	2,4-Dinitrotoluene	ND	0.1594	0.0093
SB-102 (5-6)	2,6-Dinitrotoluene	ND	0.1594	0.0094
SB-102 (5-6)	Hexachlorobenzene	ND	0.1594	0.047
SB-102 (5-6)	Hexachlorobutadiene	ND	0.1594	0.12
SB-102 (5-6)	Methylene chloride	ND	0.0536	0.016
SB-102 (5-6)	Nitrobenzene	ND	0.1594	0.094
SB-102 (5-6)	N-Nitrosodimethylamine	ND	0.1594	5.3E-05
SB-102 (5-6)	N-Nitroso-di-n-propylamine	ND	0.1594	0.0011
SB-102 (5-6)	Pentachlorophenol	ND	1.266	0.047
SB-103 (0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1922	0.0022
SB-103 (0-2.0)	4-Chloroaniline	ND	0.37	0.057
SB-103 (0-2.0)	3,3-Dichlorobenzidine	ND	0.1922	0.19
SB-103 (0-2.0)	2,4-Dinitrophenol	ND	2.32	0.54
SB-103 (0-2.0)	2,4-Dinitrotoluene	ND	0.1922	0.0093
SB-103 (0-2.0)	2,6-Dinitrotoluene	ND	0.1922	0.0094
SB-103 (0-2.0)	Hexachlorobenzene	ND	0.1922	0.047
SB-103 (0-2.0)	Hexachlorobutadiene	ND	0.1922	0.12
SB-103 (0-2.0)	Methylene chloride	ND	0.1078	0.016
SB-103 (0-2.0)	Nitrobenzene	ND	0.1922	0.094
SB-103 (0-2.0)	N-Nitrosodimethylamine	ND	0.1922	5.3E-05
SB-103 (0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1922	0.0011
SB-103 (0-2.0)	Pentachlorophenol	ND	1.528	0.047
SB-103 (5-6.7)	Bis(2-Chloroethyl)ether	ND	0.1582	0.0022
SB-103 (5-6.7)	4-Chloroaniline	ND	0.304	0.057
SB-103 (5-6.7)	2,4-Dinitrophenol	ND	1.906	0.54
SB-103 (5-6.7)	2,4-Dinitrotoluene	ND	0.1582	0.0093
SB-103 (5-6.7)	2,6-Dinitrotoluene	ND	0.1582	0.0094
SB-103 (5-6.7)	Hexachlorobenzene	ND	0.1582	0.047
SB-103 (5-6.7)	Hexachlorobutadiene	ND	0.1582	0.12
SB-103 (5-6.7)	Methylene chloride	ND	0.0658	0.016
SB-103 (5-6.7)	Nitrobenzene	ND	0.1582	0.094
SB-103 (5-6.7)	N-Nitrosodimethylamine	ND	0.1582	5.3E-05
SB-103 (5-6.7)	N-Nitroso-di-n-propylamine	ND	0.1582	0.0011

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-103 (5-6.7)	Pentachlorophenol	ND	1.258	0.047
SB-104 (0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1866	0.0022
SB-104 (0-2.0)	4-Chloroaniline	ND	0.358	0.057
SB-104 (0-2.0)	1,1-Dichloroethene	ND	0.0316	0.03
SB-104 (0-2.0)	2,4-Dinitrophenol	ND	2.24	0.54
SB-104 (0-2.0)	2,4-Dinitrotoluene	ND	0.1866	0.0093
SB-104 (0-2.0)	2,6-Dinitrotoluene	ND	0.1866	0.0094
SB-104 (0-2.0)	Hexachlorobenzene	ND	0.1866	0.047
SB-104 (0-2.0)	Hexachlorobutadiene	ND	0.1866	0.12
SB-104 (0-2.0)	Methylene chloride	ND	0.1256	0.016
SB-104 (0-2.0)	Nitrobenzene	ND	0.1866	0.094
SB-104 (0-2.0)	N-Nitrosodimethylamine	ND	0.1866	5.3E-05
SB-104 (0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1866	0.0011
SB-104 (0-2.0)	Pentachlorophenol	ND	1.484	0.047
SB-104 (5.0-6.7)	Bis(2-Chloroethyl)ether	ND	0.165	0.0022
SB-104 (5.0-6.7)	4-Chloroaniline	ND	0.318	0.057
SB-104 (5.0-6.7)	2,4-Dinitrophenol	ND	1.99	0.54
SB-104 (5.0-6.7)	2,4-Dinitrotoluene	ND	0.165	0.0093
SB-104 (5.0-6.7)	2,6-Dinitrotoluene	ND	0.165	0.0094
SB-104 (5.0-6.7)	Hexachlorobenzene	ND	0.165	0.047
SB-104 (5.0-6.7)	Hexachlorobutadiene	ND	0.165	0.12
SB-104 (5.0-6.7)	Methylene chloride	ND	0.06	0.016
SB-104 (5.0-6.7)	Nitrobenzene	ND	0.165	0.094
SB-104 (5.0-6.7)	N-Nitrosodimethylamine	ND	0.165	5.3E-05
SB-104 (5.0-6.7)	N-Nitroso-di-n-propylamine	ND	0.165	0.0011
SB-104 (5.0-6.7)	Pentachlorophenol	ND	1.312	0.047
SB-105 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.179	0.0022
SB-105 (0.0-2.0)	4-Chloroaniline	ND	0.344	0.057
SB-105 (0.0-2.0)	2,4-Dinitrophenol	ND	2.16	0.54
SB-105 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.179	0.0093
SB-105 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.179	0.0094
SB-105 (0.0-2.0)	Hexachlorobenzene	ND	0.179	0.047
SB-105 (0.0-2.0)	Hexachlorobutadiene	ND	0.179	0.12
SB-105 (0.0-2.0)	Methylene chloride	ND	0.0928	0.016
SB-105 (0.0-2.0)	Nitrobenzene	ND	0.179	0.094
SB-105 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.179	5.3E-05
SB-105 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.179	0.0011
SB-105 (0.0-2.0)	Pentachlorophenol	ND	1.422	0.047
SB-105 (5.0-6.2)	Bis(2-Chloroethyl)ether	ND	0.158	0.0022
SB-105 (5.0-6.2)	4-Chloroaniline	ND	0.304	0.057
SB-105 (5.0-6.2)	2,4-Dinitrophenol	ND	1.904	0.54
SB-105 (5.0-6.2)	2,4-Dinitrotoluene	ND	0.158	0.0093
SB-105 (5.0-6.2)	2,6-Dinitrotoluene	ND	0.158	0.0094
SB-105 (5.0-6.2)	Hexachlorobenzene	ND	0.158	0.047
SB-105 (5.0-6.2)	Hexachlorobutadiene	ND	0.158	0.12
SB-105 (5.0-6.2)	Methylene chloride	ND	0.0688	0.016
SB-105 (5.0-6.2)	Nitrobenzene	ND	0.158	0.094
SB-105 (5.0-6.2)	N-Nitrosodimethylamine	ND	0.158	5.3E-05
SB-105 (5.0-6.2)	N-Nitroso-di-n-propylamine	ND	0.158	0.0011
SB-105 (5.0-6.2)	Pentachlorophenol	ND	1.256	0.047

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-108(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	6.76	0.0022
SB-108(0.0-2.0)	4-Chloroaniline	ND	13	0.057
SB-108(0.0-2.0)	2-Chlorophenol	ND	6.76	1.5
SB-108(0.0-2.0)	1,2-Dichlorobenzene	ND	6.76	5.1
SB-108(0.0-2.0)	3,3-Dichlorobenzidine	ND	6.76	0.19
SB-108(0.0-2.0)	2,4-Dichlorophenol	ND	6.76	1.3
SB-108(0.0-2.0)	2,4-Dinitrophenol	ND	81.4	0.54
SB-108(0.0-2.0)	2,4-Dinitrotoluene	ND	6.76	0.0093
SB-108(0.0-2.0)	2,6-Dinitrotoluene	ND	6.76	0.0094
SB-108(0.0-2.0)	Hexachlorobenzene	ND	6.76	0.047
SB-108(0.0-2.0)	Hexachlorobutadiene	ND	6.76	0.12
SB-108(0.0-2.0)	Hexachlorocyclopentadiene	ND	17.34	1.3
SB-108(0.0-2.0)	Hexachloroethane	ND	6.76	0.21
SB-108(0.0-2.0)	Isophorone	ND	6.76	3.1
SB-108(0.0-2.0)	Methylene chloride	ND	0.0834	0.016
SB-108(0.0-2.0)	3&4-Methylphenol (p&m-Cresol)	ND	26.8	1.5
SB-108(0.0-2.0)	Nitrobenzene	ND	6.76	0.094
SB-108(0.0-2.0)	N-Nitrosodimethylamine	ND	6.76	5.3E-05
SB-108(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	6.76	0.0011
SB-108(0.0-2.0)	Pentachlorophenol	ND	53.8	0.047
SB-108(0.0-2.0)	2,4,6-Trichlorophenol	ND	6.76	1.4
SB-108(6.5-7.5)	Bis(2-Chloroethyl)ether	ND	0.1942	0.0022
SB-108(6.5-7.5)	4-Chloroaniline	ND	0.374	0.057
SB-108(6.5-7.5)	3,3-Dichlorobenzidine	ND	0.1942	0.19
SB-108(6.5-7.5)	2,4-Dinitrophenol	ND	2.34	0.54
SB-108(6.5-7.5)	2,4-Dinitrotoluene	ND	0.1942	0.0093
SB-108(6.5-7.5)	2,6-Dinitrotoluene	ND	0.1942	0.0094
SB-108(6.5-7.5)	Hexachlorobenzene	ND	0.1942	0.047
SB-108(6.5-7.5)	Hexachlorobutadiene	ND	0.1942	0.12
SB-108(6.5-7.5)	Methylene chloride	ND	0.0738	0.016
SB-108(6.5-7.5)	Nitrobenzene	ND	0.1942	0.094
SB-108(6.5-7.5)	N-Nitrosodimethylamine	ND	0.1942	5.3E-05
SB-108(6.5-7.5)	N-Nitroso-di-n-propylamine	ND	0.1942	0.0011
SB-108(6.5-7.5)	Pentachlorophenol	ND	1.544	0.047
SB-118 0.0-2.0	Bis(2-Chloroethyl)ether	ND	0.165	0.0022
SB-118 0.0-2.0	4-Chloroaniline	ND	0.318	0.057
SB-118 0.0-2.0	2,4-Dinitrophenol	ND	1.988	0.54
SB-118 0.0-2.0	2,4-Dinitrotoluene	ND	0.165	0.0093
SB-118 0.0-2.0	2,6-Dinitrotoluene	ND	0.165	0.0094
SB-118 0.0-2.0	Hexachlorobenzene	ND	0.165	0.047
SB-118 0.0-2.0	Hexachlorobutadiene	ND	0.165	0.12
SB-118 0.0-2.0	Nitrobenzene	ND	0.165	0.094
SB-118 0.0-2.0	N-Nitrosodimethylamine	ND	0.165	5.3E-05
SB-118 0.0-2.0	N-Nitroso-di-n-propylamine	ND	0.165	0.0011
SB-118 0.0-2.0	Pentachlorophenol	ND	1.31	0.047
SB-118 2.0-3.7	Bis(2-Chloroethyl)ether	ND	0.1918	0.0022
SB-118 2.0-3.7	4-Chloroaniline	ND	0.368	0.057
SB-118 2.0-3.7	3,3-Dichlorobenzidine	ND	0.1918	0.19
SB-118 2.0-3.7	2,4-Dinitrophenol	ND	2.32	0.54
SB-118 2.0-3.7	2,4-Dinitrotoluene	ND	0.1918	0.0093

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-118 2.0-3.7	2,6-Dinitrotoluene	ND	0.1918	0.0094
SB-118 2.0-3.7	Hexachlorobenzene	ND	0.1918	0.047
SB-118 2.0-3.7	Hexachlorobutadiene	ND	0.1918	0.12
SB-118 2.0-3.7	Methylene chloride	ND	0.111	0.016
SB-118 2.0-3.7	Nitrobenzene	ND	0.1918	0.094
SB-118 2.0-3.7	N-Nitrosodimethylamine	ND	0.1918	5.3E-05
SB-118 2.0-3.7	N-Nitroso-di-n-propylamine	ND	0.1918	0.0011
SB-118 2.0-3.7	Pentachlorophenol	ND	1.524	0.047
SB-120(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1692	0.0022
SB-120(0.0-2.0)	4-Chloroaniline	ND	0.326	0.057
SB-120(0.0-2.0)	2,4-Dinitrophenol	ND	2.04	0.54
SB-120(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1692	0.0093
SB-120(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1692	0.0094
SB-120(0.0-2.0)	Hexachlorobenzene	ND	0.1692	0.047
SB-120(0.0-2.0)	Hexachlorobutadiene	ND	0.1692	0.12
SB-120(0.0-2.0)	Methylene chloride	ND	0.0834	0.016
SB-120(0.0-2.0)	Nitrobenzene	ND	0.1692	0.094
SB-120(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1692	5.3E-05
SB-120(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1692	0.0011
SB-120(0.0-2.0)	Pentachlorophenol	ND	1.344	0.047
SB-120(12.0-13.1)	Bis(2-Chloroethyl)ether	ND	0.1658	0.0022
SB-120(12.0-13.1)	4-Chloroaniline	ND	0.318	0.057
SB-120(12.0-13.1)	2,4-Dinitrophenol	ND	1.998	0.54
SB-120(12.0-13.1)	2,4-Dinitrotoluene	ND	0.1658	0.0093
SB-120(12.0-13.1)	2,6-Dinitrotoluene	ND	0.1658	0.0094
SB-120(12.0-13.1)	Hexachlorobenzene	ND	0.1658	0.047
SB-120(12.0-13.1)	Hexachlorobutadiene	ND	0.1658	0.12
SB-120(12.0-13.1)	Nitrobenzene	ND	0.1658	0.094
SB-120(12.0-13.1)	N-Nitrosodimethylamine	ND	0.1658	5.3E-05
SB-120(12.0-13.1)	N-Nitroso-di-n-propylamine	ND	0.1658	0.0011
SB-120(12.0-13.1)	Pentachlorophenol	ND	1.318	0.047
SB-120(7.2-9.2)	Bis(2-Chloroethyl)ether	ND	0.1588	0.0022
SB-120(7.2-9.2)	4-Chloroaniline	ND	0.306	0.057
SB-120(7.2-9.2)	2,4-Dinitrophenol	ND	1.914	0.54
SB-120(7.2-9.2)	2,4-Dinitrotoluene	ND	0.1588	0.0093
SB-120(7.2-9.2)	2,6-Dinitrotoluene	ND	0.1588	0.0094
SB-120(7.2-9.2)	Hexachlorobenzene	ND	0.1588	0.047
SB-120(7.2-9.2)	Hexachlorobutadiene	ND	0.1588	0.12
SB-120(7.2-9.2)	Methylene chloride	ND	0.0492	0.016
SB-120(7.2-9.2)	Nitrobenzene	ND	0.1588	0.094
SB-120(7.2-9.2)	N-Nitrosodimethylamine	ND	0.1588	5.3E-05
SB-120(7.2-9.2)	N-Nitroso-di-n-propylamine	ND	0.1588	0.0011
SB-120(7.2-9.2)	Pentachlorophenol	ND	1.262	0.047
SB-121 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.161	0.0022
SB-121 (0.0-2.0)	4-Chloroaniline	ND	0.31	0.057
SB-121 (0.0-2.0)	2,4-Dinitrophenol	ND	1.94	0.54
SB-121 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.161	0.0093
SB-121 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.161	0.0094
SB-121 (0.0-2.0)	Hexachlorobenzene	ND	0.161	0.047
SB-121 (0.0-2.0)	Hexachlorobutadiene	ND	0.161	0.12

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-121 (0.0-2.0)	Nitrobenzene	ND	0.161	0.094
SB-121 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.161	5.3E-05
SB-121 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.161	0.0011
SB-121 (0.0-2.0)	Pentachlorophenol	ND	1.28	0.047
SB-121 (4.0-6.1)	Bis(2-Chloroethyl)ether	ND	0.1824	0.0022
SB-121 (4.0-6.1)	4-Chloroaniline	ND	0.35	0.057
SB-121 (4.0-6.1)	2,4-Dinitrophenol	ND	2.2	0.54
SB-121 (4.0-6.1)	2,4-Dinitrotoluene	ND	0.1824	0.0093
SB-121 (4.0-6.1)	2,6-Dinitrotoluene	ND	0.1824	0.0094
SB-121 (4.0-6.1)	Hexachlorobenzene	ND	0.1824	0.047
SB-121 (4.0-6.1)	Hexachlorobutadiene	ND	0.1824	0.12
SB-121 (4.0-6.1)	Methylene chloride	ND	0.0852	0.016
SB-121 (4.0-6.1)	Nitrobenzene	ND	0.1824	0.094
SB-121 (4.0-6.1)	N-Nitrosodimethylamine	ND	0.1824	5.3E-05
SB-121 (4.0-6.1)	N-Nitroso-di-n-propylamine	ND	0.1824	0.0011
SB-121 (4.0-6.1)	Pentachlorophenol	ND	1.45	0.047
SB-123 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1678	0.0022
SB-123 (0.0-2.0)	4-Chloroaniline	ND	0.322	0.057
SB-123 (0.0-2.0)	2,4-Dinitrophenol	ND	2.02	0.54
SB-123 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1678	0.0093
SB-123 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1678	0.0094
SB-123 (0.0-2.0)	Hexachlorobenzene	ND	0.1678	0.047
SB-123 (0.0-2.0)	Hexachlorobutadiene	ND	0.1678	0.12
SB-123 (0.0-2.0)	Nitrobenzene	ND	0.1678	0.094
SB-123 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1678	5.3E-05
SB-123 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1678	0.0011
SB-123 (0.0-2.0)	Pentachlorophenol	ND	1.334	0.047
SB-123 (11.5-13.0)	Bis(2-Chloroethyl)ether	ND	0.17	0.0022
SB-123 (11.5-13.0)	4-Chloroaniline	ND	0.328	0.057
SB-123 (11.5-13.0)	2,4-Dinitrophenol	ND	2.04	0.54
SB-123 (11.5-13.0)	2,4-Dinitrotoluene	ND	0.17	0.0093
SB-123 (11.5-13.0)	2,6-Dinitrotoluene	ND	0.17	0.0094
SB-123 (11.5-13.0)	Hexachlorobenzene	ND	0.17	0.047
SB-123 (11.5-13.0)	Hexachlorobutadiene	ND	0.17	0.12
SB-123 (11.5-13.0)	Methylene chloride	ND	0.0478	0.016
SB-123 (11.5-13.0)	Nitrobenzene	ND	0.17	0.094
SB-123 (11.5-13.0)	N-Nitrosodimethylamine	ND	0.17	5.3E-05
SB-123 (11.5-13.0)	N-Nitroso-di-n-propylamine	ND	0.17	0.0011
SB-123 (11.5-13.0)	Pentachlorophenol	ND	1.352	0.047
SB-123 (3.5-5.2)	Bis(2-Chloroethyl)ether	ND	0.1726	0.0022
SB-123 (3.5-5.2)	4-Chloroaniline	ND	0.332	0.057
SB-123 (3.5-5.2)	2,4-Dinitrophenol	ND	2.08	0.54
SB-123 (3.5-5.2)	2,4-Dinitrotoluene	ND	0.1726	0.0093
SB-123 (3.5-5.2)	2,6-Dinitrotoluene	ND	0.1726	0.0094
SB-123 (3.5-5.2)	Hexachlorobenzene	ND	0.1726	0.047
SB-123 (3.5-5.2)	Hexachlorobutadiene	ND	0.1726	0.12
SB-123 (3.5-5.2)	Nitrobenzene	ND	0.1726	0.094
SB-123 (3.5-5.2)	N-Nitrosodimethylamine	ND	0.1726	5.3E-05
SB-123 (3.5-5.2)	N-Nitroso-di-n-propylamine	ND	0.1726	0.0011
SB-123 (3.5-5.2)	Pentachlorophenol	ND	1.372	0.047

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-123 (3.5-5.2)	Bis(2-Chloroethyl)ether	ND	0.1724	0.0022
SB-123 (3.5-5.2)	4-Chloroaniline	ND	0.332	0.057
SB-123 (3.5-5.2)	1,1-Dichloroethene	ND	0.158	0.03
SB-123 (3.5-5.2)	2,4-Dinitrophenol	ND	2.08	0.54
SB-123 (3.5-5.2)	2,4-Dinitrotoluene	ND	0.1724	0.0093
SB-123 (3.5-5.2)	2,6-Dinitrotoluene	ND	0.1724	0.0094
SB-123 (3.5-5.2)	Hexachlorobenzene	ND	0.1724	0.047
SB-123 (3.5-5.2)	Hexachlorobutadiene	ND	0.1724	0.12
SB-123 (3.5-5.2)	Methylene chloride	ND	0.628	0.016
SB-123 (3.5-5.2)	Nitrobenzene	ND	0.1724	0.094
SB-123 (3.5-5.2)	N-Nitrosodimethylamine	ND	0.1724	5.3E-05
SB-123 (3.5-5.2)	N-Nitroso-di-n-propylamine	ND	0.1724	0.0011
SB-123 (3.5-5.2)	Pentachlorophenol	ND	1.37	0.047
SB-125 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1696	0.0022
SB-125 (0.0-2.0)	4-Chloroaniline	ND	0.326	0.057
SB-125 (0.0-2.0)	1,1-Dichloroethene	ND	0.031	0.03
SB-125 (0.0-2.0)	2,4-Dinitrophenol	ND	2.04	0.54
SB-125 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1696	0.0093
SB-125 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1696	0.0094
SB-125 (0.0-2.0)	Hexachlorobenzene	ND	0.1696	0.047
SB-125 (0.0-2.0)	Hexachlorobutadiene	ND	0.1696	0.12
SB-125 (0.0-2.0)	Methylene chloride	ND	0.1232	0.016
SB-125 (0.0-2.0)	Nitrobenzene	ND	0.1696	0.094
SB-125 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1696	5.3E-05
SB-125 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1696	0.0011
SB-125 (0.0-2.0)	Pentachlorophenol	ND	1.348	0.047
SB-125 (5.0-6.5)	Bis(2-Chloroethyl)ether	ND	0.1596	0.0022
SB-125 (5.0-6.5)	4-Chloroaniline	ND	0.306	0.057
SB-125 (5.0-6.5)	2,4-Dinitrophenol	ND	1.922	0.54
SB-125 (5.0-6.5)	2,4-Dinitrotoluene	ND	0.1596	0.0093
SB-125 (5.0-6.5)	2,6-Dinitrotoluene	ND	0.1596	0.0094
SB-125 (5.0-6.5)	Hexachlorobenzene	ND	0.1596	0.047
SB-125 (5.0-6.5)	Hexachlorobutadiene	ND	0.1596	0.12
SB-125 (5.0-6.5)	Methylene chloride	ND	0.0654	0.016
SB-125 (5.0-6.5)	Nitrobenzene	ND	0.1596	0.094
SB-125 (5.0-6.5)	N-Nitrosodimethylamine	ND	0.1596	5.3E-05
SB-125 (5.0-6.5)	N-Nitroso-di-n-propylamine	ND	0.1596	0.0011
SB-125 (5.0-6.5)	Pentachlorophenol	ND	1.268	0.047
SB-129 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1594	0.0022
SB-129 (0.0-2.0)	4-Chloroaniline	ND	0.306	0.057
SB-129 (0.0-2.0)	2,4-Dinitrophenol	ND	1.92	0.54
SB-129 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1594	0.0093
SB-129 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1594	0.0094
SB-129 (0.0-2.0)	Hexachlorobenzene	ND	0.1594	0.047
SB-129 (0.0-2.0)	Hexachlorobutadiene	ND	0.1594	0.12
SB-129 (0.0-2.0)	Methylene chloride	ND	0.0576	0.016
SB-129 (0.0-2.0)	Nitrobenzene	ND	0.1594	0.094
SB-129 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1594	5.3E-05
SB-129 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1594	0.0011
SB-129 (0.0-2.0)	Pentachlorophenol	ND	1.266	0.047

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-129 (10.5-12.2)	Bis(2-Chloroethyl)ether	ND	0.1722	0.0022
SB-129 (10.5-12.2)	4-Chloroaniline	ND	0.332	0.057
SB-129 (10.5-12.2)	2,4-Dinitrophenol	ND	2.08	0.54
SB-129 (10.5-12.2)	2,4-Dinitrotoluene	ND	0.1722	0.0093
SB-129 (10.5-12.2)	2,6-Dinitrotoluene	ND	0.1722	0.0094
SB-129 (10.5-12.2)	Hexachlorobenzene	ND	0.1722	0.047
SB-129 (10.5-12.2)	Hexachlorobutadiene	ND	0.1722	0.12
SB-129 (10.5-12.2)	Methylene chloride	ND	0.0554	0.016
SB-129 (10.5-12.2)	Nitrobenzene	ND	0.1722	0.094
SB-129 (10.5-12.2)	N-Nitrosodimethylamine	ND	0.1722	5.3E-05
SB-129 (10.5-12.2)	N-Nitroso-di-n-propylamine	ND	0.1722	0.0011
SB-129 (10.5-12.2)	Pentachlorophenol	ND	1.368	0.047
SB-129 (5.5-7.5)	Bis(2-Chloroethyl)ether	ND	0.1576	0.0022
SB-129 (5.5-7.5)	4-Chloroaniline	ND	0.304	0.057
SB-129 (5.5-7.5)	2,4-Dinitrophenol	ND	1.9	0.54
SB-129 (5.5-7.5)	2,4-Dinitrotoluene	ND	0.1576	0.0093
SB-129 (5.5-7.5)	2,6-Dinitrotoluene	ND	0.1576	0.0094
SB-129 (5.5-7.5)	Hexachlorobenzene	ND	0.1576	0.047
SB-129 (5.5-7.5)	Hexachlorobutadiene	ND	0.1576	0.12
SB-129 (5.5-7.5)	Nitrobenzene	ND	0.1576	0.094
SB-129 (5.5-7.5)	N-Nitrosodimethylamine	ND	0.1576	5.3E-05
SB-129 (5.5-7.5)	N-Nitroso-di-n-propylamine	ND	0.1576	0.0011
SB-129 (5.5-7.5)	Pentachlorophenol	ND	1.254	0.047
SB-129 (7.5-8.7)	Bis(2-Chloroethyl)ether	ND	0.166	0.0022
SB-129 (7.5-8.7)	4-Chloroaniline	ND	0.32	0.057
SB-129 (7.5-8.7)	2,4-Dinitrophenol	ND	2	0.54
SB-129 (7.5-8.7)	2,4-Dinitrotoluene	ND	0.166	0.0093
SB-129 (7.5-8.7)	2,6-Dinitrotoluene	ND	0.166	0.0094
SB-129 (7.5-8.7)	Hexachlorobenzene	ND	0.166	0.047
SB-129 (7.5-8.7)	Hexachlorobutadiene	ND	0.166	0.12
SB-129 (7.5-8.7)	Nitrobenzene	ND	0.166	0.094
SB-129 (7.5-8.7)	N-Nitrosodimethylamine	ND	0.166	5.3E-05
SB-129 (7.5-8.7)	N-Nitroso-di-n-propylamine	ND	0.166	0.0011
SB-129 (7.5-8.7)	Pentachlorophenol	ND	1.32	0.047
SB-132 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1742	0.0022
SB-132 (0.0-2.0)	4-Chloroaniline	ND	0.334	0.057
SB-132 (0.0-2.0)	2,4-Dinitrophenol	ND	2.1	0.54
SB-132 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1742	0.0093
SB-132 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1742	0.0094
SB-132 (0.0-2.0)	Hexachlorobenzene	ND	0.1742	0.047
SB-132 (0.0-2.0)	Hexachlorobutadiene	ND	0.1742	0.12
SB-132 (0.0-2.0)	Methylene chloride	ND	0.097	0.016
SB-132 (0.0-2.0)	Nitrobenzene	ND	0.1742	0.094
SB-132 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1742	5.3E-05
SB-132 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1742	0.0011
SB-132 (0.0-2.0)	Pentachlorophenol	ND	1.384	0.047
SB-132 (8.5-10.5)	Bis(2-Chloroethyl)ether	ND	0.181	0.0022
SB-132 (8.5-10.5)	4-Chloroaniline	ND	0.348	0.057
SB-132 (8.5-10.5)	2,4-Dinitrophenol	ND	2.18	0.54
SB-132 (8.5-10.5)	2,4-Dinitrotoluene	ND	0.181	0.0093

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-132 (8.5-10.5)	2,6-Dinitrotoluene	ND	0.181	0.0094
SB-132 (8.5-10.5)	Hexachlorobenzene	ND	0.181	0.047
SB-132 (8.5-10.5)	Hexachlorobutadiene	ND	0.181	0.12
SB-132 (8.5-10.5)	Methylene chloride	ND	0.106	0.016
SB-132 (8.5-10.5)	Nitrobenzene	ND	0.181	0.094
SB-132 (8.5-10.5)	N-Nitrosodimethylamine	ND	0.181	5.3E-05
SB-132 (8.5-10.5)	N-Nitroso-di-n-propylamine	ND	0.181	0.0011
SB-132 (8.5-10.5)	Pentachlorophenol	ND	1.438	0.047
SB-138(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1622	0.0022
SB-138(0.0-2.0)	4-Chloroaniline	ND	0.312	0.057
SB-138(0.0-2.0)	2,4-Dinitrophenol	ND	1.954	0.54
SB-138(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1622	0.0093
SB-138(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1622	0.0094
SB-138(0.0-2.0)	Hexachlorobenzene	ND	0.1622	0.047
SB-138(0.0-2.0)	Hexachlorobutadiene	ND	0.1622	0.12
SB-138(0.0-2.0)	Methylene chloride	ND	0.0608	0.016
SB-138(0.0-2.0)	Nitrobenzene	ND	0.1622	0.094
SB-138(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1622	5.3E-05
SB-138(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1622	0.0011
SB-138(0.0-2.0)	Pentachlorophenol	ND	1.29	0.047
SB-138(3.0-5.2)	Bis(2-Chloroethyl)ether	ND	0.177	0.0022
SB-138(3.0-5.2)	4-Chloroaniline	ND	0.34	0.057
SB-138(3.0-5.2)	2,4-Dinitrophenol	ND	2.14	0.54
SB-138(3.0-5.2)	2,4-Dinitrotoluene	ND	0.177	0.0093
SB-138(3.0-5.2)	2,6-Dinitrotoluene	ND	0.177	0.0094
SB-138(3.0-5.2)	Hexachlorobenzene	ND	0.177	0.047
SB-138(3.0-5.2)	Hexachlorobutadiene	ND	0.177	0.12
SB-138(3.0-5.2)	Methylene chloride	ND	0.0826	0.016
SB-138(3.0-5.2)	Nitrobenzene	ND	0.177	0.094
SB-138(3.0-5.2)	N-Nitrosodimethylamine	ND	0.177	5.3E-05
SB-138(3.0-5.2)	N-Nitroso-di-n-propylamine	ND	0.177	0.0011
SB-138(3.0-5.2)	Pentachlorophenol	ND	1.406	0.047
SB-140 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1604	0.0022
SB-140 (0.0-2.0)	4-Chloroaniline	ND	0.308	0.057
SB-140 (0.0-2.0)	2,4-Dinitrophenol	ND	1.934	0.54
SB-140 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1604	0.0093
SB-140 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1604	0.0094
SB-140 (0.0-2.0)	Hexachlorobenzene	ND	0.1604	0.047
SB-140 (0.0-2.0)	Hexachlorobutadiene	ND	0.1604	0.12
SB-140 (0.0-2.0)	Methylene chloride	ND	0.0588	0.016
SB-140 (0.0-2.0)	Nitrobenzene	ND	0.1604	0.094
SB-140 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1604	5.3E-05
SB-140 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1604	0.0011
SB-140 (0.0-2.0)	Pentachlorophenol	ND	1.276	0.047
SB-140 (3.0-5.0)	Bis(2-Chloroethyl)ether	ND	0.202	0.0022
SB-140 (3.0-5.0)	4-Chloroaniline	ND	0.388	0.057
SB-140 (3.0-5.0)	3,3-Dichlorobenzidine	ND	0.202	0.19
SB-140 (3.0-5.0)	2,4-Dinitrophenol	ND	2.44	0.54
SB-140 (3.0-5.0)	2,4-Dinitrotoluene	ND	0.202	0.0093
SB-140 (3.0-5.0)	2,6-Dinitrotoluene	ND	0.202	0.0094

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-140 (3.0-5.0)	Hexachlorobenzene	ND	0.202	0.047
SB-140 (3.0-5.0)	Hexachlorobutadiene	ND	0.202	0.12
SB-140 (3.0-5.0)	Methylene chloride	ND	0.105	0.016
SB-140 (3.0-5.0)	Nitrobenzene	ND	0.202	0.094
SB-140 (3.0-5.0)	N-Nitrosodimethylamine	ND	0.202	5.3E-05
SB-140 (3.0-5.0)	N-Nitroso-di-n-propylamine	ND	0.202	0.0011
SB-140 (3.0-5.0)	Pentachlorophenol	ND	1.606	0.047
SB-151 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1582	0.0022
SB-151 (0.0-2.0)	4-Chloroaniline	ND	0.304	0.057
SB-151 (0.0-2.0)	2,4-Dinitrophenol	ND	1.908	0.54
SB-151 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1582	0.0093
SB-151 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1582	0.0094
SB-151 (0.0-2.0)	Hexachlorobenzene	ND	0.1582	0.047
SB-151 (0.0-2.0)	Hexachlorobutadiene	ND	0.1582	0.12
SB-151 (0.0-2.0)	Methylene chloride	ND	0.0474	0.016
SB-151 (0.0-2.0)	Nitrobenzene	ND	0.1582	0.094
SB-151 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1582	5.3E-05
SB-151 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1582	0.0011
SB-151 (0.0-2.0)	Pentachlorophenol	ND	1.258	0.047
SB-151 (16.0-17.8)	Bis(2-Chloroethyl)ether	ND	0.1724	0.0022
SB-151 (16.0-17.8)	4-Chloroaniline	ND	0.332	0.057
SB-151 (16.0-17.8)	2,4-Dinitrophenol	ND	2.08	0.54
SB-151 (16.0-17.8)	2,4-Dinitrotoluene	ND	0.1724	0.0093
SB-151 (16.0-17.8)	2,6-Dinitrotoluene	ND	0.1724	0.0094
SB-151 (16.0-17.8)	Hexachlorobenzene	ND	0.1724	0.047
SB-151 (16.0-17.8)	Hexachlorobutadiene	ND	0.1724	0.12
SB-151 (16.0-17.8)	Methylene chloride	ND	0.0548	0.016
SB-151 (16.0-17.8)	Nitrobenzene	ND	0.1724	0.094
SB-151 (16.0-17.8)	N-Nitrosodimethylamine	ND	0.1724	5.3E-05
SB-151 (16.0-17.8)	N-Nitroso-di-n-propylamine	ND	0.1724	0.0011
SB-151 (16.0-17.8)	Pentachlorophenol	ND	1.372	0.047
SB-151 (16.0-17.8)	Bis(2-Chloroethyl)ether	ND	0.932	0.0022
SB-151 (16.0-17.8)	4-Chloroaniline	ND	1.794	0.057
SB-151 (16.0-17.8)	Chlorobenzene	ND	2.14	0.63
SB-151 (16.0-17.8)	3,3-Dichlorobenzidine	ND	0.932	0.19
SB-151 (16.0-17.8)	1,1-Dichloroethene	ND	0.214	0.03
SB-151 (16.0-17.8)	2,4-Dinitrophenol	ND	11.24	0.54
SB-151 (16.0-17.8)	2,4-Dinitrotoluene	ND	0.932	0.0093
SB-151 (16.0-17.8)	2,6-Dinitrotoluene	ND	0.932	0.0094
SB-151 (16.0-17.8)	Hexachlorobenzene	ND	0.932	0.047
SB-151 (16.0-17.8)	Hexachlorobutadiene	ND	0.932	0.12
SB-151 (16.0-17.8)	Hexachlorocyclopentadiene	ND	2.4	1.3
SB-151 (16.0-17.8)	Hexachloroethane	ND	0.932	0.21
SB-151 (16.0-17.8)	Methylene chloride	ND	0.85	0.016
SB-151 (16.0-17.8)	3&4-Methylphenol (p&m-Cresol)	ND	3.7	1.5
SB-151 (16.0-17.8)	Nitrobenzene	ND	0.932	0.094
SB-151 (16.0-17.8)	N-Nitrosodimethylamine	ND	0.932	5.3E-05
SB-151 (16.0-17.8)	N-Nitroso-di-n-propylamine	ND	0.932	0.0011
SB-151 (16.0-17.8)	Pentachlorophenol	ND	7.42	0.047
SB-151 (16.0-17.8)	Bis(2-Chloroethyl)ether	ND	0.926	0.0022

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-151 (16.0-17.8)	4-Chloroaniline	ND	1.782	0.057
SB-151 (16.0-17.8)	Chlorobenzene	ND	1.358	0.63
SB-151 (16.0-17.8)	3,3-Dichlorobenzidine	ND	0.926	0.19
SB-151 (16.0-17.8)	1,1-Dichloroethene	ND	1.358	0.03
SB-151 (16.0-17.8)	cis-1,2-Dichloroethene	ND	1.358	0.24
SB-151 (16.0-17.8)	2,4-Dinitrophenol	ND	11.16	0.54
SB-151 (16.0-17.8)	2,4-Dinitrotoluene	ND	0.926	0.0093
SB-151 (16.0-17.8)	2,6-Dinitrotoluene	ND	0.926	0.0094
SB-151 (16.0-17.8)	Hexachlorobenzene	ND	0.926	0.047
SB-151 (16.0-17.8)	Hexachlorobutadiene	ND	0.926	0.12
SB-151 (16.0-17.8)	Hexachlorocyclopentadiene	ND	2.38	1.3
SB-151 (16.0-17.8)	Hexachloroethane	ND	0.926	0.21
SB-151 (16.0-17.8)	Methylene chloride	ND	5.4	0.016
SB-151 (16.0-17.8)	3&4-Methylphenol (p&m-Cresol)	ND	3.68	1.5
SB-151 (16.0-17.8)	Methyl-t-butyl ether	ND	5.4	1.3
SB-151 (16.0-17.8)	Nitrobenzene	ND	0.926	0.094
SB-151 (16.0-17.8)	N-Nitrosodimethylamine	ND	0.926	5.3E-05
SB-151 (16.0-17.8)	N-Nitroso-di-n-propylamine	ND	0.926	0.0011
SB-151 (16.0-17.8)	Pentachlorophenol	ND	7.36	0.047
SB-157 0.0-2.0	Bis(2-Chloroethyl)ether	ND	0.1608	0.0022
SB-157 0.0-2.0	4-Chloroaniline	ND	0.31	0.057
SB-157 0.0-2.0	2,4-Dinitrophenol	ND	1.938	0.54
SB-157 0.0-2.0	2,4-Dinitrotoluene	ND	0.1608	0.0093
SB-157 0.0-2.0	2,6-Dinitrotoluene	ND	0.1608	0.0094
SB-157 0.0-2.0	Hexachlorobenzene	ND	0.1608	0.047
SB-157 0.0-2.0	Hexachlorobutadiene	ND	0.1608	0.12
SB-157 0.0-2.0	Methylene chloride	ND	0.0464	0.016
SB-157 0.0-2.0	Nitrobenzene	ND	0.1608	0.094
SB-157 0.0-2.0	N-Nitrosodimethylamine	ND	0.1608	5.3E-05
SB-157 0.0-2.0	N-Nitroso-di-n-propylamine	ND	0.1608	0.0011
SB-157 0.0-2.0	Pentachlorophenol	ND	1.278	0.047
SB-157 6.0-8.0	Bis(2-Chloroethyl)ether	ND	0.1606	0.0022
SB-157 6.0-8.0	4-Chloroaniline	ND	0.308	0.057
SB-157 6.0-8.0	2,4-Dinitrophenol	ND	1.936	0.54
SB-157 6.0-8.0	2,4-Dinitrotoluene	ND	0.1606	0.0093
SB-157 6.0-8.0	2,6-Dinitrotoluene	ND	0.1606	0.0094
SB-157 6.0-8.0	Hexachlorobenzene	ND	0.1606	0.047
SB-157 6.0-8.0	Hexachlorobutadiene	ND	0.1606	0.12
SB-157 6.0-8.0	Methylene chloride	ND	0.0534	0.016
SB-157 6.0-8.0	Nitrobenzene	ND	0.1606	0.094
SB-157 6.0-8.0	N-Nitrosodimethylamine	ND	0.1606	5.3E-05
SB-157 6.0-8.0	N-Nitroso-di-n-propylamine	ND	0.1606	0.0011
SB-157 6.0-8.0	Pentachlorophenol	ND	1.276	0.047
SB-160(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1666	0.0022
SB-160(0.0-2.0)	4-Chloroaniline	ND	0.32	0.057
SB-160(0.0-2.0)	2,4-Dinitrophenol	ND	2	0.54
SB-160(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1666	0.0093
SB-160(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1666	0.0094
SB-160(0.0-2.0)	Hexachlorobenzene	ND	0.1666	0.047
SB-160(0.0-2.0)	Hexachlorobutadiene	ND	0.1666	0.12

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-160(0.0-2.0)	Methylene chloride	ND	0.0514	0.016
SB-160(0.0-2.0)	Nitrobenzene	ND	0.1666	0.094
SB-160(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1666	5.3E-05
SB-160(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1666	0.0011
SB-160(0.0-2.0)	Pentachlorophenol	ND	1.324	0.047
SB-160(12-13.5)	Bis(2-Chloroethyl)ether	ND	0.1728	0.0022
SB-160(12-13.5)	4-Chloroaniline	ND	0.332	0.057
SB-160(12-13.5)	2,4-Dinitrophenol	ND	2.08	0.54
SB-160(12-13.5)	2,4-Dinitrotoluene	ND	0.1728	0.0093
SB-160(12-13.5)	2,6-Dinitrotoluene	ND	0.1728	0.0094
SB-160(12-13.5)	Hexachlorobenzene	ND	0.1728	0.047
SB-160(12-13.5)	Hexachlorobutadiene	ND	0.1728	0.12
SB-160(12-13.5)	Methylene chloride	ND	0.05	0.016
SB-160(12-13.5)	Nitrobenzene	ND	0.1728	0.094
SB-160(12-13.5)	N-Nitrosodimethylamine	ND	0.1728	5.3E-05
SB-160(12-13.5)	N-Nitroso-di-n-propylamine	ND	0.1728	0.0011
SB-160(12-13.5)	Pentachlorophenol	ND	1.374	0.047
SB-160(12-13.5)	Bis(2-Chloroethyl)ether	ND	1.596	0.0022
SB-160(12-13.5)	4-Chloroaniline	ND	3.06	0.057
SB-160(12-13.5)	2-Chlorophenol	ND	1.596	1.5
SB-160(12-13.5)	3,3-Dichlorobenzidine	ND	1.596	0.19
SB-160(12-13.5)	1,1-Dichloroethene	ND	0.1124	0.03
SB-160(12-13.5)	2,4-Dichlorophenol	ND	1.596	1.3
SB-160(12-13.5)	2,4-Dinitrophenol	ND	19.24	0.54
SB-160(12-13.5)	2,4-Dinitrotoluene	ND	1.596	0.0093
SB-160(12-13.5)	2,6-Dinitrotoluene	ND	1.596	0.0094
SB-160(12-13.5)	Hexachlorobenzene	ND	1.596	0.047
SB-160(12-13.5)	Hexachlorobutadiene	ND	1.596	0.12
SB-160(12-13.5)	Hexachlorocyclopentadiene	ND	4.1	1.3
SB-160(12-13.5)	Hexachloroethane	ND	1.596	0.21
SB-160(12-13.5)	Methylene chloride	ND	0.448	0.016
SB-160(12-13.5)	3&4-Methylphenol (p&m-Cresol)	ND	6.34	1.5
SB-160(12-13.5)	Nitrobenzene	ND	1.596	0.094
SB-160(12-13.5)	N-Nitrosodimethylamine	ND	1.596	5.3E-05
SB-160(12-13.5)	N-Nitroso-di-n-propylamine	ND	1.596	0.0011
SB-160(12-13.5)	Pentachlorophenol	ND	12.68	0.047
SB-160(12-13.5)	2,4,6-Trichlorophenol	ND	1.596	1.4
SB-160(12-13.5)	Bis(2-Chloroethyl)ether	ND	8.5	0.0022
SB-160(12-13.5)	4-Chloroaniline	ND	16.34	0.057
SB-160(12-13.5)	2-Chlorophenol	ND	8.5	1.5
SB-160(12-13.5)	1,2-Dichlorobenzene	ND	8.5	5.1
SB-160(12-13.5)	3,3-Dichlorobenzidine	ND	8.5	0.19
SB-160(12-13.5)	1,1-Dichloroethene	ND	0.1238	0.03
SB-160(12-13.5)	2,4-Dichlorophenol	ND	8.5	1.3
SB-160(12-13.5)	2,4-Dinitrophenol	ND	102.4	0.54
SB-160(12-13.5)	2,4-Dinitrotoluene	ND	8.5	0.0093
SB-160(12-13.5)	2,6-Dinitrotoluene	ND	8.5	0.0094
SB-160(12-13.5)	Hexachlorobenzene	ND	8.5	0.047
SB-160(12-13.5)	Hexachlorobutadiene	ND	8.5	0.12
SB-160(12-13.5)	Hexachlorocyclopentadiene	ND	21.8	1.3

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-160(12-13.5)	Hexachloroethane	ND	8.5	0.21
SB-160(12-13.5)	Isophorone	ND	8.5	3.1
SB-160(12-13.5)	Methylene chloride	ND	0.492	0.016
SB-160(12-13.5)	3&4-Methylphenol (p&m-Cresol)	ND	33.8	1.5
SB-160(12-13.5)	Nitrobenzene	ND	8.5	0.094
SB-160(12-13.5)	N-Nitrosodimethylamine	ND	8.5	5.3E-05
SB-160(12-13.5)	N-Nitroso-di-n-propylamine	ND	8.5	0.0011
SB-160(12-13.5)	Pentachlorophenol	ND	67.6	0.047
SB-160(12-13.5)	2,4,6-Trichlorophenol	ND	8.5	1.4
SB-162(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1572	0.0022
SB-162(0.0-2.0)	4-Chloroaniline	ND	0.302	0.057
SB-162(0.0-2.0)	2,4-Dinitrophenol	ND	1.894	0.54
SB-162(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1572	0.0093
SB-162(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1572	0.0094
SB-162(0.0-2.0)	Hexachlorobenzene	ND	0.1572	0.047
SB-162(0.0-2.0)	Hexachlorobutadiene	ND	0.1572	0.12
SB-162(0.0-2.0)	Methylene chloride	ND	0.0404	0.016
SB-162(0.0-2.0)	Nitrobenzene	ND	0.1572	0.094
SB-162(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1572	5.3E-05
SB-162(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1572	0.0011
SB-162(0.0-2.0)	Pentachlorophenol	ND	1.25	0.047
SB-162(5.5-7.1)	Bis(2-Chloroethyl)ether	ND	0.1598	0.0022
SB-162(5.5-7.1)	4-Chloroaniline	ND	0.308	0.057
SB-162(5.5-7.1)	2,4-Dinitrophenol	ND	1.926	0.54
SB-162(5.5-7.1)	2,4-Dinitrotoluene	ND	0.1598	0.0093
SB-162(5.5-7.1)	2,6-Dinitrotoluene	ND	0.1598	0.0094
SB-162(5.5-7.1)	Hexachlorobenzene	ND	0.1598	0.047
SB-162(5.5-7.1)	Hexachlorobutadiene	ND	0.1598	0.12
SB-162(5.5-7.1)	Methylene chloride	ND	0.0404	0.016
SB-162(5.5-7.1)	Nitrobenzene	ND	0.1598	0.094
SB-162(5.5-7.1)	N-Nitrosodimethylamine	ND	0.1598	5.3E-05
SB-162(5.5-7.1)	N-Nitroso-di-n-propylamine	ND	0.1598	0.0011
SB-162(5.5-7.1)	Pentachlorophenol	ND	1.27	0.047
SB-164 0.0-2.0	Bis(2-Chloroethyl)ether	ND	0.1634	0.0022
SB-164 0.0-2.0	4-Chloroaniline	ND	0.314	0.057
SB-164 0.0-2.0	2,4-Dinitrophenol	ND	1.968	0.54
SB-164 0.0-2.0	2,4-Dinitrotoluene	ND	0.1634	0.0093
SB-164 0.0-2.0	2,6-Dinitrotoluene	ND	0.1634	0.0094
SB-164 0.0-2.0	Hexachlorobenzene	ND	0.1634	0.047
SB-164 0.0-2.0	Hexachlorobutadiene	ND	0.1634	0.12
SB-164 0.0-2.0	Methylene chloride	ND	0.05	0.016
SB-164 0.0-2.0	Nitrobenzene	ND	0.1634	0.094
SB-164 0.0-2.0	N-Nitrosodimethylamine	ND	0.1634	5.3E-05
SB-164 0.0-2.0	N-Nitroso-di-n-propylamine	ND	0.1634	0.0011
SB-164 0.0-2.0	Pentachlorophenol	ND	1.298	0.047
SB-164 3.0-4.5	Bis(2-Chloroethyl)ether	ND	0.196	0.0022
SB-164 3.0-4.5	4-Chloroaniline	ND	0.376	0.057
SB-164 3.0-4.5	3,3-Dichlorobenzidine	ND	0.196	0.19
SB-164 3.0-4.5	2,4-Dinitrophenol	ND	2.36	0.54
SB-164 3.0-4.5	2,4-Dinitrotoluene	ND	0.196	0.0093

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-164 3.0-4.5	2,6-Dinitrotoluene	ND	0.196	0.0094
SB-164 3.0-4.5	Hexachlorobenzene	ND	0.196	0.047
SB-164 3.0-4.5	Hexachlorobutadiene	ND	0.196	0.12
SB-164 3.0-4.5	Methylene chloride	ND	0.0814	0.016
SB-164 3.0-4.5	Nitrobenzene	ND	0.196	0.094
SB-164 3.0-4.5	N-Nitrosodimethylamine	ND	0.196	5.3E-05
SB-164 3.0-4.5	N-Nitroso-di-n-propylamine	ND	0.196	0.0011
SB-164 3.0-4.5	Pentachlorophenol	ND	1.558	0.047
SB-167 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1596	0.0022
SB-167 (0.0-2.0)	4-Chloroaniline	ND	0.306	0.057
SB-167 (0.0-2.0)	2,4-Dinitrophenol	ND	1.924	0.54
SB-167 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1596	0.0093
SB-167 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1596	0.0094
SB-167 (0.0-2.0)	Hexachlorobenzene	ND	0.1596	0.047
SB-167 (0.0-2.0)	Hexachlorobutadiene	ND	0.1596	0.12
SB-167 (0.0-2.0)	Methylene chloride	ND	0.048	0.016
SB-167 (0.0-2.0)	Nitrobenzene	ND	0.1596	0.094
SB-167 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1596	5.3E-05
SB-167 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1596	0.0011
SB-167 (0.0-2.0)	Pentachlorophenol	ND	1.268	0.047
SB-167 (5.0-6.2)	Bis(2-Chloroethyl)ether	ND	0.1598	0.0022
SB-167 (5.0-6.2)	4-Chloroaniline	ND	0.308	0.057
SB-167 (5.0-6.2)	2,4-Dinitrophenol	ND	1.926	0.54
SB-167 (5.0-6.2)	2,4-Dinitrotoluene	ND	0.1598	0.0093
SB-167 (5.0-6.2)	2,6-Dinitrotoluene	ND	0.1598	0.0094
SB-167 (5.0-6.2)	Hexachlorobenzene	ND	0.1598	0.047
SB-167 (5.0-6.2)	Hexachlorobutadiene	ND	0.1598	0.12
SB-167 (5.0-6.2)	Methylene chloride	ND	0.0454	0.016
SB-167 (5.0-6.2)	Nitrobenzene	ND	0.1598	0.094
SB-167 (5.0-6.2)	N-Nitrosodimethylamine	ND	0.1598	5.3E-05
SB-167 (5.0-6.2)	N-Nitroso-di-n-propylamine	ND	0.1598	0.0011
SB-167 (5.0-6.2)	Pentachlorophenol	ND	1.27	0.047
SB-172 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1626	0.0022
SB-172 (0.0-2.0)	4-Chloroaniline	ND	0.312	0.057
SB-172 (0.0-2.0)	2,4-Dinitrophenol	ND	1.96	0.54
SB-172 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1626	0.0093
SB-172 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1626	0.0094
SB-172 (0.0-2.0)	Hexachlorobenzene	ND	0.1626	0.047
SB-172 (0.0-2.0)	Hexachlorobutadiene	ND	0.1626	0.12
SB-172 (0.0-2.0)	Methylene chloride	ND	0.0494	0.016
SB-172 (0.0-2.0)	Nitrobenzene	ND	0.1626	0.094
SB-172 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1626	5.3E-05
SB-172 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1626	0.0011
SB-172 (0.0-2.0)	Pentachlorophenol	ND	1.292	0.047
SB-172 (5.0-6.5)	Bis(2-Chloroethyl)ether	ND	0.1636	0.0022
SB-172 (5.0-6.5)	4-Chloroaniline	ND	0.314	0.057
SB-172 (5.0-6.5)	2,4-Dinitrophenol	ND	1.972	0.54
SB-172 (5.0-6.5)	2,4-Dinitrotoluene	ND	0.1636	0.0093
SB-172 (5.0-6.5)	2,6-Dinitrotoluene	ND	0.1636	0.0094
SB-172 (5.0-6.5)	Hexachlorobenzene	ND	0.1636	0.047

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-172 (5.0-6.5)	Hexachlorobutadiene	ND	0.1636	0.12
SB-172 (5.0-6.5)	Methylene chloride	ND	0.0566	0.016
SB-172 (5.0-6.5)	Nitrobenzene	ND	0.1636	0.094
SB-172 (5.0-6.5)	N-Nitrosodimethylamine	ND	0.1636	5.3E-05
SB-172 (5.0-6.5)	N-Nitroso-di-n-propylamine	ND	0.1636	0.0011
SB-172 (5.0-6.5)	Pentachlorophenol	ND	1.3	0.047
SB-175 (0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1604	0.0022
SB-175 (0.0-2.0)	4-Chloroaniline	ND	0.308	0.057
SB-175 (0.0-2.0)	2,4-Dinitrophenol	ND	1.932	0.54
SB-175 (0.0-2.0)	2,4-Dinitrotoluene	ND	0.1604	0.0093
SB-175 (0.0-2.0)	2,6-Dinitrotoluene	ND	0.1604	0.0094
SB-175 (0.0-2.0)	Hexachlorobenzene	ND	0.1604	0.047
SB-175 (0.0-2.0)	Hexachlorobutadiene	ND	0.1604	0.12
SB-175 (0.0-2.0)	Methylene chloride	ND	0.0406	0.016
SB-175 (0.0-2.0)	Nitrobenzene	ND	0.1604	0.094
SB-175 (0.0-2.0)	N-Nitrosodimethylamine	ND	0.1604	5.3E-05
SB-175 (0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1604	0.0011
SB-175 (0.0-2.0)	Pentachlorophenol	ND	1.274	0.047
SB-175 (10.5-12.5)	Bis(2-Chloroethyl)ether	ND	0.1776	0.0022
SB-175 (10.5-12.5)	4-Chloroaniline	ND	0.342	0.057
SB-175 (10.5-12.5)	2,4-Dinitrophenol	ND	2.14	0.54
SB-175 (10.5-12.5)	2,4-Dinitrotoluene	ND	0.1776	0.0093
SB-175 (10.5-12.5)	2,6-Dinitrotoluene	ND	0.1776	0.0094
SB-175 (10.5-12.5)	Hexachlorobenzene	ND	0.1776	0.047
SB-175 (10.5-12.5)	Hexachlorobutadiene	ND	0.1776	0.12
SB-175 (10.5-12.5)	Methylene chloride	ND	0.0616	0.016
SB-175 (10.5-12.5)	Nitrobenzene	ND	0.1776	0.094
SB-175 (10.5-12.5)	N-Nitrosodimethylamine	ND	0.1776	5.3E-05
SB-175 (10.5-12.5)	N-Nitroso-di-n-propylamine	ND	0.1776	0.0011
SB-175 (10.5-12.5)	Pentachlorophenol	ND	1.412	0.047
SB-175 (5.0-7.0)	Bis(2-Chloroethyl)ether	ND	0.1586	0.0022
SB-175 (5.0-7.0)	4-Chloroaniline	ND	0.304	0.057
SB-175 (5.0-7.0)	2,4-Dinitrophenol	ND	1.912	0.54
SB-175 (5.0-7.0)	2,4-Dinitrotoluene	ND	0.1586	0.0093
SB-175 (5.0-7.0)	2,6-Dinitrotoluene	ND	0.1586	0.0094
SB-175 (5.0-7.0)	Hexachlorobenzene	ND	0.1586	0.047
SB-175 (5.0-7.0)	Hexachlorobutadiene	ND	0.1586	0.12
SB-175 (5.0-7.0)	Methylene chloride	ND	0.0494	0.016
SB-175 (5.0-7.0)	Nitrobenzene	ND	0.1586	0.094
SB-175 (5.0-7.0)	N-Nitrosodimethylamine	ND	0.1586	5.3E-05
SB-175 (5.0-7.0)	N-Nitroso-di-n-propylamine	ND	0.1586	0.0011
SB-175 (5.0-7.0)	Pentachlorophenol	ND	1.26	0.047
SB-175 (5.0-7.0)	Bis(2-Chloroethyl)ether	ND	0.1682	0.0022
SB-175 (5.0-7.0)	4-Chloroaniline	ND	0.324	0.057
SB-175 (5.0-7.0)	1,1-Dichloroethene	ND	0.0888	0.03
SB-175 (5.0-7.0)	2,4-Dinitrophenol	ND	2.02	0.54
SB-175 (5.0-7.0)	2,4-Dinitrotoluene	ND	0.1682	0.0093
SB-175 (5.0-7.0)	2,6-Dinitrotoluene	ND	0.1682	0.0094
SB-175 (5.0-7.0)	Hexachlorobenzene	ND	0.1682	0.047
SB-175 (5.0-7.0)	Hexachlorobutadiene	ND	0.1682	0.12

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-175 (5.0-7.0)	Methylene chloride	ND	0.354	0.016
SB-175 (5.0-7.0)	Nitrobenzene	ND	0.1682	0.094
SB-175 (5.0-7.0)	N-Nitrosodimethylamine	ND	0.1682	5.3E-05
SB-175 (5.0-7.0)	N-Nitroso-di-n-propylamine	ND	0.1682	0.0011
SB-175 (5.0-7.0)	Pentachlorophenol	ND	1.338	0.047
SB-176(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1644	0.0022
SB-176(0.0-2.0)	4-Chloroaniline	ND	0.316	0.057
SB-176(0.0-2.0)	2,4-Dinitrophenol	ND	1.982	0.54
SB-176(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1644	0.0093
SB-176(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1644	0.0094
SB-176(0.0-2.0)	Hexachlorobenzene	ND	0.1644	0.047
SB-176(0.0-2.0)	Hexachlorobutadiene	ND	0.1644	0.12
SB-176(0.0-2.0)	Methylene chloride	ND	0.0502	0.016
SB-176(0.0-2.0)	Nitrobenzene	ND	0.1644	0.094
SB-176(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1644	5.3E-05
SB-176(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1644	0.0011
SB-176(0.0-2.0)	Pentachlorophenol	ND	1.308	0.047
SB-176(6.0-7.1)	Bis(2-Chloroethyl)ether	ND	0.1744	0.0022
SB-176(6.0-7.1)	4-Chloroaniline	ND	0.336	0.057
SB-176(6.0-7.1)	2,4-Dinitrophenol	ND	2.1	0.54
SB-176(6.0-7.1)	2,4-Dinitrotoluene	ND	0.1744	0.0093
SB-176(6.0-7.1)	2,6-Dinitrotoluene	ND	0.1744	0.0094
SB-176(6.0-7.1)	Hexachlorobenzene	ND	0.1744	0.047
SB-176(6.0-7.1)	Hexachlorobutadiene	ND	0.1744	0.12
SB-176(6.0-7.1)	Methylene chloride	ND	0.0754	0.016
SB-176(6.0-7.1)	Nitrobenzene	ND	0.1744	0.094
SB-176(6.0-7.1)	N-Nitrosodimethylamine	ND	0.1744	5.3E-05
SB-176(6.0-7.1)	N-Nitroso-di-n-propylamine	ND	0.1744	0.0011
SB-176(6.0-7.1)	Pentachlorophenol	ND	1.386	0.047
SB-176(6.0-7.1)	Bromodichloromethane	ND	0.1204	0.044
SB-176(6.0-7.1)	Carbon tetrachloride	ND	0.1204	0.023
SB-176(6.0-7.1)	Dibromochloromethane	ND	0.1204	0.032
SB-176(6.0-7.1)	1,2-Dichloroethane	ND	0.1204	0.016
SB-176(6.0-7.1)	1,1-Dichloroethene	ND	0.1204	0.03
SB-176(6.0-7.1)	1,2-Dichloropropane	ND	0.1204	0.018
SB-176(6.0-7.1)	trans-1,3-Dichloropropene	ND	0.1204	0.033
SB-176(6.0-7.1)	cis-1,3-Dichloropropene	ND	0.1204	0.033
SB-176(6.0-7.1)	1,2-Dibromoethane	ND	0.1204	0.00016
SB-176(6.0-7.1)	Hexachlorobutadiene	ND	0.232	0.12
SB-176(6.0-7.1)	Bromomethane	ND	0.958	0.16
SB-176(6.0-7.1)	Methylene chloride	ND	0.478	0.016
SB-176(6.0-7.1)	1,1,2,2-Tetrachloroethane	ND	0.232	0.017
SB-176(6.0-7.1)	Tetrachloroethene	ND	0.0602	0.024
SB-176(6.0-7.1)	1,1,2-Trichloroethane	ND	0.1204	0.018
SB-176(6.0-7.1)	Trichloroethene	ND	0.0602	0.02
SB-176(6.0-7.1)	1,2,3-Trichloropropane	ND	0.1204	0.00053
SB-176(6.0-7.1)	Vinyl chloride	ND	0.1204	0.0085
SB-181 0.0-2.0	Bis(2-Chloroethyl)ether	ND	0.1892	0.0022
SB-181 0.0-2.0	4-Chloroaniline	ND	0.364	0.057
SB-181 0.0-2.0	2,4-Dinitrophenol	ND	2.28	0.54

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SB-181 0.0-2.0	2,4-Dinitrotoluene	ND	0.1892	0.0093
SB-181 0.0-2.0	2,6-Dinitrotoluene	ND	0.1892	0.0094
SB-181 0.0-2.0	Hexachlorobenzene	ND	0.1892	0.047
SB-181 0.0-2.0	Hexachlorobutadiene	ND	0.1892	0.12
SB-181 0.0-2.0	Methylene chloride	ND	0.097	0.016
SB-181 0.0-2.0	Nitrobenzene	ND	0.1892	0.094
SB-181 0.0-2.0	N-Nitrosodimethylamine	ND	0.1892	5.3E-05
SB-181 0.0-2.0	N-Nitroso-di-n-propylamine	ND	0.1892	0.0011
SB-181 0.0-2.0	Pentachlorophenol	ND	1.504	0.047
SB-181 2.5-4.1	Bis(2-Chloroethyl)ether	ND	0.176	0.0022
SB-181 2.5-4.1	4-Chloroaniline	ND	0.338	0.057
SB-181 2.5-4.1	2,4-Dinitrophenol	ND	2.12	0.54
SB-181 2.5-4.1	2,4-Dinitrotoluene	ND	0.176	0.0093
SB-181 2.5-4.1	2,6-Dinitrotoluene	ND	0.176	0.0094
SB-181 2.5-4.1	Hexachlorobenzene	ND	0.176	0.047
SB-181 2.5-4.1	Hexachlorobutadiene	ND	0.176	0.12
SB-181 2.5-4.1	Methylene chloride	ND	0.0636	0.016
SB-181 2.5-4.1	Nitrobenzene	ND	0.176	0.094
SB-181 2.5-4.1	N-Nitrosodimethylamine	ND	0.176	5.3E-05
SB-181 2.5-4.1	N-Nitroso-di-n-propylamine	ND	0.176	0.0011
SB-181 2.5-4.1	Pentachlorophenol	ND	1.398	0.047
SB-183(0.0-2.0)	Bis(2-Chloroethyl)ether	ND	0.1632	0.0022
SB-183(0.0-2.0)	4-Chloroaniline	ND	0.314	0.057
SB-183(0.0-2.0)	2,4-Dinitrophenol	ND	1.966	0.54
SB-183(0.0-2.0)	2,4-Dinitrotoluene	ND	0.1632	0.0093
SB-183(0.0-2.0)	2,6-Dinitrotoluene	ND	0.1632	0.0094
SB-183(0.0-2.0)	Hexachlorobenzene	ND	0.1632	0.047
SB-183(0.0-2.0)	Hexachlorobutadiene	ND	0.1632	0.12
SB-183(0.0-2.0)	Methylene chloride	ND	0.0498	0.016
SB-183(0.0-2.0)	Nitrobenzene	ND	0.1632	0.094
SB-183(0.0-2.0)	N-Nitrosodimethylamine	ND	0.1632	5.3E-05
SB-183(0.0-2.0)	N-Nitroso-di-n-propylamine	ND	0.1632	0.0011
SB-183(0.0-2.0)	Pentachlorophenol	ND	1.296	0.047
SB-183(5.0-6.1)	Bis(2-Chloroethyl)ether	ND	0.1594	0.0022
SB-183(5.0-6.1)	4-Chloroaniline	ND	0.306	0.057
SB-183(5.0-6.1)	2,4-Dinitrophenol	ND	1.922	0.54
SB-183(5.0-6.1)	2,4-Dinitrotoluene	ND	0.1594	0.0093
SB-183(5.0-6.1)	2,6-Dinitrotoluene	ND	0.1594	0.0094
SB-183(5.0-6.1)	Hexachlorobenzene	ND	0.1594	0.047
SB-183(5.0-6.1)	Hexachlorobutadiene	ND	0.1594	0.12
SB-183(5.0-6.1)	Methylene chloride	ND	0.0342	0.016
SB-183(5.0-6.1)	Nitrobenzene	ND	0.1594	0.094
SB-183(5.0-6.1)	N-Nitrosodimethylamine	ND	0.1594	5.3E-05
SB-183(5.0-6.1)	N-Nitroso-di-n-propylamine	ND	0.1594	0.0011
SB-183(5.0-6.1)	Pentachlorophenol	ND	1.268	0.047
SD-120(7.2-9.2)	Bis(2-Chloroethyl)ether	ND	0.1578	0.0022
SD-120(7.2-9.2)	4-Chloroaniline	ND	0.304	0.057
SD-120(7.2-9.2)	2,4-Dinitrophenol	ND	1.902	0.54
SD-120(7.2-9.2)	2,4-Dinitrotoluene	ND	0.1578	0.0093
SD-120(7.2-9.2)	2,6-Dinitrotoluene	ND	0.1578	0.0094

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SD-120(7.2-9.2)	Hexachlorobenzene	ND	0.1578	0.047
SD-120(7.2-9.2)	Hexachlorobutadiene	ND	0.1578	0.12
SD-120(7.2-9.2)	Methylene chloride	ND	0.052	0.016
SD-120(7.2-9.2)	Nitrobenzene	ND	0.1578	0.094
SD-120(7.2-9.2)	N-Nitrosodimethylamine	ND	0.1578	5.3E-05
SD-120(7.2-9.2)	N-Nitroso-di-n-propylamine	ND	0.1578	0.0011
SD-120(7.2-9.2)	Pentachlorophenol	ND	1.254	0.047
SD-123 (3.5-5.2)	Bis(2-Chloroethyl)ether	ND	0.1738	0.0022
SD-123 (3.5-5.2)	4-Chloroaniline	ND	0.334	0.057
SD-123 (3.5-5.2)	2,4-Dinitrophenol	ND	2.1	0.54
SD-123 (3.5-5.2)	2,4-Dinitrotoluene	ND	0.1738	0.0093
SD-123 (3.5-5.2)	2,6-Dinitrotoluene	ND	0.1738	0.0094
SD-123 (3.5-5.2)	Hexachlorobenzene	ND	0.1738	0.047
SD-123 (3.5-5.2)	Hexachlorobutadiene	ND	0.1738	0.12
SD-123 (3.5-5.2)	Methylene chloride	ND	0.0844	0.016
SD-123 (3.5-5.2)	Nitrobenzene	ND	0.1738	0.094
SD-123 (3.5-5.2)	N-Nitrosodimethylamine	ND	0.1738	5.3E-05
SD-123 (3.5-5.2)	N-Nitroso-di-n-propylamine	ND	0.1738	0.0011
SD-123 (3.5-5.2)	Pentachlorophenol	ND	1.382	0.047
SD-132 (8.5-10.5)	Bis(2-Chloroethyl)ether	ND	0.185	0.0022
SD-132 (8.5-10.5)	4-Chloroaniline	ND	0.356	0.057
SD-132 (8.5-10.5)	2,4-Dinitrophenol	ND	2.22	0.54
SD-132 (8.5-10.5)	2,4-Dinitrotoluene	ND	0.185	0.0093
SD-132 (8.5-10.5)	2,6-Dinitrotoluene	ND	0.185	0.0094
SD-132 (8.5-10.5)	Hexachlorobenzene	ND	0.185	0.047
SD-132 (8.5-10.5)	Hexachlorobutadiene	ND	0.185	0.12
SD-132 (8.5-10.5)	Methylene chloride	ND	0.1128	0.016
SD-132 (8.5-10.5)	Nitrobenzene	ND	0.185	0.094
SD-132 (8.5-10.5)	N-Nitrosodimethylamine	ND	0.185	5.3E-05
SD-132 (8.5-10.5)	N-Nitroso-di-n-propylamine	ND	0.185	0.0011
SD-132 (8.5-10.5)	Pentachlorophenol	ND	1.47	0.047
SD-132 (8.5-10.5)	Bis(2-Chloroethyl)ether	ND	0.1912	0.0022
SD-132 (8.5-10.5)	4-Chloroaniline	ND	0.368	0.057
SD-132 (8.5-10.5)	3,3-Dichlorobenzidine	ND	0.1912	0.19
SD-132 (8.5-10.5)	1,1-Dichloroethene	ND	0.222	0.03
SD-132 (8.5-10.5)	2,4-Dinitrophenol	ND	2.3	0.54
SD-132 (8.5-10.5)	2,4-Dinitrotoluene	ND	0.1912	0.0093
SD-132 (8.5-10.5)	2,6-Dinitrotoluene	ND	0.1912	0.0094
SD-132 (8.5-10.5)	Hexachlorobenzene	ND	0.1912	0.047
SD-132 (8.5-10.5)	Hexachlorobutadiene	ND	0.1912	0.12
SD-132 (8.5-10.5)	Methylene chloride	ND	0.884	0.016
SD-132 (8.5-10.5)	Nitrobenzene	ND	0.1912	0.094
SD-132 (8.5-10.5)	N-Nitrosodimethylamine	ND	0.1912	5.3E-05
SD-132 (8.5-10.5)	N-Nitroso-di-n-propylamine	ND	0.1912	0.0011
SD-132 (8.5-10.5)	Pentachlorophenol	ND	1.52	0.047
SD-132 (8.5-10.5)	Bis(2-Chloroethyl)ether	ND	1.61	0.0022
SD-132 (8.5-10.5)	4-Chloroaniline	ND	3.1	0.057
SD-132 (8.5-10.5)	2-Chlorophenol	ND	1.61	1.5
SD-132 (8.5-10.5)	3,3-Dichlorobenzidine	ND	1.61	0.19
SD-132 (8.5-10.5)	1,1-Dichloroethene	ND	0.112	0.03

Table 65
Analytes Not Detected with LODs Greater than the Soil Cleanup Level
North Pole Refinery
Flint Hills Resources Alaska, LLC

Sample	Analyte	Result	LOD	Migration to Groundwater Cleanup Level
SD-132 (8.5-10.5)	2,4-Dichlorophenol	ND	1.61	1.3
SD-132 (8.5-10.5)	2,4-Dinitrophenol	ND	19.4	0.54
SD-132 (8.5-10.5)	2,4-Dinitrotoluene	ND	1.61	0.0093
SD-132 (8.5-10.5)	2,6-Dinitrotoluene	ND	1.61	0.0094
SD-132 (8.5-10.5)	Hexachlorobenzene	ND	1.61	0.047
SD-132 (8.5-10.5)	Hexachlorobutadiene	ND	1.61	0.12
SD-132 (8.5-10.5)	Hexachlorocyclopentadiene	ND	4.12	1.3
SD-132 (8.5-10.5)	Hexachloroethane	ND	1.61	0.21
SD-132 (8.5-10.5)	Methylene chloride	ND	0.444	0.016
SD-132 (8.5-10.5)	3&4-Methylphenol (p&m-Cresol)	ND	6.4	1.5
SD-132 (8.5-10.5)	Nitrobenzene	ND	1.61	0.094
SD-132 (8.5-10.5)	N-Nitrosodimethylamine	ND	1.61	5.3E-05
SD-132 (8.5-10.5)	N-Nitroso-di-n-propylamine	ND	1.61	0.0011
SD-132 (8.5-10.5)	Pentachlorophenol	ND	12.8	0.047
SD-132 (8.5-10.5)	2,4,6-Trichlorophenol	ND	1.61	1.4

Table 66
Soil Sample Data Validation Flags for Re-extracted Sulfolane Samples
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1116000	DO-10 (8-10)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0035	0.007	0.0113	mg/kg	R	R	none	holding time
1116000	DO-13 (8.0-9.1)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0036	0.0072	0.0116	mg/kg	R	R	none	holding time
1116000	DO-19 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0104	mg/kg	R	R	none	holding time
1116000	DO-21 (0-2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0052	J	0.0037	0.0074	0.0119	mg/kg	0.00515	J	none	holding time
1116000	DO-21 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	J	0.0038	0.0076	0.0122	mg/kg	R	R	none	matrix interference; holding time
1116000	MW-195 (0-2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0035	0.007	0.0113	mg/kg	R	R	none	holding time
1116000	MW-195 (2-4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0037	0.0075	0.012	mg/kg	R	R	none	holding time
1116000	O-10 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0254	=	0.0042	0.0084	0.0136	mg/kg	0.0254	J	none	holding time
1116000	O-10 (8-10)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0034	0.0068	0.011	mg/kg	R	R	none	holding time
1116000	O-11 (10-12)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0056	J	0.0032	0.0065	0.0104	mg/kg	0.00555	J	none	holding time
1116000	O-11 (8-10)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0513	=	0.0034	0.0067	0.0108	mg/kg	0.0513	J	none	holding time
1116000	O-13 (8.0-9.1)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0056	J	0.0035	0.0069	0.0112	mg/kg	0.00558	J	none	holding time
1116000	O-19 (4-6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0036	0.0072	0.0115	mg/kg	R	R	none	holding time
1116000	O-19 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0065	0.0104	mg/kg	R	R	none	holding time
1116000	O-21 (0-2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0035	0.007	0.0112	mg/kg	R	R	none	holding time
1116000	0-21 (4-6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0037	0.0074	0.0119	mg/kg	R	R	none	holding time
1116000	O-21 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0577	=	0.0034	0.0069	0.0111	mg/kg	0.0577	J	none	ion ratios; holding time
1116000	SB-108 (0.0-2.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0067	0.0107	mg/kg	R	R	none	holding time
1116000	SB-109 (7.5-8.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0066	0.0106	mg/kg	R	R	none	holding time
1116000	SB-110 (5.0-6.9)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1116000	SB-110 (7.0-8.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0364	=	0.0034	0.0068	0.0109	mg/kg	0.0364	J	none	holding time
1116000	SB-111 (4.0-6.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0065	0.0105	mg/kg	R	R	none	holding time
1116000	SB-112 (5.5-7.3)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1116000	SB-113 (5.0-7.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0066	0.0106	mg/kg	R	R	none	holding time
1116000	SB-114 (5.0-6.8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0056	J	0.0035	0.0069	0.0112	mg/kg	0.00557	J	none	holding time
1116000	SB-114 (7.0-8.6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0543	=	0.0034	0.0067	0.0108	mg/kg	0.0543	J	none	holding time
1116000	SB-118 (2.0-3.7)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.191	=	0.0032	0.0065	0.0105	mg/kg	0.191	J	none	holding time
1116000	SB-120 (7.2-9.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0113	=	0.0032	0.0064	0.0103	mg/kg	0.0113	J	none	holding time
1116000	SB-122 (5.0-6.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0035	0.007	0.0114	mg/kg	R	R	none	holding time
1116000	SB-122 (6.5-7.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0506	=	0.0033	0.0066	0.0107	mg/kg	0.0506	J	none	holding time
1116000	SB-123 (6.0-8.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0284	=	0.0034	0.0069	0.0111	mg/kg	0.0284	J	none	holding time
1116000	SB-124 (0-2.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0034	0.0068	0.011	mg/kg	R	R	none	holding time
1116000	SB124 (10.0-11.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0187	=	0.0035	0.007	0.0112	mg/kg	0.0187	J	none	holding time
1116000	SB-124 (5.0-6.3)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0104	mg/kg	R	R	none	holding time

Table 66
Soil Sample Data Validation Flags for Re-extracted Sulfolane Samples
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1116000	SB-126 (6.0-7.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0082	J	0.0032	0.0064	0.0103	mg/kg	0.00823	J	none	holding time
1116000	SB-128 (5.0-6.6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1116000	SB-130 (4.0-5.6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1116000	SB-130 (7.0-8.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0043	J	0.0034	0.0067	0.0109	mg/kg	0.00434	J	none	holding time
1116000	SB-134 (5.0-6.8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0575	=	0.0032	0.0064	0.0103	mg/kg	0.0575	J	none	holding time
1116000	SB-143 (0.0-2.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	J	0.0035	0.0071	0.0114	mg/kg	R	R	none	failed analysis; holding time
1116000	SB-146 (5.0-6.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0721	=	0.0032	0.0064	0.0103	mg/kg	0.0721	J	none	holding time
1116000	SB-147 (3.0-5.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0051	J	0.0039	0.0078	0.0127	mg/kg	0.00506	J	none	holding time
1116000	SB-148 (3.5-5.1)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0072	J	0.0037	0.0075	0.012	mg/kg	0.00721	J	none	holding time
1116000	SB-149 (3.5-5.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0036	0.0073	0.0117	mg/kg	R	R	none	holding time
1116000	SB-150 (5.0-6.1)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0146	=	0.0032	0.0065	0.0105	mg/kg	0.0146	J	none	holding time
1116000	SB-150 (6.5-8.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0064	J	0.0033	0.0066	0.0107	mg/kg	0.00641	J	none	holding time
1116000	SB-156 (6.0-8.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0066	0.0106	mg/kg	R	R	none	holding time
1116000	SB-158 (0.0-2.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0135	=	0.0033	0.0066	0.0106	mg/kg	0.0135	J	none	holding time
1116000	SB-158 (7.0-8.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.441	=	0.0033	0.0066	0.0107	mg/kg	0.441	J	none	holding time
1116000	SB-160 (4.5-6.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.549	=	0.0032	0.0064	0.0103	mg/kg	0.549	J	none	holding time
1116000	SB-160 (6.4-8.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.12	=	0.0034	0.0068	0.0109	mg/kg	0.12	J	none	holding time
1116000	SB-165 (5.0-6.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0066	0.0106	mg/kg	R	R	none	holding time
1116000	SB-165 (6.5-8.3)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0204	=	0.0034	0.0068	0.0109	mg/kg	0.0204	J	none	holding time
1116000	SB-173 (3.0-4.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1116000	SB-173 (5.0-6.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0066	0.0107	mg/kg	R	R	none	holding time
1116000	SB-174 (5.5-7.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.117	=	0.0032	0.0064	0.0103	mg/kg	0.117	J	none	holding time
1116000	SB-174 (7.5-9.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0751	=	0.0033	0.0067	0.0107	mg/kg	0.0751	J	none	holding time
1116000	SB-175 (7.0-9.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	1.43	=	0.0034	0.0067	0.0109	mg/kg	1.43	J	none	holding time
1116000	SB-180 (5.5-7.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0571	=	0.0032	0.0064	0.0103	mg/kg	0.0571	J	none	holding time
1116000	SB-180 (7.5-9.5)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.305	=	0.0034	0.0068	0.011	mg/kg	0.305	J	none	holding time
1116000	SD-114 (7.0-8.6)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0534	=	0.0034	0.0068	0.0109	mg/kg	0.0534	J	none	holding time
1116000	SD-120 (7.2-9.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0131	=	0.0032	0.0064	0.0103	mg/kg	0.0131	J	none	holding time
1116000	SD-124 (0-2.0)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0033	0.0065	0.0106	mg/kg	R	R	none	holding time
1116000	SD-146 (5.0-6.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.0673	=	0.0032	0.0064	0.0103	mg/kg	0.0673	J	none	holding time
1116000	SD-149 (3.5-5.2)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.0036	0.0073	0.0117	mg/kg	R	R	none	holding time
1116000	SD-160 (4.5-6.4)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0.59	=	0.0032	0.0064	0.0103	mg/kg	0.59	J	none	holding time
1120303	MW-197B(15)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.00368	0.00736	0.0119	mg/kg	R	R	none	holding time
1120303	MW-197B(50-52)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.00367	0.00734	0.0118	mg/kg	R	R	none	holding time
1120303	DO-7 (6-8)	Sulfolane-SW8270D M w/IsoDl Sl	Sulfolane	0	ND	0.00325	0.0065	0.0105	mg/kg	R	R	none	holding time

Table 66
Soil Sample Data Validation Flags for Re-extracted Sulfolane Samples
North Pole Refinery
Flint Hills Resources Alaska, LLC

Work Order	Sample ID	Method	Analyte	Original Result	Original Result Flag	DL	LOD	LOQ	Units	Final Reporting Value	QC Flag	Bias	Reason
1120303	O-7 (6-8)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.0032	0.0064	0.0103	mg/kg	R	R	none	holding time
1120303	SB-15(5.0-6.7)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.0105	J	0.00375	0.0075	0.0121	mg/kg	0.0105	J	none	holding time
1120303	MW-0-27(9-9.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00318	0.00636	0.0103	mg/kg	R	R	none	holding time
1120303	MW-0-27(10.3-11)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.0389	=	0.00348	0.00696	0.0112	mg/kg	0.0389	J	none	holding time
1120303	MW-0-28(8-9)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0.309	=	0.00426	0.00852	0.0137	mg/kg	0.309	J	none	holding time
1120303	MW-0-29(11-11.5)	Sulfolane-SW8270D M w/IsoDl SI	Sulfolane	0	ND	0.00335	0.0067	0.0108	mg/kg	R	R	none	holding time

Table 67
Proposed Phase 7 Monitoring Wells
North Pole Refinery
Flint Hills Resources Alaska, LLC

Proposed Locations[1]	Proposed Depths			
	Water Table	10-55 Feet BWT Zone[2]	55-90 Feet BWT Zone[2]	Top of Permafrost
C	X			X
D	X			X
E	X			X
F	X			X
G	X			X
I	X	X		X
J	X	X		
K	X			X
M	X			X
Q	X			X
R	X			X
S	X			X
U	X	X		X
V	X	X		X
X	X			X
AA	X			X
AC	X			X
AF	X			X
AH	X			X
AJ	X			X
AL	X			X
AP				X
AR[3]	X			
WL-1	X			X
WL-2	X			X
WL-3	X			X[4]
MW-149C				X[5]
MW-150C				X
MW-188A	X			
MW-197A		X		
MW-302-95			X	
MW-303-95			X	
MW-304-15	X			
MW-304-95			X	
MW-306-15	X			

Notes

[1] Letters correspond to Figures 148 and 149

[2] May infill if needed in future phases.

[3] Adjacent to Chena River, near Old Badger Road

[4] if no permafrost encountered at WL-2 then advance ro permafrost at this location

[5] Install to permafrost, if permafrost is confirmed at 19 feet, no well is to be installed.

Table 68
Proposed Pressure Transducer Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

	Monitoring Well Nest	Monitoring Well
Existing Network	MW-151	A[1]
		B
		C
	MW-156	A[1]
	MW-157	A
	MW-158	A
	MW-161	A
	MW-162	A
		B
	MW-170	A
		C
	MW-186	A
		B
		C
		MW-111
		MW-113

Notes

[1] sent to manufacturer for repair

	Monitoring Well Nest	Monitoring Well
Proposed Additional Deployments	MW-164	A
		C
	MW-169	A
		C
	MW-172	A
		B
	MW-175	MW-175
		S-43
	MW-179	A
		B
		C
		D
	MW-181	A
		B
		C
	7-K	A
		B
	7-E	A
		B
	7-I	A
		B
	7-J	A
		B
	7-S	A
		B
	7-V	A
		C
	7-AR	A
		B
	MW-304	MW-304-15
		MW-304-125
		MW-304-150
	MW-306	MW-306-15
		MW-306-150
		MW-109
		O-12
	7-WL-1	A
		B
	7-WL-2	A
		B
	7-WL-3	A
		B

Table 69
Stable Carbon Isotope Evaluation - Phase II Revised Proposed Well Network
North Pole Refinery
Flint Hills Resources Alaska, LLC

Phase 1 Wells Analyzed	Revised Phase 2 Wells Proposed	Screened Interval (feet below ground surface)	Screened Interval Grouping
MW-110	MW-110	13.5-18	Near water table
MW-127	MW-127	20.0-24.5	Near water table
MW-142	MW-142	5.4-19.4	Across water table
MW-148B	MW-148B	22.0-27.0	10-55' Well
MW-161A	MW-161A	5.5-15.2	Across water table
MW-164A	MW-164A	5.5-15.2	Across water table
MW-182A	MW-182A	5.7-15.4	Across water table
--	MW-130	19.0-23.0	Near water table
--	MW-138	3.9-18.1	Across water table
	MW-148A	5.0-15.0	Across water table
	MW-152A	19.9-24.4	Near water table
	MW-154B	90.2-94.8	55-90' Well
--	MW-156A	5.4-15.1	Across water table
--	MW-160B	85.6-90.2	55-90' Well
--	MW-161B	46.0-50.4	10-55' Well
--	MW-178B	46.0-50.7	10-55' Well
	MW-183A	5.8-15.5	Across water table
	MW-194B	34.4-39.0	10-55' Well
	MW-304-CMT-20	Intake at 20	Near water table
--	O-1	4.9-14.7	Across water table