



Weston Solutions, Inc.
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Anchorage, Alaska 99501
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September 19, 2010

Mrs. Stephanie Olson
Environmental Technical Lead
Marathon Oil Company
35350 Kalifornsky Beach Road
Kenai, AK 99611
Via e-mail: ssolson@marathonoil.com

Subject: Initial Site Characterization Report, Beaver Creek Pad 1A, Kenai, Alaska

Dear Mrs. Olson:

Weston Solutions, Inc. (Weston) is submitting this report to Marathon Oil Company (Marathon) documenting the results of the initial site characterization activities conducted at the Beaver Creek Pad 1A Dehydration Building, Kenai, Alaska (Figure 1 and Figure 2). Beaver Creek Pad 1A is located within the boundaries of the Kenai National Wildlife Refuge (KNWR), on land leased by Marathon from the United States Fish and Wildlife Service (USF&WS).

On September 6, 2012, Weston performed soil field screening and collected soil samples for off-site laboratory analysis to determine the nature and extents of hydrocarbon-impacted soil within the excavation area north of the Dehydration Building and within the stockpiled soils located in a staging area on the east side of the pad. Associated attachments to this report include:

- Figures 1 through 3 depicting site location, features, and sample locations and analytical results (Attachment 1);
- Tables 1 and 2 summarizing field screening and analytical results (Attachment 2);
- Photographic log (Attachment 3);
- Analytical data results, Alaska Department of Environmental Conservation (ADEC) Checklist, and Quality Assurance Report (Attachment 4);
- Weston field notes (Attachment 5);
- Conceptual Site Model (CSM) Scoping Form and Graphic (Attachment 6).

BACKGROUND

Marathon personnel observed an area of hydrocarbon impact on the north side of the Dehydration Building during recent excavation activities. Marathon immediately contacted the Alaska Department of Environmental Conservation (ADEC), Bureau of Land Management (BLM), and USF&WS regarding the discovery. Excavated soils were segregated and placed on a liner and covered. Weston was then contracted by Marathon to characterize the extents of impact remaining at the excavation and to characterize the stockpiled soil to determine dismissal options. Weston conducted all work in accordance with ADEC guidance (*draft* Field Sampling Guidance, May 2010) and a letter work plan dated September 6, 2012 submitted to Marathon. Soil samples collected for off-site laboratory analysis were

evaluated for ADEC's standard petroleum hydrocarbon analysis as well as for glycols at the request of the ADEC.

FIELD ACTIVITIES

Weston mobilized to the site on September 6, 2012, from the Anchorage Weston office. The Weston representative met with Marathon's Health and Environment Supervisor, Mr. Mark Tornai and the Lead Operator for Beaver Creek Operations and was given a briefing regarding the found area of impact.

The Dehydration Building is located on the north side of the pad. The area of excavation is located on the north side of the Dehydration Building. Prior to Weston personnel arriving on site, Marathon personnel had removed approximately 33 cubic yards of potentially contaminated soil (Photographs 1, 2, and 3; Attachment 3). Marathon personnel placed the excavated soil on a liner located on the east side of the pad. Marathon then covered the stockpile with additional liner material (Photograph 4, Attachment 3). Additionally, prior to Weston personnel arriving on site, Marathon personnel removed an abandoned buried pipe that was located within the area of the excavation (Photograph 1, Attachment 3). The integrity of the removed pipe and what material the pipe may have contained is unknown.

Characterization of the excavation began with the screening of floor and side wall using a photo-ionization detector (PID) and ADEC's heated headspace method for field screening. Based on field screening results, Weston then collected samples for off-site laboratory analysis from the excavation floor and side wall at the locations where the highest relative PID readings were found. Weston also collected heated headspace field screening samples of the stockpile prior to collection of samples for off-site analysis. Hand tools were used to conduct this field effort.

Field Observations

The area excavated by marathon measured approximately 12 feet by 25 feet with a depth of up to 4 feet, but generally 3 feet or less in depth. Field observations indicated an abandoned subterranean pipe may have been the source of the hydrocarbon impact discovered as the most elevated field screening results were located under or directly adjacent to the former pipe.

There appeared to be some staining of the soil near the Dehydration Building, where the removed abandoned pipe tied into the building. There also appeared to be staining of soil under where the pipe had been located, extending from the pipe junction near the building to approximately 20 feet northwest along the pipe's former run.

The affected soil is non-native backfill consisting of approximately 40% fine to medium-grained brown/grey sand, with 50% fine silt, and 10% fine to coarse sub-angular to sub-rounded gravel. Most soils were damp with a slight to strong hydrocarbon odor. When the soil in the excavation area was disturbed, there was a very strong hydrocarbon odor.

Field Screening – Excavation

Following ADEC's *Draft* Field Sampling Guidance (Table 2A and 2B [May 2010]), Weston collected a total of 15 heated headspace field screening samples: 11 from the excavation floor and five from the sidewalls.

Excavation floor field screening samples were identified as F1 through F11. Side wall screening samples were identified as SW1 through SW5.

The field screening PID results from the floor of the excavation ranged from 13.6 parts per million (ppm) at location F11 (the furthest west field screening location) to 841 ppm at location F2 located immediately below an elbow of the now removed buried pipe. At the three highest excavation floor field screening locations, analytical samples were collected for off-site laboratory analysis.

The field screening PID results for the sidewall ranged from 7.1 ppm at SW5, located on the northwest sidewall, to 297 ppm at SW4, located on the southwest sidewall. One analytical sample was collected for off-site analysis from the sidewall with the highest PID result.

Figure 3 of Attachment 1 depicts both the field screening locations and results. Field screen results are also presented in Table 2, Attachment 2.

Field Screening – Soil Stockpile

Based on the estimated cubic yards of stockpiled soil, five heated headspace PID screening samples were collected at random locations throughout the stockpile. Each stockpile field screening sample was collected at a depth of approximately 1.5 feet into the stockpile. The stockpile screening samples were identified as SP1 through SP5. The head headspace results ranged from 521 ppm at SP1, located on the northwest side of the stockpile to 291 ppm at SP3, located in the center of the stockpile. Two soil samples with the highest PID results were collected for off-site analysis.

Figure 3 of Attachment 1 depicts both the field screening locations and results. Field screen results are also presented in Table 2, Attachment 2.

ANALYTICAL RESULTS

A total of seven samples were collected and submitted for off-site laboratory analysis. Three analytical samples plus one duplicate sample were submitted from the excavation floor, one analytical sample was submitted from the excavation sidewall, and two analytical samples were submitted from the stockpile. All analytical samples were submitted to ESC Science Laboratory (ESC) located in Mount Juliet, Tennessee. All samples were analyzed for:

- Gasoline-range organics (GRO) by Alaska Method (AK)101;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8260B;
- Diesel-range organics (DRO) by AK102;
- Residual-range organics (RRO) by AK103; and,
- Percent moisture by EPA Method 2540G.

Additionally, one sample from the excavation and one sample from the stockpile were submitted for glycol analysis by EPA Method 8015M.

Attachment 2, Table 1 summarizes samples collected and analyses performed. Table 2 presents a summary of analytical results compared to the corresponding ADEC Method Two Cleanup Level for soil.

Attachment 4 contains the laboratory analytical report, ADEC data review checklists, and the Quality Assurance Report.

For all samples, BTEX values were reported as non-detect. GRO was detected in all samples, but below the ADEC Method Two Cleanup Level of 300 milligrams per kilogram (mg/kg), with the exception of sample 12-BCP1A-FL2-SO, the primary sample collected from floor sample location FL2. The GRO concentration in this sample was 340 mg/kg, slightly above the 300 mg/kg ADEC Method Two Cleanup Level.

DRO was reported above the ADEC Method Two Cleanup Level of 250 mg/kg in all samples. The DRO concentrations from samples collected from the floor of the excavation ranged from 320 mg/kg at F5 to 8,200 mg/kg at F2. The DRO concentration in the sample collected from the sidewall, SW4, was 590 mg/kg. The DRO concentrations in the samples collected from the stockpile were 280 mg/kg in SP1 and 770 mg/kg in SP4.

RRO was either not detected or below the ADEC Method Two Cleanup level of 10,000 mg/kg in all samples.

The glycol concentrations in the samples submitted to the laboratory for glycol analysis contained concentrations of ethylene glycol below the ADEC Method Two Cleanup Level of 190 mg/kg. The glycol results ranged from 8.8 mg/kg in the sample collected from the stockpile (12-BCP1A-SP1-SO) to 24 mg/kg in the sample collected from the floor of the excavation (F2, 12-BCP1A-F2-SO).

Investigation-Derived Waste

Investigation-derived waste included used nitrile gloves, paper towels, stainless steel sampling spoons, Terra-Core™ sample plugs, and used re-sealable plastic bags. These articles were bagged and disposed of in a solid waste receptacle located on pad.

On September 14, 2012, ADEC gave Marathon verbal approval to dispose of the stockpiled soil at the Kenai Peninsula Borough landfill. ADEC also gave Marathon approval to backfill the excavation with clean soil.

CONCEPTUAL SITE MODEL

As part of this initial characterization, Weston has prepared an ADEC CSM scoping form and graphic, included as Attachment 6.

Human health exposure routes may include ingestion, dermal absorption, and inhalation. A human health exposure pathway via subsurface soil media is potentially complete for future residents, current and future commercial/industrial, current and future construction workers, future farmers or subsistence harvesters, and future subsistence consumers. A human health exposure pathway via groundwater is potentially complete for future residents, current and future commercial/industrial, current and future construction workers, future farmers or subsistence harvesters, and future subsistence consumers. A human health pathway via air inhalation is potentially complete for future residents, current and future commercial/industrial, current and future construction workers, future farmers or subsistence harvesters, and future subsistence consumers. A human health pathway via biota ingestion is potentially complete for future residents, future farmers or subsistence harvesters, and future subsistence consumers.

CONCLUSIONS

The concentration of hydrocarbon contamination in the diesel range suggests a release of natural gas condensate. DRO is the primary contaminant of concern that exists at this site in levels exceeding ADEC Method Two Soil Cleanup Levels, with only one sample containing lighter hydrocarbons in the gasoline-range at sample location F2, the overall most impacted area.

The vertical and horizontal extents of contamination have not been defined, however PID field screening results suggest reduced impact evident horizontally as one moves away (both north and south) from the former pipe area. Vertical delineation was not conducted and the excavation floor samples indicate impact above ADEC cleanup levels for DRO remain in-place.

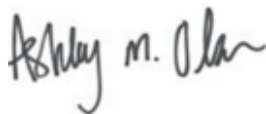
Analytical results from the soil stockpile indicate the soil is above ADEC cleanup levels for DRO and should be treated as impacted soil per ADEC guidance.

RECOMMENDATIONS

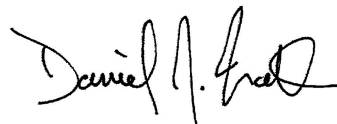
The vertical and horizontal extent of contamination in soil and groundwater should be found using mechanical means. Impact to groundwater has not been evaluated, and if impact extends vertically to groundwater, evaluation of groundwater would be necessary. Weston recommends additional vertical and horizontal delineation using direct push technology (i.e. Geoprobe®). If evaluation of groundwater is necessary, the use of retractable groundwater samplers (i.e. Geoprobe SP-16® samplers) is recommended. Groundwater is expected greater than 20 feet below ground surface.

Weston thanks you for the opportunity to assist Marathon with this project. Please contact me at (907) 343-2777 if you have any question regarding this report.

Sincerely,
Weston Solutions, Inc.



Ashley M. Olson
Environmental Scientist



Daniel J. Frank
Project Manager

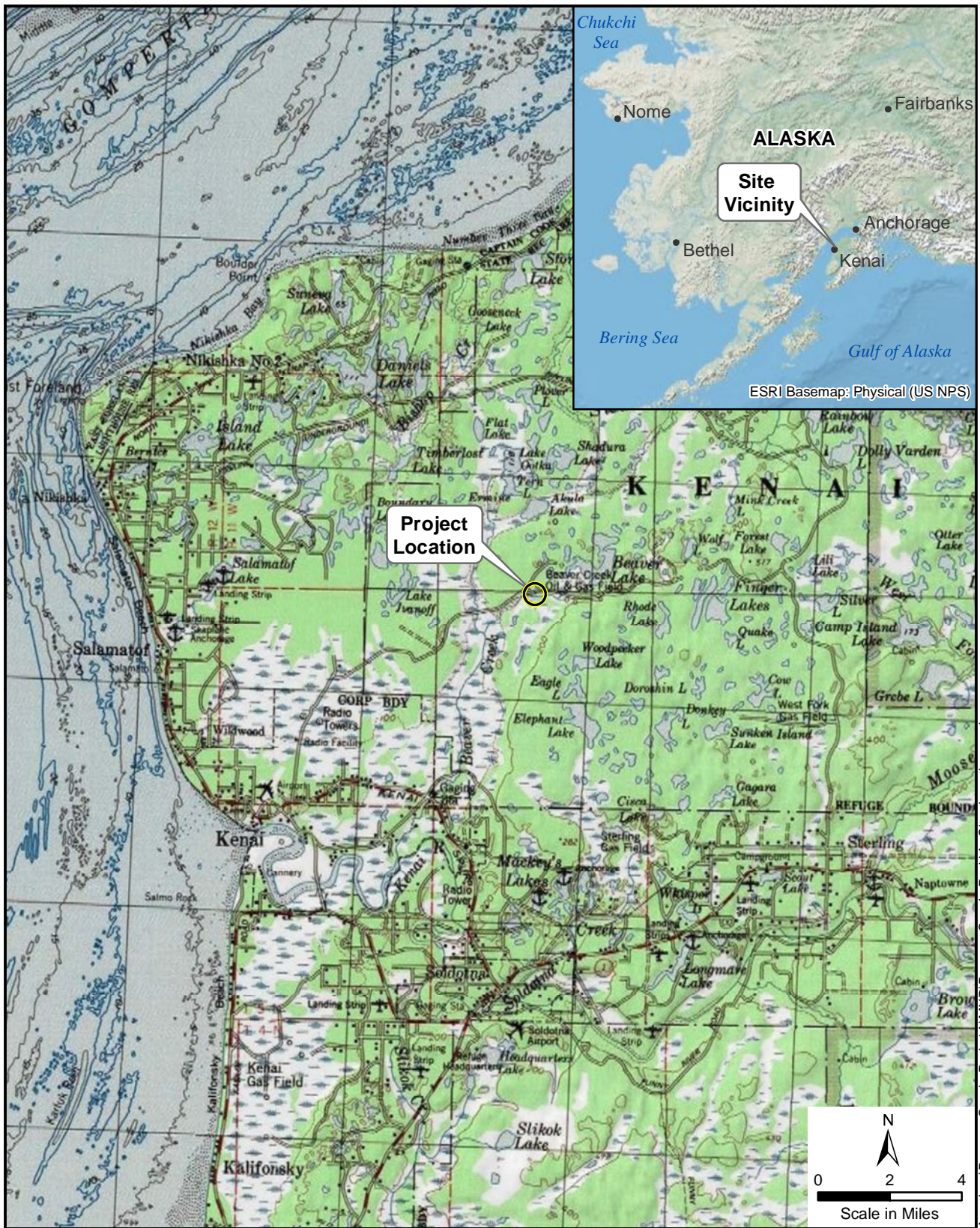
Attachments:

1. Figures 1 through 3
2. Tables 1 and 2
3. Photographic Log
4. Analytical Data Results; ADEC Checklists; Quality Assurance Report
5. Copy of Site Visit Field Notes
6. Conceptual Site Model Scoping Form and Graphic

ATTACHMENT 1

Figures 1 through 3

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Anchorage, AK 99501
(907) 276-6610

Project No: 12553.006.001.0006
 Drawn by: SWD
 Checked by:
 Date: 09/13/12
 Version: DRAFT

SITE LOCATION MAP

BEAVER CREEK PAD 1A INITIAL CHARACTERIZATION
 SEPTEMBER 2012
 MARATHON OIL COMPANY
 BEAVER CREEK PAD 1A
 KENAI, ALASKA

FIGURE

1

Path: W:\GIS\Alaska - Marathon\Beaver_Creek_Pad 1A\MapXD\Beaver_Creek_Pad 1A_Site_Location.mxd



FIGURE

2

SITE OVERVIEW

BEAVER CREEK PAD 1A INITIAL CHARACTERIZATION, SEPTEMBER 2012
 MARATHON OIL COMPANY
 BEAVER CREEK PAD 1A
 KENAI, ALASKA

Project No: 12553.006.001.0006

Drawn by: SWD

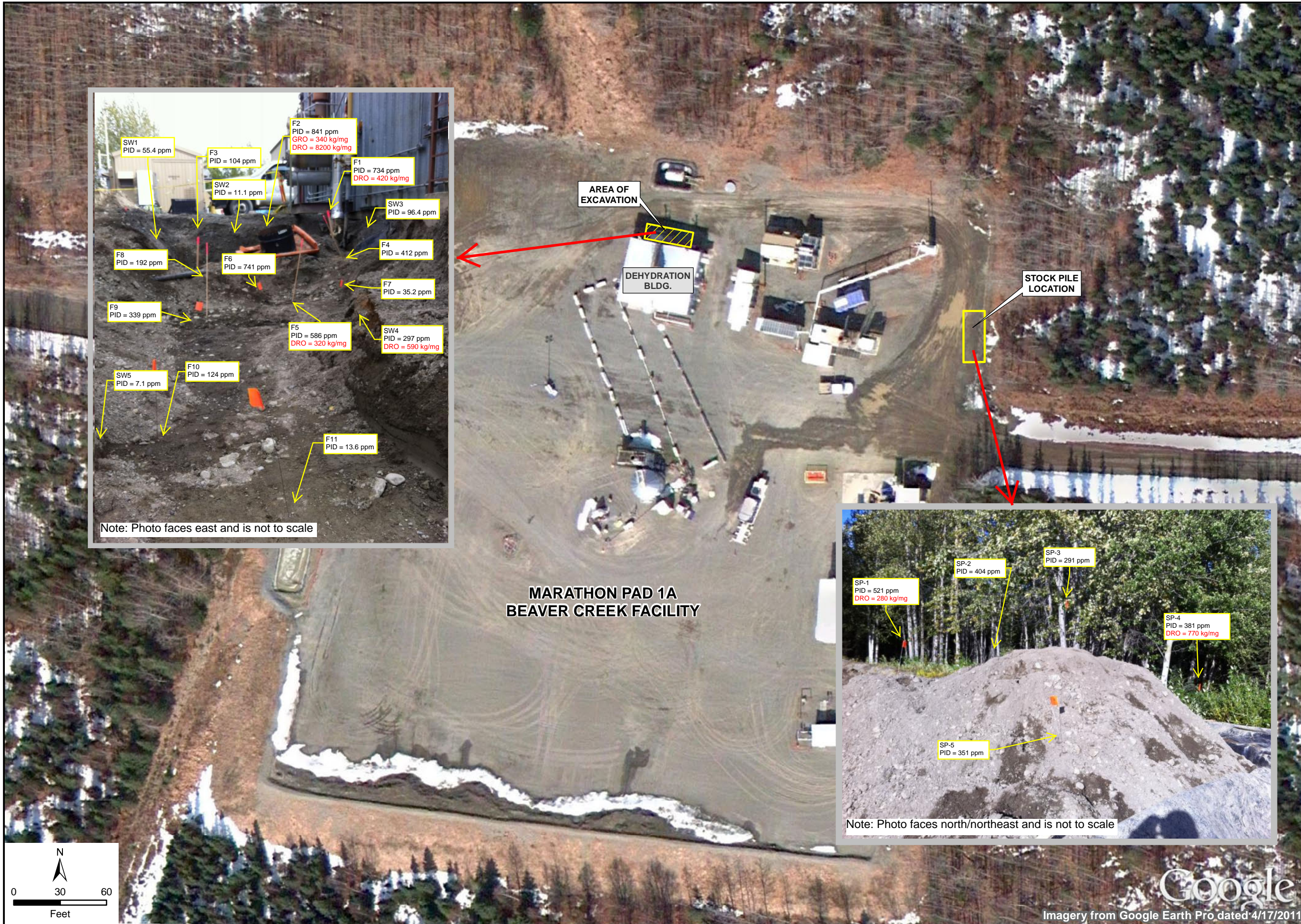
Checked by:

Date: 09/12/12

Version: DRAFT



425 G Street, Suite 300
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**SAMPLE LOCATIONS WITH PID RESULTS
AND ANALYTICAL RESULTS**

BEAVER CREEK PAD 1A INITIAL CHARACTERIZATION, SEPTEMBER 2012
 MARATHON OIL COMPANY
 BEAVER CREEK PAD 1A
 KENAI, ALASKA

Project No: 12553.006.001.0006

Drawn by: SWD

Checked by:

Date: 09/12/12

Version: DRAFT



425 G Street, Suite 300
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ATTACHMENT 2

Tables 1 and 2

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TABLE 1
Sample Collection Summary
 Initial Characterization Report
 BCP1A - September 2012
 Marathon Oil Company
 Kenai, Alaska

Location	Sample No. (12-BCP1A-)	Sample Date	Sample Time	Duplicate	MS/MSD	GRO (AK101)	BTEX (EPA 8260B)	DRO (AK102)	RRO (AK103)	Glycols (EPA 8015M)	Percent Solids (EPA 2540G)
Soil Samples											
Floor of Excavation	F1-SO	9/6/2012	1715			✓	✓	✓	✓		✓
Floor of Excavation	F2-SO	9/6/2012	1720			✓	✓	✓	✓	✓	✓
	F12-SO		1725	✓		✓	✓	✓	✓	✓	✓
Floor of Excavation	F5-SO	9/6/2012	1730			✓	✓	✓	✓		✓
Side Wall of Excavation	SW4-SO	9/6/2012	1735		✓	✓	✓	✓	✓		✓
Stockpile	SP1-SO	9/6/2012	1830			✓	✓	✓	✓	✓	✓
Stockpile	SP4-SO	9/6/2012	1835			✓	✓	✓	✓		✓
Trip Blank											
--	TB01-SO	9/6/2012	800			✓	✓				

Key:

AK = Alaska

BTEX = Benzene, toluene, ethylbenzene, xylenes

DRO = Diesel-range organics

EPA = United States Environmental Protection Agency

GRO = Gasoline-range organics

MS/MSD = Matrix spike/matrix spike duplicate

RRO = Residual-range organics

TABLE 2
Soil Analytical Results Summary
 Initial Characterization Report
 BCP1A, September 2012
 Marathon Oil Company
 Kenai, Alaska

Location:	ADEC Soil Cleanup Level ⁽¹⁾	Floor of Excavation	Floor of Excavation		Floor of Excavation	Side Wall of Excavation	Stockpile	Stockpile	Trip Blank
Sample ID (12-BCP1A-):		FL1-SO	FL2-SO	FL12-SO	FL5-SO	SW4-SO	SP1-SO	SP4-SO	TB01-01-SO
Depth (feet bgs):		4.5	3.5		4.5	2	1.5	1.5	--
PID Result (ppm):		734	841		586	297	521	381	--
Sample Date:		9/6/2012	9/6/2012		9/6/2012	9/6/2012	9/6/2012	9/6/2012	9/6/2012
ADEC Fuels (AK101, AK102, AK103; mg/kg)									
Gasoline Range Organics	300	44.0	340	240	71.0	4.8 UJ	44.0	36.0	2.4 J
Diesel Range Organics	250	420	8,200	9,300	320	590	280	770 J	--
Residual Range Organics	10,000	27.0 J	160	230 J	ND (120)	7.0 J	ND (110)	ND (520)	--
BTEX (8260B; mg/kg)									
Benzene	0.025	ND (0.092)	ND (0.14)	ND (0.33)	ND (0.089)	ND (0.055)	ND (0.084)	ND (0.080)	ND (0.050)
Toluene	6.5	ND (0.46)	ND (0.72)	ND (1.6)	ND (0.44)	ND (0.28)	ND (0.42)	ND (0.40)	ND (0.25)
Ethylbenzene	6.9	ND (0.092)	ND (0.14)	ND (0.33)	ND (0.089)	ND (0.055)	ND (0.084)	ND (0.080)	ND (0.050)
Total Xylenes	63	ND (0.058)	ND (0.43)	ND (0.98)	ND (0.27)	ND (0.17) J	ND (0.25)	ND (0.24)	ND (0.15)
Glycols (8015M; mg/kg)									
Propylene	--	--	38 J	59 J	--	--	14 J	--	--
Ethylene	190	--	24 J	31 J	--	--	8.8 J	--	--
Percent Moisture (2540G; %)	--	89.7	88.0	89.5	86.1	90.2	91.2	95.7	--

Note: Results above ADEC cleanup values are **underlined & bolded**.

⁽¹⁾ 18 AAC 75, Method Two

Key:

-- = Not analyzed

ADEC = Alaska Department of Environmental Conservation

bgs = Below ground surface

BTEX = Benzene, toluene, ethylbenzene, and total xylenes

J = Estimated Value. Analyte detected at less than the RDL and greater than or equal to the MDL or flagged as estimated due to a QC outlier.

MDL = Method detection limit

mg/kg= Milligrams per kilograms

ND = Analyte not detected above the RDL.

RDL = Reported detection limit; same value as limit of quantization (LOQ)
and practical quantization limit (PQL).

U = not detected due to trip blank contamination.

ATTACHMENT 3

Photographic Log

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PHOTOGRAPH 1: VIEW OF THE EXCAVATION AREA, DEHYDRATION BUILDING, AND LOCATION OF PIPE BEFORE IT WAS REMOVED, LOOKING EAST/SOUTHEAST (SEPTEMBER 2012, COURTESY OF CH2MHIL)



PHOTOGRAPH 2: VIEW OF THE EXCAVATION AREA AFTER PIPE WAS REMOVED, LOOKING WEST (SEPTEMBER 2012)



PHOTOGRAPH 3: VIEW OF THE EXCAVATION AREA AND THE SCREENING LOCATIONS, LOOKING EAST (SEPTEMBER 2012)



PHOTOGRAPH 4: VIEW OF THE COVERED STOCKPILE, LOOKING NORTH (SEPTEMBER 2012)



**PHOTOGRAPH 5: VIEW OF THE STOCKPILE SCREENING LOCATIONS, LOOKING NORTH
(SEPTEMBER 2012)**

ATTACHMENT 4

Analytical Data Results; ADEC Checklists; Quality Assurance Report

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Environmental Science Corporation

Mt. Juliet, TN

For: Marathon Oil Company - AK
Project: BCPIA
L593966

SDG: L593966

September 14, 2012

Sample Receiving and Handling

All sample aliquots were received at the correct temperature, in the proper containers, and with the appropriate preservatives. All method specified holding times were met.

Total Solids by Method 2540G

Laboratory Control Sample

Samples L593966-04, -01, -02, and -03 were analyzed in analytical batch WG611617. The laboratory control sample associated with these samples was within the laboratory control limits.

Samples L593966-07 and 06 were analyzed in analytical batch WG611618. The laboratory control sample associated with these samples was within the laboratory control limits.

Sample L593966-05 was analyzed in analytical batch WG611647. The laboratory control sample associated with this sample was within the laboratory control limits.

Sample Duplicate Analysis

For analytical batch WG611617 sample duplicate analysis was performed on sample L593972-01. The relative percent differences were within the method limits.

For analytical batch WG611618 sample duplicate analysis was performed on sample L594005-02. The relative percent differences were within the method limits.

For analytical batch WG611647 sample duplicate analysis was performed on sample L593966-05. The relative percent differences were within the method limits.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

Method AK101

Laboratory Control Sample

Samples L593966-05, -07, -02, and -08 were analyzed in analytical batch WG611643. The laboratory control sample associated with these samples was within the laboratory control limits for all compounds.

Samples L593966-04, -06, -01, and -03 were analyzed in analytical batch WG611804. The laboratory control sample associated with these samples was within the laboratory control limits for all compounds.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG611643 matrix spike/matrix spike duplicate analysis was performed on sample L593973-01. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes.

For analytical batch WG611804 matrix spike/matrix spike duplicate analysis was performed on sample L594024-01. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes.

For analytical batch WG611804 matrix spike/matrix spike duplicate analysis was performed on sample L593966-01. The matrix spike recoveries and relative percent differences were within laboratory control limits for all target analytes.

Environmental Science Corporation

Mt. Juliet, TN

For: Marathon Oil Company - AK
Project: BCPIA
L593966

SDG: L593966

September 14, 2012

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

AK102 / AK103

Laboratory Control Sample

Samples L593966-05, -01, -03, -06, -07, -04, and -02 were analyzed in analytical batch WG611739. The laboratory control sample associated with these samples was within the laboratory control limits.

Matrix Spike/Matrix Spike Duplicate

For analytical batch WG611739, matrix spike/matrix spike duplicate analysis was performed on sample L593966-07. The spike recoveries and relative percent differences were within laboratory control limits.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

GLYCOLS

Laboratory Control Sample

Samples L593966-06, -02, and -04 were analyzed in analytical batch WG611740. The laboratory control sample associated with these samples was within the laboratory control limits.

Samples L593966-06, -04, and -02 were analyzed in analytical batch WG611741. The laboratory control sample associated with these samples was within the laboratory control limits.

For analytical batch WG611740, matrix spike/matrix spike duplicate analysis was performed on sample L593966-04. The spike recoveries and relative percent differences were within laboratory control limits.

For analytical batch WG611741, matrix spike/matrix spike duplicate analysis was performed on sample L593966-04. The spike recoveries were above the laboratory control limits. The relative percent difference was within control limits.

Blank Analysis

The method blank, the initial, and all continuing calibration blanks contained no analytes at concentrations above the method reporting limit.

ESC Representative



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Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Attn: S657B-5030 ETS Group
Marathon Oil Company
PO Box 22165
Tulsa, OK 74121-2165

Report Summary

Friday September 14, 2012

Report Number: L593966


Samples Received: 09/08/12

Client Project:

Description: BCPIA

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:


Jared Willis, ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-IN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Attn: S657B-5030 ETS Group
Marathon Oil Company
PO Box 22165
Tulsa, OK 74121-2165

Case Narrative

Friday September 14, 2012

Report Number: L593966

Samples Received: 09/08/12

Client Project:

Description: BCPIA

Other Comments

There was no soil jar received for L593966-08 (12BCPIA-TB01-SO). Only the methanol jar was received. So, the Total Solids analysis could not be conducted to do the dry weight conversion. The results for this sample are reported in wet weight.



12065 Lebanon Rd.
 Mt. Juliet, TN 37122
 (615) 758-5858
 1-800-767-5859
 Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-F1-SO
 Collected By : AO
 Collection Date : 09/06/12 17:15

ESC Sample # : L593966-01

Site ID : BCPIA

Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Total Solids	89.7	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	44.	1.4	7.0	mg/kg		AK101	09/10/12	63
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	96.6			% Rec.		AK101	09/10/12	63
a,a,a-Trifluorotoluene(PID)	100.			% Rec.		8021	09/10/12	63
Benzene	U	0.022	0.092	mg/kg		8260B	09/10/12	83
Toluene	U	0.036	0.46	mg/kg		8260B	09/10/12	83
Ethylbenzene	U	0.025	0.092	mg/kg		8260B	09/10/12	83
Total Xylenes	U	0.058	0.28	mg/kg		8260B	09/10/12	83
Surrogate Recovery								
Toluene-d8	105.			% Rec.		8260B	09/10/12	83
Dibromofluoromethane	97.1			% Rec.		8260B	09/10/12	83
a,a,a-Trifluorotoluene	104.			% Rec.		8260B	09/10/12	83
4-Bromofluorobenzene	107.			% Rec.		8260B	09/10/12	83
AK102 DRO C10-C25	420	5.6	100	mg/kg		AK102/10	09/11/12	5
AK103 RRO C25-C36	27.	2.2	110	mg/kg	J	AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	100.			% Rec.		AK102/10	09/11/12	5
n-Triacontane d62	79.4			% Rec.		AK102/10	09/11/12	1

Results listed are dry weight basis.

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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-F2-SO
 Collected By : AO
 Collection Date : 09/06/12 17:20

ESC Sample # : L593966-02
 Site ID : BCPIA
 Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Propylene glycol	38.	2.1	57.	mg/kg	J	8015M	09/11/12	10
1,3-Propanediol	110			% Rec.		8015M	09/11/12	10
Total Solids	88.0	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	340	2.9	15.	mg/kg		AK101	09/09/12	134
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	98.9			% Rec.		AK101	09/09/12	134
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		8021	09/09/12	134
Ethylene glycol	24.	2.6	57.	mg/kg	J	8015M	09/11/12	10
1,3-Propanediol	110			% Rec.		8015M	09/11/12	10
Benzene	U	0.034	0.14	mg/kg		8260B	09/09/12	127
Toluene	U	0.055	0.72	mg/kg		8260B	09/09/12	127
Ethylbenzene	U	0.038	0.14	mg/kg		8260B	09/09/12	127
Total Xylenes	U	0.089	0.43	mg/kg		8260B	09/09/12	127
Surrogate Recovery								
Toluene-d8	104.			% Rec.		8260B	09/09/12	127
Dibromofluoromethane	99.0			% Rec.		8260B	09/09/12	127
a,a,a-Trifluorotoluene	105.			% Rec.		8260B	09/09/12	127
4-Bromofluorobenzene	191.			% Rec.	J1	8260B	09/09/12	127
AK102 DRO C10-C25	8200	23.	450	mg/kg		AK102/10	09/11/12	20
AK103 RRO C25-C36	160	2.2	110	mg/kg		AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	0.00			% Rec.	J7	AK102/10	09/11/12	20
n-Triacontane d62	0.00			% Rec.	J7	AK102/10	09/11/12	20

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L593966-02 (AK101) - Non-target compounds too high to run at a lower dilution.

L593966-02 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.



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REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-F5-SO
 Collected By : AO
 Collection Date : 09/06/12 17:30

ESC Sample # : L593966-03

Site ID : BCPIA

Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Total Solids	86.1	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	71.	1.6	8.6	mg/kg		AK101	09/10/12	74.5
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	96.2			% Rec.		AK101	09/10/12	74.5
a,a,a-Trifluorotoluene(PID)	99.6			% Rec.		8021	09/10/12	74.5
Benzene	U	0.021	0.089	mg/kg		8260B	09/10/12	76.5
Toluene	U	0.033	0.44	mg/kg		8260B	09/10/12	76.5
Ethylbenzene	U	0.023	0.089	mg/kg		8260B	09/10/12	76.5
Total Xylenes	U	0.053	0.27	mg/kg		8260B	09/10/12	76.5
Surrogate Recovery								
Toluene-d8	105.			% Rec.		8260B	09/10/12	76.5
Dibromofluoromethane	99.1			% Rec.		8260B	09/10/12	76.5
a,a,a-Trifluorotoluene	103.			% Rec.		8260B	09/10/12	76.5
4-Bromofluorobenzene	114.			% Rec.		8260B	09/10/12	76.5
AK102 DRO C10-C25	320	1.1	23.	mg/kg		AK102/10	09/11/12	1
AK103 RRO C25-C36	U	2.2	120	mg/kg		AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	84.2			% Rec.		AK102/10	09/11/12	1
n-Triacontane d62	81.1			% Rec.		AK102/10	09/11/12	1

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REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-F12-SO
 Collected By : AO
 Collection Date : 09/06/12 17:25

ESC Sample # : L593966-04
 Site ID : BCPIA
 Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Propylene glycol	59.	2.1	56.	mg/kg	J5	8015M	09/11/12	10
1,3-Propanediol	120			% Rec.		8015M	09/11/12	10
Total Solids	89.5	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	240	3.5	18.	mg/kg		AK101	09/10/12	158
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	94.9			% Rec.		AK101	09/10/12	158
a,a,a-Trifluorotoluene(PID)	98.2			% Rec.		8021	09/10/12	158
Ethylene glycol	31.	2.6	56.	mg/kg	J	8015M	09/11/12	10
1,3-Propanediol	120			% Rec.		8015M	09/11/12	10
Benzene	U	0.079	0.33	mg/kg		8260B	09/09/12	294
Toluene	U	0.13	1.6	mg/kg		8260B	09/09/12	294
Ethylbenzene	U	0.087	0.33	mg/kg		8260B	09/09/12	294
Total Xylenes	U	0.20	0.98	mg/kg		8260B	09/09/12	294
Surrogate Recovery								
Toluene-d8	103.			% Rec.		8260B	09/09/12	294
Dibromofluoromethane	98.7			% Rec.		8260B	09/09/12	294
a,a,a-Trifluorotoluene	104.			% Rec.		8260B	09/09/12	294
4-Bromofluorobenzene	165.			% Rec.	J1	8260B	09/09/12	294
AK102 DRO C10-C25	9300	56.	1100	mg/kg		AK102/10	09/11/12	50
AK103 RRO C25-C36	230	2.2	110	mg/kg		AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	0.00			% Rec.	J7	AK102/10	09/11/12	50
n-Triacontane d62	144.			% Rec.		AK102/10	09/11/12	1

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L593966-04 (V8260BTEX) - Non-target compounds too high to run at a lower dilution.



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REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-SW4-SO
 Collected By : AO
 Collection Date : 09/06/12 17:35

ESC Sample # : L593966-05

Site ID : BCPIA

Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Total Solids	90.2	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	4.8	1.8	9.0	mg/kg	J	AK101	09/09/12	81.5
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	98.8			% Rec.		AK101	09/09/12	81.5
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		8021	09/09/12	81.5
Benzene	U	0.014	0.055	mg/kg		8260B	09/09/12	50
Toluene	U	0.022	0.28	mg/kg		8260B	09/09/12	50
Ethylbenzene	U	0.015	0.055	mg/kg		8260B	09/09/12	50
Total Xylenes	0.041	0.035	0.17	mg/kg	J	8260B	09/09/12	50
Surrogate Recovery								
Toluene-d8	99.8			% Rec.		8260B	09/09/12	50
Dibromofluoromethane	90.3			% Rec.		8260B	09/09/12	50
a,a,a-Trifluorotoluene	107.			% Rec.		8260B	09/09/12	50
4-Bromofluorobenzene	111.			% Rec.		8260B	09/09/12	50
AK102 DRO C10-C25	590	5.6	110	mg/kg		AK102/10	09/11/12	5
AK103 RRO C25-C36	7.0	2.2	110	mg/kg	J	AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	104.			% Rec.		AK102/10	09/11/12	5
n-Triacontane d62	81.4			% Rec.		AK102/10	09/11/12	1

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 PO Box 22165
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September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-SP1-SO
 Collected By : AO
 Collection Date : 09/06/12 18:30

ESC Sample # : L593966-06
 Site ID : BCPIA
 Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Propylene glycol	14.	2.1	55.	mg/kg	J	8015M	09/11/12	10
1,3-Propanediol	92.			% Rec.		8015M	09/11/12	10
Total Solids	91.2	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	44.	1.6	7.9	mg/kg		AK101	09/10/12	72.5
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	95.4			% Rec.		AK101	09/10/12	72.5
a,a,a-Trifluorotoluene(PID)	98.7			% Rec.		8021	09/10/12	72.5
Ethylene glycol	8.8	2.6	55.	mg/kg	J	8015M	09/11/12	10
1,3-Propanediol	92.			% Rec.		8015M	09/11/12	10
Benzene	U	0.021	0.084	mg/kg		8260B	09/10/12	77
Toluene	U	0.033	0.42	mg/kg		8260B	09/10/12	77
Ethylbenzene	U	0.023	0.084	mg/kg		8260B	09/10/12	77
Total Xylenes	U	0.054	0.25	mg/kg		8260B	09/10/12	77
Surrogate Recovery								
Toluene-d8	105.			% Rec.		8260B	09/10/12	77
Dibromofluoromethane	100.			% Rec.		8260B	09/10/12	77
a,a,a-Trifluorotoluene	105.			% Rec.		8260B	09/10/12	77
4-Bromofluorobenzene	126.			% Rec.		8260B	09/10/12	77
AK102 DRO C10-C25	280	1.1	22.	mg/kg		AK102/10	09/11/12	1
AK103 RRO C25-C36	U	2.2	110	mg/kg		AK102/10	09/11/12	1
Surrogate Recovery								
o-Terphenyl	91.9			% Rec.		AK102/10	09/11/12	1
n-Triacontane d62	88.7			% Rec.		AK102/10	09/11/12	1

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REPORT OF ANALYSIS

Attn: S657B-5030 ETS Group
 Marathon Oil Company - AK
 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12-BCPIA-SP4-SO
 Collected By : AO
 Collection Date : 09/06/12 18:35

ESC Sample # : L593966-07

Site ID : BCPIA

Project # :

Parameter	Dry Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
Total Solids	95.7	0.0333	0.100	%		2540G	09/10/12	1
TPHGAK C6 to C10	36.	1.8	8.6	mg/kg		AK101	09/09/12	82
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	98.9			% Rec.		AK101	09/09/12	82
a,a,a-Trifluorotoluene(PID)	105.			% Rec.		8021	09/09/12	82
Benzene	U	0.021	0.080	mg/kg		8260B	09/10/12	77
Toluene	U	0.033	0.40	mg/kg		8260B	09/10/12	77
Ethylbenzene	U	0.023	0.080	mg/kg		8260B	09/10/12	77
Total Xylenes	U	0.054	0.24	mg/kg		8260B	09/10/12	77
Surrogate Recovery								
Toluene-d8	103.			% Rec.		8260B	09/10/12	77
Dibromofluoromethane	96.1			% Rec.		8260B	09/10/12	77
a,a,a-Trifluorotoluene	106.			% Rec.		8260B	09/10/12	77
4-Bromofluorobenzene	114.			% Rec.		8260B	09/10/12	77
AK102 DRO C10-C25	770	5.6	100	mg/kg	V	AK102/10	09/11/12	5
AK103 RRO C25-C36	U	11.	520	mg/kg		AK102/10	09/11/12	5
Surrogate Recovery								
o-Terphenyl	101.			% Rec.		AK102/10	09/11/12	5
n-Triacontane d62	86.3			% Rec.		AK102/10	09/11/12	5

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REPORT OF ANALYSIS

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 PO Box 22165
 Tulsa, OK 74121-2165

September 14, 2012

Date Received : September 08, 2012
 Description : BCPIA
 Sample ID : 12BCPIA-TB01-SO
 Collected By : AO
 Collection Date : 09/06/12 08:00

ESC Sample # : L593966-08

Site ID : BCPIA

Project # :

Parameter	Result	MDL	RDL	Units	Qualifier	Method	Date	Dil.
TPHGAK C6 to C10	2.4	1.1	5.0	mg/kg	J	AK101	09/09/12	50
Surrogate Recovery-%								
a,a,a-Trifluorotoluene(FID)	98.7			% Rec.		AK101	09/09/12	50
a,a,a-Trifluorotoluene(PID)	104.			% Rec.		8021	09/09/12	50
Benzene	U	0.014	0.050	mg/kg		8260B	09/10/12	50
Toluene	U	0.022	0.25	mg/kg		8260B	09/10/12	50
Ethylbenzene	U	0.015	0.050	mg/kg		8260B	09/10/12	50
Total Xylenes	U	0.035	0.15	mg/kg		8260B	09/10/12	50
Surrogate Recovery								
Toluene-d8	106.			% Rec.		8260B	09/10/12	50
Dibromofluoromethane	98.3			% Rec.		8260B	09/10/12	50
a,a,a-Trifluorotoluene	105.			% Rec.		8260B	09/10/12	50
4-Bromofluorobenzene	101.			% Rec.		8260B	09/10/12	50

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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L593966-01	WG611739	SAMP	AK103 RRO C25-C36	R2338953	J
L593966-02	WG611739	SAMP	o-Terphenyl	R2338953	J7
	WG611739	SAMP	n-Triacontane d62	R2338953	J7
	WG611741	SAMP	Propylene glycol	R2338693	J
	WG611740	SAMP	Ethylene glycol	R2338673	J
	WG611616	SAMP	4-Bromofluorobenzene	R2336697	J1
L593966-04	WG611739	SAMP	o-Terphenyl	R2338953	J7
	WG611741	SAMP	Propylene glycol	R2338693	J5
	WG611740	SAMP	Ethylene glycol	R2338673	J
	WG611616	SAMP	4-Bromofluorobenzene	R2336697	J1
L593966-05	WG611643	SAMP	TPHGAK C6 to C10	R2336853	J
	WG611739	SAMP	AK103 RRO C25-C36	R2338953	J
	WG611633	SAMP	Total Xylenes	R2335773	J
L593966-06	WG611741	SAMP	Propylene glycol	R2338693	J
	WG611740	SAMP	Ethylene glycol	R2338673	J
L593966-07	WG611739	SAMP	AK102 DRO C10-C25	R2338953	V
L593966-08	WG611643	SAMP	TPHGAK C6 to C10	R2336853	J

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J	(EPA) - Estimated value below the lowest calibration point. Confidence correlates with concentration.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Total Solids by Method 2540G	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611617
Collection Date:	9/6/2012	Analyst:	519
Analysis Date:	9/10/2012 9:53:00 AM	Extraction Date:	9/8/2012
Instrument ID:	LOGBAL2		
Sample Numbers:	L593966-04, -01, -02, -03		

Method Blank

Analyte	CAS	PQL	Qualifiers
Total Solids		<0.100	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Total Solids	50.0	50.0	100	85 - 115	



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SDG: L593966
Marathon Oil Company - AK

Test:	Total Solids by Method 2540G	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611618
Collection Date:	9/6/2012	Analyst:	519
Analysis Date:	9/10/2012 10:16:00 AM	Extraction Date:	9/8/2012
Instrument ID:	LOGBAL2		
Sample Numbers:	L593966-07, -06		

Method Blank

Analyte	CAS	PQL	Qualifiers
Total Solids		<0.100	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Total Solids	50.0	50.0	100.0	85 - 115	



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Total Solids by Method 2540G	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611647
Collection Date:	9/6/2012	Analyst:	519
Analysis Date:	9/10/2012 10:26:00 AM	Extraction Date:	9/8/2012
Instrument ID:	LOGBAL2		
Sample Numbers:	L593966-05		

Method Blank

Analyte	CAS	PQL	Qualifiers
Total Solids		<0.100	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Total Solids	50.0	50.0	100.0	85 - 115	



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Total Solids by Method 2540G	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611617
Collection Date:	9/6/2012	Analyst:	519
Analysis Date:	9/10/2012 9:53:00 AM	Extraction Date:	9/8/2012
Instrument ID:	LOGBAL2		
Sample Numbers:	L593966-04, -01, -02, -03		

Sample Duplicate
 L593972-01

Name	Sample Results	Duplic Results	%RPD	Limit	Qualifiers
Total Solids	99.4	99.5	0.1	5	



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test: Total Solids by Method 2540G
Project No: Matrix: Soil - mg/kg
Project: BCPIA EPA ID: TN00003
Collection Date: 9/6/2012 **Analytic Batch: WG611618**
Analysis Date: 9/10/2012 10:16:00 AM Analyst: 519
Instrument ID: LOGBAL2 Extraction Date: 9/8/2012
Sample Numbers: L593966-07, -06

Sample Duplicate

L594005-02

Name	Sample Results	Duplic Results	%RPD	Limit	Qualifiers
Total Solids	83.6	84.0	0.4	5	



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Total Solids by Method 2540G	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611647
Collection Date:	9/6/2012	Analyst:	519
Analysis Date:	9/10/2012 10:26:00 AM	Extraction Date:	9/8/2012
Instrument ID:	LOGBAL2		
Sample Numbers:	L593966-05		

Sample Duplicate
 L593966-05

Name	Sample Results	Duplic Results	%RPD	Limit	Qualifiers
Total Solids	90.3	91.7	1.6	5	



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611643
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/9/2012		
Instrument ID:	VOCGC1		
Sample Numbers:	L593966-05, -07, -02, -08		

Method Blank

Analyte	CAS	PQL	Qualifiers
TPHGAK C6 to C10		<5.00	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
TPHGAK C6 to C10	5.50	5.76	105	60 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
TPHGAK C6 to C10	5.50	5.72	104	60 - 120	

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611804
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/10/2012		
Instrument ID:	VOCGC10		
Sample Numbers:	L593966-04, -06, -01, -03		

Method Blank

Analyte	CAS	PQL	Qualifiers
TPHGAK C6 to C10		<5.00	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
TPHGAK C6 to C10	5.50	6.07	110	60 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
TPHGAK C6 to C10	5.50	5.84	106	60 - 120	



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611643
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/9/2012		
Instrument ID:	VOCGC1		
Sample Numbers:	L593966-05, -07, -02, -08		

Surrogate Summary

Laboratory Sample ID	a,a,a-Trifluorotoluene - FID		a,a,a-Trifluorotoluene - PID	
	ppb	% Rec	ppb	% Rec
LCS WG611643	209	105	230	115
LCSD WG611643	209	105	230	115
LCS WG611643	200	100.0	209	104
LCSD WG611643	197	98.7	206	103
MS WG611643	196	98.1	205	102
MSD WG611643	196	98.2	205	103
MS WG611643	206	103	223	111
MSD WG611643	206	103	224	112
Blank WG611643	197	98.5	208	104
L593966-02	198	98.9	207	104
L593966-05	198	98.8	209	104
L593966-07	198	98.8	210	105
L593966-08	197	98.7	208	104

a,a,a-Trifluorotoluene (FID)	200 ppb	Limits - 59 - 128
a,a,a-Trifluorotoluene (PID)	200 ppb	Limits - 54 - 144



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611804
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/10/2012		
Instrument ID:	VOCGC10		
Sample Numbers:	L593966-04, -06, -01, -03		

Surrogate Summary

Laboratory Sample ID	a,a,a-Trifluorotoluene - FID		a,a,a-Trifluorotoluene - PID	
	ppb	% Rec	ppb	% Rec
LCS WG611804	189	94.5	196	97.9
LCS WG611804	199	99.4	220	110
LCSD WG611804	197	98.7	219	109
MS WG611804	189	94.5	195	97.7
MSD WG611804	189	94.3	196	97.9
MS WG611804	192	96.2	214	107
MSD WG611804	190	95.1	211	106
Blank WG611804	195	97.7	203	102
L593966-01	193	96.6	200	100
L593966-03	192	96.2	199	99.6
L593966-04	190	94.9	196	98.2
L593966-06	191	95.4	197	98.7
LCSD WG611804	189	94.6	197	98.4

a,a,a-Trifluorotoluene (FID)	200 ppb	Limits - 70 - 130
a,a,a-Trifluorotoluene (PID)	200 ppb	Limits - 54 - 144



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611643
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/9/2012		
Instrument ID:	VOCGC1		
Sample Numbers:	L593966-05, -07, -02, -08		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD		Control Limits	Qualifier
			Rec	MSD					RPD	RPD		
TPHGAK C6 to C10	5.50	5.76	105	5.72	104	60-120		0.7	20			

Matrix Spike/Matrix Spike Duplicate

L593973-01

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	Qualifier	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD								
TPHGAK C6 to C10	27.5	0.172	22.5	81.1	22.7	81.9	55-109		1.0		20		



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611804
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/10/2012		
Instrument ID:	VOCGC10		
Sample Numbers:	L593966-04, -06, -01, -03		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD		Control Limits	Qualifier
			Rec	MSD					RPD	RPD		
TPHGAK C6 to C10	5.50	6.07	110	5.84	106	60-120		3.7	20			

Matrix Spike/Matrix Spike Duplicate

L593966-01

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	Qualifier	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD								
TPHGAK C6 to C10	346	40.0	318	80.2	283	70.1	55-109		12		20		



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611643
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/9/2012		
Instrument ID:	VOCGC1		
Sample Numbers:	L593966-05, -07, -02, -08		

Internal Standard Response and Retention Time Summary

FileID:0908_03.D Date:9/8/2012 Time:8:31 PM

	IS - FID		IS - PID	
	Response	RT	Response	RT
12 Hour Std	2965726	5.91	630040	5.91
Upper Limit	5931452	6.41	1260080	6.41
Lower Limit	1482863	5.41	315020	5.41
<hr/>				
Sample ID	Response	RT	Response	RT
Blank WG611643	2798613	5.91	585838	5.91
L593966-02	2764969	5.93	584216	5.93
L593966-05	2842679	5.92	594259	5.92
L593966-07	2824961	5.91	590332	5.91
L593966-08	2811235	5.91	592281	5.91
LCS WG611643	2901481	5.91	623411	5.91
LCS WG611643	2671656	5.91	575071	5.91
LCSD WG611643	2899339	5.91	619558	5.91
LCSD WG611643	2760992	5.92	591143	5.92
MS WG611643	2757275	5.91	583902	5.91
MS WG611643	2931569	5.91	622346	5.91
MSD WG611643	2739449	5.91	578804	5.91
MSD WG611643	2878657	5.91	612967	5.91



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Method AK101	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611804
Collection Date:	9/6/2012	Analyst:	366
Analysis Date:	9/10/2012		
Instrument ID:	VOCGC10		
Sample Numbers:	L593966-04, -06, -01, -03		

Internal Standard Response and Retention Time Summary

FileID:0910_03.D Date:9/10/2012 Time:11:54 AM

	Response	IS - FID RT	Response	IS - PID RT
12 Hour Std	267234856	6.04	194646105	6.04
Upper Limit	534469712	6.54	389292210	6.54
Lower Limit	133617428	5.54	97323052.5	5.54

Sample ID	Response	RT	Response	RT
Blank WG611804	249397575	6.04	185309688	6.04
L593966-01	259073993	6.04	190947946	6.04
L593966-03	245372146	6.04	180102576	6.04
L593966-04	236605916	6.04	173165550	6.04
L593966-06	238157171	6.04	173886679	6.03
LCS WG611804	240086306	6.04	177008208	6.03
LCS WG611804	252539209	6.04	180622562	6.04
LCSD WG611804	269108836	6.03	191048099	6.03
LCSD WG611804	247702670	6.03	181323332	6.03
MS WG611804	244196101	6.04	183073545	6.04
MS WG611804	285707432	6.04	201301919	6.04
MSD WG611804	270023547	6.04	200005556	6.04
MSD WG611804	278617059	6.04	194718184	6.04

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611616
Collection Date:	9/6/2012	Analyst:	209
Analysis Date:	9/8/2012		
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-02, -04		

Method Blank

Analyte	CAS	PQL	Qualifiers
Benzene	71-43-2	<0.0010	
Toluene	108-88-3	<0.0050	
Ethylbenzene	100-41-4	<0.0010	
m&p-Xylene	1330-20-7	<0.0030	
o-Xylene	1330-20-7	<0.0030	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0235	94.0	72 - 120	
Toluene	0.0250	0.0240	96.2	74 - 155	
Ethylbenzene	0.0250	0.0250	100	76 - 126	
m&p-Xylene	0.0500	0.0492	98.3	75 - 125	
o-Xylene	0.0250	0.0248	99.0	75 - 128	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0233	93.0	72 - 120	
Toluene	0.0250	0.0237	94.8	74 - 155	
Ethylbenzene	0.0250	0.0245	98.0	76 - 126	
m&p-Xylene	0.0500	0.0488	97.5	75 - 125	
o-Xylene	0.0250	0.0246	98.3	75 - 128	

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611633
Analysis Date:	9/9/2012	Analyst:	0
Instrument ID:	VOCMS2		
Sample Numbers:	L593966-05		

Method Blank

Analyte	CAS	PQL	Qualifiers
Benzene	71-43-2	<0.0010	
Toluene	108-88-3	<0.0050	
Ethylbenzene	100-41-4	<0.0010	
m&p-Xylene	1330-20-7	<0.0030	
o-Xylene	1330-20-7	<0.0030	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0229	91.6	72 - 120	
Toluene	0.0250	0.0244	97.6	74 - 155	
Ethylbenzene	0.0250	0.0269	107	76 - 126	
m&p-Xylene	0.0500	0.0543	109	75 - 125	
o-Xylene	0.0250	0.0270	108	75 - 128	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0220	87.8	72 - 120	
Toluene	0.0250	0.0242	96.7	74 - 155	
Ethylbenzene	0.0250	0.0260	104	76 - 126	
m&p-Xylene	0.0500	0.0540	108	75 - 125	
o-Xylene	0.0250	0.0271	109	75 - 128	

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611796
Analysis Date:	9/10/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-03, -07, -08, -01, -06		

Method Blank

Analyte	CAS	PQL	Qualifiers
Benzene	71-43-2	<0.0010	
Toluene	108-88-3	<0.0050	
Ethylbenzene	100-41-4	<0.0010	
m&p-Xylene	1330-20-7	<0.0030	
o-Xylene	1330-20-7	<0.0030	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0234	93.5	72 - 120	
Toluene	0.0250	0.0250	100.0	74 - 155	
Ethylbenzene	0.0250	0.0260	104	76 - 126	
m&p-Xylene	0.0500	0.0527	105	75 - 125	
o-Xylene	0.0250	0.0260	104	75 - 128	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Benzene	0.0250	0.0238	95.3	72 - 120	
Toluene	0.0250	0.0247	98.7	74 - 155	
Ethylbenzene	0.0250	0.0255	102	76 - 126	
m&p-Xylene	0.0500	0.0507	101	75 - 125	
o-Xylene	0.0250	0.0253	101	75 - 128	



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611616
Analysis Date:	9/8/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-02, -04		

Surrogate Summary

Laboratory Sample ID	Dibromofluoromethane		Toluene-d8		4-Bromofluorobenzene		Alternate Surrogate a,a,a-Trifluorotoluene	
	ppb	% Rec	ppb	% Rec	ppb	% Rec	ppb	% Rec
LCS WG611616	40.3	101	41.5	104	40.4	101	41.7	104
LCSD WG611616	40.4	101	41.4	103	40.6	102	41.6	104
Blank WG611616	39.3	98.2	41.5	104	39.9	99.7	41.9	105
MS WG611616	41.1	103	41.5	104	41.8	105	41.3	103
MSD WG611616	41.6	104	41.5	104	39.2	98.1	41.3	103
L593966-02	39.6	99.0	41.5	104	76.3	191	*	42.1 105
L593966-04	39.5	98.7	41.1	103	65.8	165	*	41.6 104

Dibromofluoromethane	40 ppb	63 - 139
Toluene - d8	40 ppb	84 - 116
4-Bromofluorobenzene	40 ppb	59 - 140
Alternate Surrogate		
a,a,a-Trifluorotoluene	40 ppb	80 - 118

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611633
Analysis Date:	9/9/2012	Analyst:	0
Instrument ID:	VOCMS2		
Sample Numbers:	L593966-05		

Surrogate Summary

Laboratory Sample ID	Dibromofluoromethane		Toluene-d8		4-Bromofluorobenzene		Alternate Surrogate a,a,a-Trifluorotoluene	
	ppb	% Rec	ppb	% Rec	ppb	% Rec	ppb	% Rec
LCS WG611633	37.7	94.2	38.9	97.3	41.4	103	42.5	106
LCSD WG611633	37.8	94.4	39.8	99.5	42.8	107	42.5	106
MS WG611633	38.2	95.6	40.0	100.0	41.5	104	42.5	106
MSD WG611633	38.3	95.9	39.1	97.7	41.9	105	42.5	106
Blank WG611633	37.3	93.2	39.8	99.5	44.4	111	42.7	107
L593966-05	36.1	90.3	39.9	99.7	44.5	111	42.9	107

Dibromofluoromethane	40 ppb	72 - 135
Toluene - d8	40 ppb	90 - 113
4-Bromofluorobenzene	40 ppb	67 - 133
Alternate Surrogate		
a,a,a-Trifluorotoluene	40 ppb	89 - 115

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611796
Analysis Date:	9/10/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-03, -07, -08, -01, -06		

Surrogate Summary

Laboratory Sample ID	Dibromofluoromethane		Toluene-d8		4-Bromofluorobenzene		Alternate Surrogate a,a,a-Trifluorotoluene	
	ppb	% Rec	ppb	% Rec	ppb	% Rec	ppb	% Rec
LCS WG611796	39.8	99.6	41.9	105	41.7	104	42.6	107
LCSD WG611796	39.9	99.9	41.5	104	40.6	101	41.7	104
MS WG611796	40.1	100	41.0	103	39.8	99.4	41.2	103
MSD WG611796	39.7	99.3	41.5	104	40.1	100	41.6	104
Blank WG611796	39.0	97.6	42.3	106	38.4	96.0	41.7	104
L593966-08	39.3	98.3	42.3	106	40.2	101	42.0	105
L593966-01	38.8	97.1	41.9	105	42.8	107	41.4	104
L593966-03	39.6	99.1	42.1	105	45.8	114	41.4	103
L593966-06	40.1	100	41.9	105	50.3	126	42.1	105
L593966-07	38.4	96.1	41.4	103	45.5	114	42.5	106

Dibromofluoromethane	40 ppb	63 - 139
Toluene - d8	40 ppb	84 - 116
4-Bromofluorobenzene	40 ppb	59 - 140
Alternate Surrogate		
a,a,a-Trifluorotoluene	40 ppb	80 - 118

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611616
Analysis Date:	9/8/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-02, -04		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD	% Rec	
			Rec	MSD						Rec	MSD
Benzene	0.0250	0.0235	94.0	0.0233	93.0	72-120		1.0	20		
Toluene	0.0250	0.0240	96.2	0.0237	94.8	74-155		1.5	20		
Ethylbenzene	0.0250	0.0250	100	0.0245	98.0	76-126		2.1	20		
m&p-Xylene	0.0500	0.0492	98.3	0.0488	97.5	75-125		0.8	20		
o-Xylene	0.0250	0.0248	99.0	0.0246	98.3	75-128		0.8	20		

Matrix Spike/Matrix Spike Duplicate

L594005-01

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD							
Benzene	0.0250	0.0000	0.0173	69.1	0.0166	66.4	44-131		4.0	21		
Toluene	0.0250	0.0000	0.0173	69.2	0.0168	67.2	43-127		2.8	21		
Ethylbenzene	0.0250	0.0000	0.0180	72.2	0.0164	65.8	38-139		9.3	27		
m&p-Xylene	0.0500	0.0000	0.0358	71.7	0.0331	66.1	39-136		8.1	27		
o-Xylene	0.0250	0.0000	0.0179	71.6	0.0166	66.3	38-139		7.7	26		

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611633
Analysis Date:	9/9/2012	Analyst:	0
Instrument ID:	VOCMS2		
Sample Numbers:	L593966-05		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD	% Rec	
			Rec	MSD						Rec	MSD
Benzene	0.0250	0.0229	91.6	0.0220	87.8	72-120		4.2	20		
Toluene	0.0250	0.0244	97.6	0.0242	96.7	74-155		0.9	20		
Ethylbenzene	0.0250	0.0269	107	0.0260	104	76-126		3.2	20		
m&p-Xylene	0.0500	0.0543	109	0.0540	108	75-125		0.5	20		
o-Xylene	0.0250	0.0270	108	0.0271	109	75-128		0.4	20		

Matrix Spike/Matrix Spike Duplicate

L594029-01

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD							
Benzene	0.125	0.0000	0.0992	79.4	0.0977	78.1	44-131		1.6	21		
Toluene	0.125	0.0000	0.107	85.3	0.106	84.6	43-127		0.8	21		
Ethylbenzene	0.125	0.0000	0.111	88.7	0.114	91.1	38-139		2.8	27		
m&p-Xylene	0.250	0.0000	0.226	90.2	0.230	92.2	39-136		2.2	27		
o-Xylene	0.125	0.0000	0.113	90.1	0.116	92.7	38-139		2.9	26		

Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611796
Analysis Date:	9/10/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-03, -07, -08, -01, -06		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	%		Control Limits	Qualifier	RPD	Control	
			Rec	LCSD				Rec	Limits
Benzene	0.0250	0.0234	93.5	0.0238	95.3	72-120	1.9	20	
Toluene	0.0250	0.0250	100.0	0.0247	98.7	74-155	1.3	20	
Ethylbenzene	0.0250	0.0260	104	0.0255	102	76-126	2.0	20	
m&p-Xylene	0.0500	0.0527	105	0.0507	101	75-125	3.9	20	
o-Xylene	0.0250	0.0260	104	0.0253	101	75-128	2.6	20	

Matrix Spike/Matrix Spike Duplicate

L592900-17

Analyte	Spike		MS	%		MSD	Control Limits	% Rec Qualifier	RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD						
Benzene	0.125	0.0016	0.116	91.5	0.111	87.8	44-131		4.1	21	
Toluene	0.125	0.0580	0.160	81.3	0.153	76.0	43-127		4.3	21	
Ethylbenzene	0.125	0.0041	0.124	95.8	0.118	90.7	38-139		5.2	27	
m&p-Xylene	0.250	0.0215	0.255	93.5	0.243	88.4	39-136		5.1	27	
o-Xylene	0.125	0.0065	0.125	94.6	0.118	89.6	38-139		5.2	26	



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611616
Analysis Date:	9/8/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-02, -04		

Internal Standard Response and Retention Time Summary

FileID:0908_05.D

Date:9/8/2012

Time:12:00 PM

	IS1		IS2		IS3		IS4	
	Response	RT	Response	RT	Response	RT	Response	RT
12 Hour Std	331802	5.46	577899	5.89	88349	7.43	238489	10.5
Upper Limit	663604	5.96	1155798	6.39	176698	7.93	476978	11
Lower Limit	165901	4.96	288949.5	5.39	44174.5	6.93	119244.5	10

Sample ID	Response	RT	Response	RT	Response	RT	Response	RT
Blank WG611616	301113	5.46	511910	5.89	77111	7.42	202881	10.51
LCS WG611616	327109	5.46	565114	5.89	86638	7.42	235064	10.51
LCSD WG611616	325437	5.46	559641	5.89	85693	7.42	235742	10.51
MS WG611616	304252	5.46	522165	5.89	80278	7.42	231246	10.5
MSD WG611616	303054	5.46	520488	5.89	84658	7.42	231527	10.5



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611616
Analysis Date:	9/8/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-02, -04		

Internal Standard Response and Retention Time Summary

FileID:0908_20.D

Date:9/9/2012

Time:6:45 AM

	IS1		IS2		IS3		IS4	
	Response	RT	Response	RT	Response	RT	Response	RT
12 Hour Std	277672	5.46	478426	5.89	72369	7.42	207944	10.51
Upper Limit	555344	5.96	956852	6.39	144738	7.92	415888	11.01
Lower Limit	138836	4.96	239213	5.39	36184.5	6.92	103972	10.01

Sample ID	Response	RT	Response	RT	Response	RT	Response	RT
L593966-02	281279	5.45	474011	5.89	72324	7.42	227343	10.51
L593966-04	283914	5.46	482002	5.89	71293	7.42	209469	10.51



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611633
Analysis Date:	9/9/2012	Analyst:	0
Instrument ID:	VOCMS2		
Sample Numbers:	L593966-05		

Internal Standard Response and Retention Time Summary

FileID:0909_31.D

Date:9/9/2012

Time:5:08 PM

	IS1		IS2		IS3		IS4	
	Response	RT	Response	RT	Response	RT	Response	RT
12 Hour Std	218580	4.38	387490	4.71	59581	5.88	184251	8.26
Upper Limit	437160	4.88	774980	5.21	119162	6.38	368502	8.76
Lower Limit	109290	3.88	193745	4.21	29790.5	5.38	92125.5	7.76

Sample ID	Response	RT	Response	RT	Response	RT	Response	RT
Blank WG611633	213601	4.38	379295	4.71	55277	5.88	176417	8.26
L593966-05	225409	4.37	395712	4.7	57677	5.88	187602	8.26
LCS WG611633	215833	4.38	384967	4.71	57913	5.88	175132	8.26
LCSD WG611633	226956	4.38	392668	4.71	59345	5.88	189618	8.26
MS WG611633	221722	4.38	391372	4.71	60780	5.88	183683	8.26
MSD WG611633	225620	4.38	400417	4.71	60466	5.88	187422	8.26

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Volatile Organic Compounds by Method 8260B		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611796
Analysis Date:	9/10/2012	Analyst:	209
Instrument ID:	VOCMS22		
Sample Numbers:	L593966-03, -07, -08, -01, -06		

Internal Standard Response and Retention Time Summary

FileID:0910_05.D

Date:9/10/2012

Time:1:27 PM

	IS1		IS2		IS3		IS4	
	Response	RT	Response	RT	Response	RT	Response	RT
12 Hour Std	310683	5.46	514797	5.89	79864	7.42	226980	10.5
Upper Limit	621366	5.96	1029594	6.39	159728	7.92	453960	11
Lower Limit	155341.5	4.96	257398.5	5.39	39932	6.92	113490	10

Sample ID	Response	RT	Response	RT	Response	RT	Response	RT
Blank WG611796	243212	5.46	413091	5.89	63544	7.43	168013	10.5
L593966-01	219196	5.45	373794	5.89	57908	7.42	169567	10.5
L593966-03	250525	5.45	427289	5.89	63943	7.42	203739	10.5
L593966-06	261242	5.45	442841	5.89	66022	7.42	202664	10.5
L593966-07	274215	5.45	456807	5.89	67716	7.42	201522	10.5
L593966-08	253237	5.45	428619	5.89	64060	7.42	178069	10.5
LCS WG611796	297856	5.46	494286	5.89	74084	7.42	219793	10.5
LCSD WG611796	286565	5.46	483242	5.89	74420	7.43	214929	10.5
MS WG611796	286278	5.46	483943	5.89	74972	7.42	215642	10.5
MSD WG611796	275998	5.46	467263	5.89	72501	7.42	204873	10.5

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	AK102 / AK103	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611739
Collection Date:	9/6/2012	Analyst:	187
Analysis Date:	9/11/2012	Extraction Date:	9/10/2012
Instrument ID:	SVGC16		
Sample Numbers:	L593966-05, -01, -03, -06, -07, -04, -02		

Method Blank

Analyte	CAS	PQL	Qualifiers
AK102 DRO C10-C25		<20.0	
AK103 RRO C25-C36		<100	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
AK102 DRO C10-C25	60.0	49.1	81.8	75 - 125	
AK103 RRO C25-C36	60.0	46.6	77.7	60 - 120	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
AK102 DRO C10-C25	60.0	46.8	78.0	75 - 125	
AK103 RRO C25-C36	60.0	44.0	73.3	60 - 120	

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	AK102 / AK103	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611739
Collection Date:	9/6/2012	Analyst:	187
Analysis Date:	9/11/2012	Extraction Date:	9/10/2012
Instrument ID:	SVGC16		
Sample Numbers:	L593966-05, -01, -03, -06, -07, -04, -02		

Surrogate Summary

Laboratory Sample ID	n-Triacontane d62		o-Terphenyl	
	ppm	% Rec	ppm	% Rec
Blank WG611739	1.54	77.0	0.639	79.9
LCS WG611739	1.46	73.2	0.663	82.8
LCSD WG611739	1.50	75.2	0.689	86.1
L593966-01	1.59	79.4	2.39	299 J1
L593966-03	1.62	81.1	0.674	84.2
L593966-04	2.88	144	51.2	6397 J1
L593966-05	1.63	81.4	2.30	288 J1
L593966-06	1.77	88.7	0.736	91.9
L593966-07 5x	1.72	86.2	0.805	101
MS WG611739	0.00	0.0	0.771	96.3

n-Triacontane d62

True Value: 2ppm Limits: 50 - 150

o-Terphenyl

True Value: 0.8ppm Limits: 50 - 150

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	AK102 / AK103	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611739
Collection Date:	9/6/2012	Analyst:	187
Analysis Date:	9/11/2012	Extraction Date:	9/10/2012
Instrument ID:	SVGC16		
Sample Numbers:	L593966-05, -01, -03, -06, -07, -04, -02		

Surrogate Summary

Laboratory Sample ID	n-Triacontane d62		o-Terphenyl	
	ppm	% Rec	ppm	% Rec
MSD WG611739	0.0000000	0.0	0.712	89.0
L593966-01 5x	0.000	0.0	0.803	100
L593966-05 5x	0.000	0.0	0.834	104
L593966-02 20x	0.000	0.0 J7	0.000	0.0 J7
L593966-04 50x	0.000	0.0 J7	0.000	0.0 J7

n-Triacontane d62

True Value: 2ppm Limits: 50 - 150

o-Terphenyl

True Value: 0.8ppm Limits: 50 - 150



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	AK102 / AK103	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611739
Collection Date:	9/6/2012	Analyst:	187
Analysis Date:	9/11/2012	Extraction Date:	9/10/2012
Instrument ID:	SVGC16		
Sample Numbers:	L593966-05, -01, -03, -06, -07, -04, -02		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD	% Control Limits		Qualifier
			Rec	MSD						Rec	MSD	
AK102 DRO C10-C25	60.0	49.1	81.8	46.8	78.0	75-125		4.8	20			
AK103 RRO C25-C36	60.0	46.6	77.7	44.0	73.3	60-120		5.8	20			

Matrix Spike/Matrix Spike Duplicate

L593966-07

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	Qualifier	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD								
AK102 DRO C10-C25	60.0	740	775	59.1	718	-37.0	75-125	V	7.7	20			



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Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Diesel Range Organics by Method 8015	Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003
Project:	BCPIA	Analytic Batch:	WG611740
Collection Date:	9/6/2012	Analyst:	478
Analysis Date:	9/10/2012	Extraction Date:	9/10/2012
Instrument ID:	SVGC10		
Sample Numbers:	L593966-06, -02, -04		

Method Blank

Analyte	CAS	PQL	Qualifiers
Ethylene glycol		<5.00	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Ethylene glycol	30.0	29.0	96.7	70 - 130	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Ethylene glycol	30.0	29.0	96.7	70 - 130	

Quality Control Summary

SDG: L593966

Marathon Oil Company - AK

Test:	Diesel Range Organics by Method 8015		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611741
Analysis Date:	9/10/2012	Analyst:	478
Instrument ID:	SVGC10	Extraction Date:	9/10/2012
Sample Numbers:	L593966-06, -04, -02		

Method Blank

Analyte	CAS	PQL	Qualifiers
Propylene glycol		<5.00	

Laboratory Control Sample (LCS)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Propylene glycol	30.0	29.0	96.7	70 - 130	

Laboratory Control Sample Duplicate (LCSD)

Analyte	True Value	Found	Recovery %	Control Limits	Qualifiers
Propylene glycol	30.0	29.0	96.7	70 - 130	



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Diesel Range Organics by Method 8015			Matrix:	Soil - mg/kg
Project No:		EPA ID:	TN00003		
Project:	BCPIA	Analytic Batch:	WG611740		
Collection Date:	9/6/2012	Analyst:	478		
Analysis Date:	9/10/2012	Extraction Date:	9/10/2012		
Instrument ID:	SVGC10				
Sample Numbers:	L593966-06, -02, -04				

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD	% Control	
			Rec	MSD						Limits	Qualifier
Ethylene glycol	30.0	29.0	96.7	29.0	96.7	70-130		0.0	20		

Matrix Spike/Matrix Spike Duplicate

L593966-04

Analyte	Spike		MS	% Rec		MSD	% Rec	Control Limits	% Rec	% RPD	Control Limits	RPD Qual
	Value	Sample		Rec	MSD							
Ethylene glycol	30.0	28.0	52.0	80.0	53.0	83.3	70-130		1.9	20		



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Quality Control Summary
SDG: L593966
Marathon Oil Company - AK

Test:	Diesel Range Organics by Method 8015		
Project No:		Matrix:	Soil - mg/kg
Project:	BCPIA	EPA ID:	TN00003
Collection Date:	9/6/2012	Analytic Batch:	WG611741
Analysis Date:	9/10/2012	Analyst:	478
Instrument ID:	SVGC10	Extraction Date:	9/10/2012
Sample Numbers:	L593966-06, -04, -02		

Laboratory Control Sample/ Laboratory Control Sample Duplicate

Analyte	Spike	LCS	% Rec		LCS D	% Rec	Control Limits	Qualifier	% RPD	% Control	
			Rec	MSD						Limits	Qualifier
Propylene glycol	30.0	29.0	96.7	29.0	96.7	70-130		0.0	20		

Matrix Spike/Matrix Spike Duplicate

L593966-04

Analyte	Spike Value	Sample	MS	% Rec		MSD	% Rec	Control Limits	% Rec	% RPD	Control Limits	RPD Qual
				Rec	MSD							
Propylene glycol	30.0	53.0	90.0	123	98.0	150	70-130	J5	8.5	20		

Weston Solutions
Ashley Olson / Dan Frank
425 G St, Ste 300
Anchorage AK 99501

Billing Information:
Marathon
Houston, TX

Report to:
Ashley.olson@westonsolutions.com
Daniel.Frank@westonsolutions.com

Email to:
Same

Analysis/Container/Preservative

J090 Chain of Custody Page 1 of 1

ESC
L.A.B S.C.I.E.N.C.E.S

12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

2594966

Project Description: BCP1A
Phone: (907) 268-9024
FAX:
Collected by: AO
Collected by (signature): Ashley Olson

City/State Collected: Kenai, AK
Client Project #: ESC Key: Marathon Oil Company - AK
Site/Facility ID#: BCP1A
P.O.#:

BTX 8200 MCH
G20 AX101 MCH
DRO120 AX102/103
% moisture
Alkyls 805M

CoCode (lab use only)
Template/Prelogin
Marathon Oil Company - AK
Shipped Via: FedEx

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	Analysis/Container/Preservative										Remarks/Contaminant	Sample # (lab only)
							BTX	G20	DRO	% moisture	Alkyls	Other	Other	Other	Other	Other		
12-BCPIA-F1-SO	Grab	SS	NA	9/6/12	1715	4	X	X	X	X	X						01	
12-BCPIA-F2-SO					1720												02	
12-BCPIA-F3-SO					1730												03	
12-BCPIA-F2-SO					1725												04	
12-BCPIA-SW4-SO					1735										ms/mSD		05	
12-BCPIA-SP1-SO					1830												06	
12-BCPIA-SP4-SO					1835												07	
12-BCPIA-TB01-SO					0800	1											08	

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____ pH _____ Temp _____

Remarks: _____ Flow _____ Other _____

5274 8790 5282

Relinquished by: (Signature) Ashley Olson	Date: 9/7/12	Time: 0800	Received by: (Signature)	Samples returned via: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: 5 (lab use only)
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.7	Bottles Received: 29
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9-8-12	Time: 1000

Troy Dunlap

From: Jarred Willis
Sent: Friday, September 07, 2012 11:38 AM
To: Login
Cc: Due VOC; Due SVOC; Extractions; Ken Buckley; Subout Team; Janice Cozby; Tom Mellette
Subject: Rush samples from MAROILNAK arriving Saturday, 9/8 along with 2 subout samples for ETHGLY

LOGIN / LAB:

We will be receiving 7 SS from ***MAROILNAK*** on Saturday, 9/8 for AK101, AK102/103, V8260BTEX, and TS. Please log as R2 due Tuesday, 9/11 with a 2x rush multiplier.

Please take extra care when extracting and analyzing these samples. They are from a remote area of Alaska, and resampling is extremely difficult.

LOGIN / SUBOUTS:

2 of these soil samples will also be logged for **ETHGLY**, but client will need **all of the Glycols**. Please have the sub lab (Maxxam Analytical) log them on a **10-day rush** with a 25% upcharge. Login, please add the **1.25x rush multiplier**.

Thanks,

Jarred Willis

Technical Service Representative (TSR)

E-mail: jwillis@esclabsciences.com

Phone: 800-767-5859 Ext. 9678

Direct: (615) 773-9678

www.esclabsciences.com





Cooler Receipt Form

Client: MARCOILNAX

Cooler Received On: 9/8/12 and Opened On: 9/8/12 By: Max Bryson

(Signature)

Temperature of cooler when opened: 3.7 Degrees Celsius / Was sufficient ice used: Yes No

What kind of packing material was used? Bubblewrap Peanuts Other None

Were custody seals on outside of cooler and intact? Yes No N/A

Were custody papers properly filled out (ink, signed, etc.)? Yes No N/A

Did you sign the custody papers in the appropriate place? Yes No N/A

Did all bottles arrive in good condition? Yes No N/A

Were all bottle labels complete? (#, date, signed, pres, etc)? Yes No N/A

Did all bottle labels and tags agree with custody papers? Yes No N/A

Were correct bottles used for the analyses requested? Yes No N/A

Was sufficient amount of sample sent in each bottle? Yes No N/A

Were correct preservatives used? Yes No N/A

If applicable, was an observable VOA headspace present? Yes No N/A

Non Conformance Generated: (See attached NCF if yes)

Laboratory Data Review Checklist

Completed by:

Title: Date:

CS Report Name: Report Date:

Consultant Firm:

Laboratory Name: Laboratory Report Number:

ADEC File Number: ADEC RecKey Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?
 Yes No NA (Please explain.) Comments:

- b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?
 Yes No NA (Please explain.) Comments:

2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?
 Yes No NA (Please explain.) Comments:

- b. Correct analyses requested?
 Yes No NA (Please explain.) Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ($4^{\circ} \pm 2^{\circ} \text{C}$)?
 Yes No NA (Please explain.) Comments:

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

Yes No NA (Please explain.) Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?
 Yes No NA (Please explain.) Comments:

All samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?
 Yes No NA (Please explain.) Comments:

A soil jar was not received by the laboratory for sample 12-BCP1A-TB01-SO, only the methanol jar was received. Total solids could not be analyzed for this sample so the BTEX and GRO results were reported in wet weight.

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

No effect on the data quality or usability because these samples were for informative use and not compliance samples.

4. Case Narrative

- a. Present and understandable?
 Yes No NA (Please explain.) Comments:

- b. Discrepancies, errors or QC failures identified by the lab?
 Yes No NA (Please explain.) Comments:

QC items identified in the case narrative or definitions/glossary are discussed in the relevant sections of this checklist. No additional QC items were identified.

- c. Were all corrective actions documented?
 Yes No NA (Please explain.) Comments:

No further corrective actions were noted.

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

There was no effect on data quality or usability.

5. Samples Results

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

Yes No NA (Please explain.)

Comments:

b. All applicable holding times met?

Yes No NA (Please explain.)

Comments:

c. All soils reported on a dry weight basis?

Yes No NA (Please explain.)

Comments:

BTEX and GRO results for sample 12-BCP1A-TB01-SO were reported in wet weight because a soil jar for total solids analysis was not received by the laboratory.

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

Yes No NA (Please explain.)

Comments:

PQLs for benzene were slightly higher than the ADEC cleanup levels. MDLs for samples 12-BCP1A-F2-SO and 12-BCP1A-F12-SO were slightly higher than ADEC cleanup levels.

e. Data quality or usability affected?

Comments:

Data are usable because the results are for informative use and not compliance.

6. QC Samples

a. Method Blank

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

Yes No NA (Please explain.)

Comments:

ii. All method blank results less than PQL?

Yes No NA (Please explain.)

Comments:

iii. If above PQL, what samples are affected?

Not applicable.

Comments:

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

Yes No NA (Please explain.)

Comments:

No data flags were required.

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

Comments:

There was no effect on the data quality or usability.

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

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

Yes No NA (Please explain.)

Comments:

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

Yes No NA (Please explain.)

Comments:

No metals samples were submitted or analyzed for this sample delivery group.

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

Yes No NA (Please explain.)

Comments:

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

Yes No NA (Please explain.)

Comments:

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

Comments:

All LCS, LCSD and LCS/LCSD RPD results were acceptable.

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

Yes No NA (Please explain.)

Comments:

Not applicable.

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

Comments:

Not applicable.

c. Surrogates – Organics Only

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

Yes No NA (Please explain.) Comments:

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

Yes No NA (Please explain.) Comments:

BTEX 4-BFB surrogate recovery was outside QC limits (high) for samples 12-BCP1A-F2-SO and 12-BBCP1A-F12-SO. RRO o-Terphenyl surrogate was outside QC limits (high) for samples 12-BCP1A-F1-SO, 12-PCB1A-F12-SO and 12-PCB1A-SW4-SO.

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

Yes No NA (Please explain.) Comments:

RRO detections in samples 12-BCP1A-F1-SO, 12-PCB1A-F12-SO and 12-PCB1A-SW4-SO were flagged as estimated (J).

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

Comments:

RRO results for these samples are usable but estimated.

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

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

Yes No NA (Please explain.) Comments:

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

Yes No NA (Please explain.) Comments:

iii. All results less than PQL?

Yes No NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

Not applicable.

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

Comments:

BTEX and GRO results were not detected above the PQL in the trip blank sample.

e. Field Duplicate

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

Yes

No

NA (Please explain.)

Comments:

ii. Submitted blind to lab?

Yes

No

NA (Please explain.)

Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes

No

NA (Please explain.)

Comments:

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

Comments:

Field duplicate RPD values were acceptable.

f. Decontamination or Equipment Blank (If not used explain why).

Yes

No

NA (Please explain.)

Comments:

Collection of decon/equipment blanks were not required for this project.

i. All results less than PQL?

Yes

No

NA (Please explain.)

Comments:

No decon/equipment blanks were collected.

ii. If above PQL, what samples are affected?

Comments:

Not applicable. No decon/equipment blanks were collected.

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

Comments:

Not applicable. No decon/equipment blanks were collected.

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

a. Defined and appropriate?

Yes

No

NA (Please explain.)

Comments:

Qualification of results that do not meet project DQOs generally follows the EPA National Functional Guidelines.

GRO result for sample 12-BCPA1-SW4-SO was qualified as not detected (U) at the reported concentration due to a GRO trip blank detection greater than the MDL but less than the PQL as directed in the EPA National Function Guidelines for Organic Data Validation (June 2008).



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MEMORANDUM

Date: September 17, 2012
From: Linda Korobka, Technical Manager, Weston Solutions, Inc., Okemos, Michigan
To: Daniel Frank, Project Manager, Weston Solutions, Inc., Anchorage, Alaska
Subject: **Quality Assurance Review, Marathon Oil Company, Beaver Creek Pad 1A, Kenai, Alaska**
Ref: Weston Project Number: 12553.006.001.0006.00

Laboratory Quality Assurance/Quality Control (QA/QC) data associated with the analysis of project samples were reviewed to evaluate the integrity of the analytical data generated during the September 6, 2012 soil sampling for the Marathon Oil Company's (Marathon) Beaver Creek Pad 1A (BCP1A) in Kenai, Alaska. Environmental samples were shipped to ESC Lab Sciences (ESC) in Mt. Juliet, Tennessee, in one sample delivery group (SDG): L593966. Sample identification included the prefix 12-BCP1A- to indicate samples were collected from Marathon's BCP1A project in 2012. Samples were collected, reported, and shipped in general accordance with the Alaska Department of Environmental Conservation (ADEC) guidance.

All data were reviewed in accordance with appropriate United States Environmental Protection Agency (EPA) procedural guidance documents (USEPA 2008) and ADEC regulatory guidance documents (ADEC 2009; 2010). This data review focuses on criteria for the following QA/QC parameters and their effect on the quality of data and usability: sample handling and chain-of-custody (CoC) documentation; holding time compliance; field QA/QC (trip blanks, field duplicate) results; laboratory QA/QC (method blanks, laboratory control samples, surrogates, matrix spike duplicate [MS/MSD]) results and analytical methods; method reporting limits; precision and accuracy; and completeness. In absence of other regulatory QC guidance, method- and/or standard operating procedure-specific QC limits were utilized to apply qualifiers to the data.

Samples were analyzed using the following methods for the associated analytes:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Solid Waste (SW)-846 Method 8260B
- Gasoline-range organics (GRO) by Alaska Method (AK) 101
- Diesel-range organics (DRO) by AK102
- Residual-range organics (RRO) by AK103
- Glycols by EPA SW-846 Method 8015M

All sample results are considered usable and meet project objectives; however, the results are considered estimated. The completeness for this project is 100 percent (%). The details of this review and qualification of the data are summarized in the following sections.

SAMPLE HANDLING AND CHAIN OF CUSTODY

The sample cooler was delivered with custody seals intact. CoC forms, laboratory sample receipt forms, and case narratives were reviewed to determine if any sample handling activities might affect the integrity of the samples and the quality of the associated data.

For SDG L593966, according to the laboratory, samples received for 12-BCP1A-TB01-SO did not include a soil jar to be used for the total solids analysis. As a result, the results for sample 12-BCP1A-TB01-SO could not be converted to dry weight and were reported in wet weight. The sample did not contain any BTEX compounds so the wet weight reporting did not affect the usability of the BTEX trip blank sample. GRO was detected in the trip blank sample above the method detection limit (MDL) but less than the practical quantitation limit (PQL). The GRO detection in the trip blank sample was biased low due to wet weight reporting but was used to evaluate the associated GRO investigative results in the Field QA/QC section.

All other sample containers in the sample cooler were received at the laboratory intact and with proper documentation. The cooler was received by the laboratory within the 4 degrees Celsius ($^{\circ}\text{C}$) \pm 2 $^{\circ}\text{C}$ acceptance range.

FIELD Quality Assurance/Quality Control

Field QA/QC protocols are designed to monitor for possible contamination during collection and transport of samples collected in the field. Collection and analysis of field duplicates also facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures and laboratory analyses. For this project, trip blanks and field duplicates were submitted for analysis.

Trip Blanks

This SDG (L593966) contained one trip blank sample. BTEX compounds were not detected in the trip blank sample. GRO was detected above the MDL and less than the PQL. The GRO result for sample 12-BCP1A-SW4-SO was affected and qualified as not detected (U) at the reported concentration.

Field Duplicates

There were six primary soil samples and one soil field duplicate samples submitted to the laboratory. Sample 12-BCP1A-F12-SO was the field duplicate of sample 12-BCP1A-F2-SO.

The frequency of field duplicate collection met the 10% frequency requirements specified in the work plan. When analytes were present in concentrations below the MRL in one or both samples, no valid comparison could be made. The primary sample and duplicate relative percent difference (RPDs) met applicable ADEC recommended limits of <50% in soil.

LABORATORY Quality Assurance/Quality Control

Method Blanks

Method blanks were analyzed concurrent with a batch of 20 or fewer primary samples for each of the analytical procedures performed for this project. Method blanks were analyzed at the required frequency and target analytes were not detected in the blanks at concentrations above the analytical reporting limit (RL) or PQL.

Laboratory Control Samples

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical method, analyte and matrix. The BTEX, GRO, DRO, RRO, and Glycol LCS sample recovery (%R) and LCSD sample

recovery met laboratory and project QC goals. The BTEX, GRO, DRO, RRO, and Glycol LCS/LCSD relative percent difference values were within the laboratory and project limits.

Matrix Spikes

Extra volumes of primary field samples were collected and submitted to the laboratory for the MS/MSD analyses. Matrix spikes have a known quantity of target analytes added (spiked) to field samples. Spike recoveries are calculated and are used to evaluate both site conditions and laboratory quality control.

The BTEX, GRO, DRO, RRO, and Ethylene Glycol MS, MSD and MS/MSD RPD results were within the laboratory and project QC limits.

The Propylene Glycol MS and MS/MSD RPD results were within the laboratory and project QC limits. The Propylene Glycol MSD was recovered above the laboratory and project QC limits. No action was taken because the Propylene Glycol LCS, LCSD and LCS/LCSD RPD results were within QC limits.

Internal Standard Recovery

Internal standards are chemical substances that are added in a constant amount to samples, the blank and calibration standards and are used for instrumentation calibration. All internal standard recoveries met laboratory and project QC goals for target analytes.

Surrogates

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes. These compounds are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance.

Surrogate recoveries were within prescribed control limits for all primary samples, LCS/LCSD and MS/MSD except for the following surrogates from the listed analyses.

Analysis	Surrogate	Sample
BTEX	4-Bromofluorobenzene	12-BCP1A-F2-SO
BTEX	4-Bromofluorobenzene	12-BCP1A-F12-SO
RRO	o-Terphenyl	12-BCP1A-F1-SO
RRO	o-Terphenyl	12-BCB1A-F12-SO
RRO	o-Terphenyl	12-BCB1A-SW4-SO

BTEX results in samples 12-BCP1A-F2-SO and 12-BCP1A-F12-SO were not affected by the high recovery of surrogate spike 4-Bromofluorobenzene because no BTEX compounds were detected in these samples. RRO results for sample 12-BCP1A-F1-SO, 12-BCP1A-F12-SO and 12-BCP1A-SW4-SO were qualified as estimated (J) due to high o-Terphenyl surrogate spike recoveries.

Method Detection Limits

The laboratory established MDL or PQL were below the ADEC cleanup levels except for benzene. All samples were not detected for benzene at a concentration above the ADEC cleanup level (the PQL). All samples except 12-BCP1A-F2-SO and 12-BCP1A-F12-SO had MDL values for benzene that were below the ADEC cleanup levels.

PRECISION AND ACCURACY

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with “true values” established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs, MS/MSDs and field duplicate pairs for this project. Field duplicates and MS/MSD samples were collected in accordance with Work Plan specifications. Field duplicate RPDs met applicable control limits, with any exceptions noted in previous sections. Recoveries and RPDs for all LCS/LSCD and MS/MSD samples were within required limits, with any exceptions noted in previous sections. Data quality objectives (DQO) of at least an overall 90% accuracy in QC samples were met.

COMPLETENESS

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 100%:

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

All requested analyses were performed in accordance with work plan specifications. Completeness for this project is 100 %.

REPRESENTATIVENESS

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the Work Plan (Weston Solutions, Inc 2012) and verified in the field to account accurately for site variations and sample matrices. The DQO for representativeness were met.

COMPARABILITY

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

DATA SUMMARY

Based upon the information provided, all data are acceptable for use. All requested analyses were performed in accordance with work plan specifications. Completeness for this project is 100%. The EPA National Functional Guidelines (EPA 2008) were used to evaluate the acceptability of the data. Overall, data quality meets DQOs established in the work plan for this project.

REFERENCES:

- ADEC. 2009. Technical Memorandum: Environmental Laboratory Data and Quality Assurance Requirements. March.
- ADEC. 2010. Laboratory Data Review Checklist. Version 2.7. January.
- EPA. 2008. Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA 540/R-94/012).
- Weston Solutions, Inc. 2012. Beaver Creek Pad 1A Initial Characterization Work Plan. September 6.

ATTACHMENT 5

Copy of Site Visit Field Notes

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Rite in the Rain.

ALL-WEATHER

FIELD

Nº 353N

Beaver Creek
Pad 1A

Thursday
9/6/12

Beaver Creek pad 1A 540';
Spill investigation 15 mph wind
A. Olson sunny

1200 Arrived in Kenai, obtained rental car & gear. Headed out to MOC to meet w/ Mark Torner.

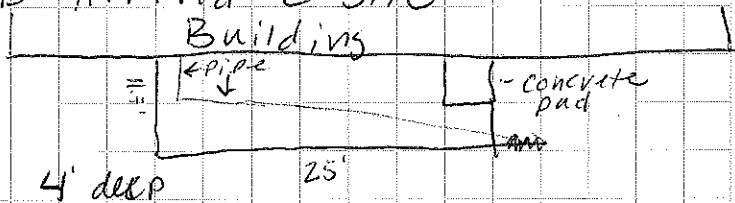
1310 m Torner not available, took a trip out to 141-6 H2O building to gather supplies.

1340 Arrived back @ KGF 34-31 to meet w/ Mark

1400 Headed out to BC

1440 Arrived @ BCPU to obtain work authorization

1515 Arrived @ Site



$$12 \times 25 \times 4 = 1,200 \text{ ft}^3$$

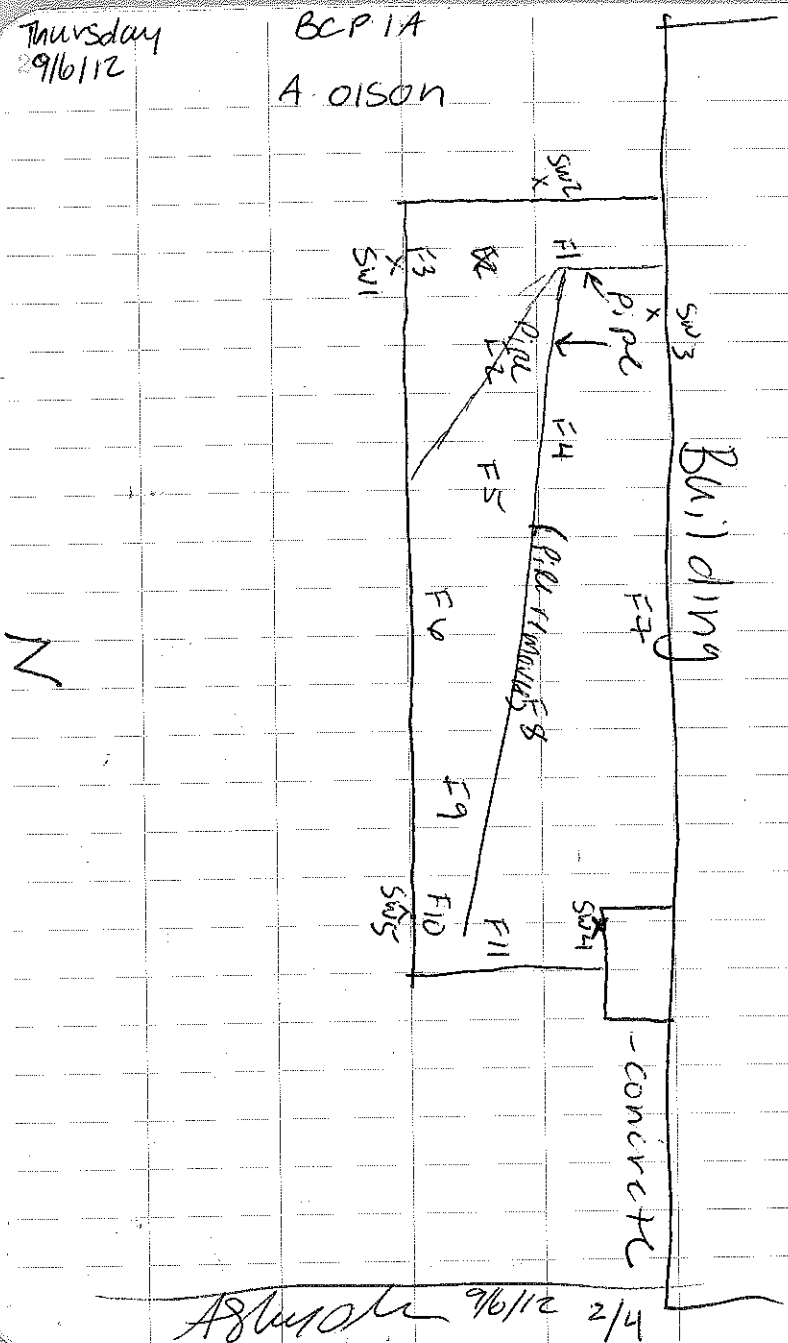
$$12 \times 25 = 300 \text{ ft}^2$$

See next page for bigger drawing

A. Olson 1/4
Rite in the Rain
9/6/12

Thursday
29/6/12

BCP 1A
A. OISON



Abuse 9/6/12 2/4

Thursday
9/6/12

BCPIA

A. OLSON

Excavation Field Screening

ID	Pid	Analytical?	DUP?	MS/MSD?
F1	734 ppm	12-BCPIA-F1-50	@ 1715	
F2	841 ppm	12-BCPIA-F2-50	(1720)	(1725)
F3	104 ppm			
F4	412 ppm			
F5	586 ppm	12-BCPIA-F5-50	@ 1730	
*F6	741 ppm			
F7	35.2 ppm			
F8	192 ppm			
F9	339 ppm			
F10	124 ppm			
F11	13.6 ppm			
SW1	55.4 ppm			
SW2	11.1 ppm			
SW3	96.4	12-BCPIA-SW3-50		MS/MSD AO
SW4	297 ppm	12-BCPIA-SW4-50	@ 1735	MS/MSD
SW5	7.1 ppm			
*F6	Saturated			

STOCK PILE = $19 \times 3 \times 15' = 855 \text{ ft}^3 = 32 \text{ yd}^3$

5 screening samples

2 samples to lab

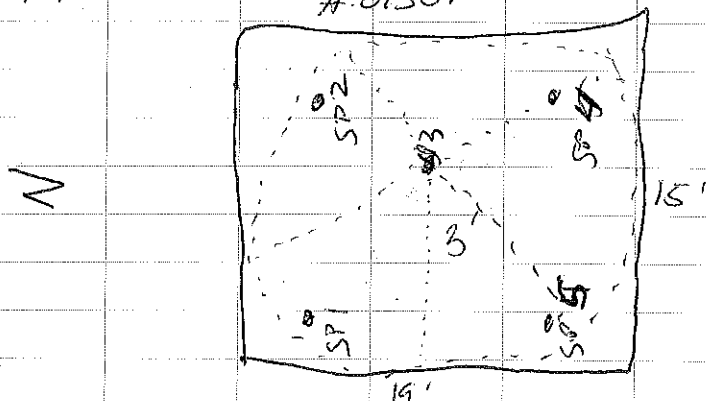
A. Olson

9/6/12

3/4

Thursday
9/6/12

BCPIA
A. OLSON



ID	Stockpile P10 ppm	Field Screening Analytical
SP1	521	12-BCPIA-SP1-SO @ 1830
SP2	404	
SP3	291	
SP4	381	12- BCPIA ^{BCP} 14-SP4-SO @ 1835
SP5	351	

All collected from ~ 18"

All soils were fine to medium grained sand, brown/gray, w/ silt and fine to medium gravel.

40% sand, 50% silt, 10% gravel damp, most had odor.

1900 Turned in WA. + departed site

#0500 12-BCPIA-TB-01

Asman

9/6/12

9/14

ATTACHMENT 6

Conceptual Site Model Scoping Form and Graphic

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Human Health Conceptual Site Model Scoping Form

Site Name:

File Number:

Completed by:

Introduction

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

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

1. General Information:

Sources *(check potential sources at the site)*

- | | |
|--|--|
| <input type="checkbox"/> USTs | <input type="checkbox"/> Vehicles |
| <input type="checkbox"/> ASTs | <input type="checkbox"/> Landfills |
| <input type="checkbox"/> Dispensers/fuel loading racks | <input type="checkbox"/> Transformers |
| <input type="checkbox"/> Drums | <input checked="" type="checkbox"/> Other: <input type="text" value="Leaky pipe or leaky connection"/> |

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

- | | |
|---|--|
| <input type="checkbox"/> Spills | <input type="checkbox"/> Direct discharge |
| <input checked="" type="checkbox"/> Leaks | <input type="checkbox"/> Burning |
| | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|---|--|
| <input type="checkbox"/> Surface soil (0-2 feet bgs*) | <input checked="" type="checkbox"/> Groundwater |
| <input checked="" type="checkbox"/> Subsurface soil (>2 feet bgs) | <input type="checkbox"/> Surface water |
| <input checked="" type="checkbox"/> Air | <input type="checkbox"/> Biota |
| <input type="checkbox"/> Sediment | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|--|--|
| <input type="checkbox"/> Residents (adult or child) | <input type="checkbox"/> Site visitor |
| <input checked="" type="checkbox"/> Commercial or industrial worker | <input type="checkbox"/> Trespasser |
| <input checked="" type="checkbox"/> Construction worker | <input type="checkbox"/> Recreational user |
| <input type="checkbox"/> Subsistence harvester (i.e. gathers wild foods) | <input type="checkbox"/> Farmer |
| <input type="checkbox"/> Subsistence consumer (i.e. eats wild foods) | <input type="checkbox"/> Other: <input type="text"/> |

* bgs - below ground surface

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

a) Direct Contact -

1. Incidental Soil Ingestion

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

If the box is checked, label this pathway complete:

Complete

Comments:

Soil has been excavated to approximately 4 feet. Soil samples have been collected from the floor and sidewalls of the excavation. Soils with elevated concentrations of diesel-range organics remain in place.

2. Dermal Absorption of Contaminants from Soil

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

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

If both boxes are checked, label this pathway complete:

Complete

Comments:

Soils have not been evaluated for PAHs. Soils have been evaluated for glycols with the detected concentrations below ADEC Method Two Cleanup Levels. Therefore, this pathway is considered potentially complete.

b) Ingestion -

1. Ingestion of Groundwater

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

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

If both boxes are checked, label this pathway complete:

Complete

Comments:

Groundwater has not been evaluated.

2. Ingestion of Surface Water

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

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

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

There are no surface water location on or adjacent to the site.

3. Ingestion of Wild and Farmed Foods

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

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

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

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

Complete

Comments:

The site is located on private property with in the Kenai National Wildlife Refuge. The soils or groundwater have not been evaluated for PAHs.

c) Inhalation-

1. Inhalation of Outdoor Air

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

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

If both boxes are checked, label this pathway complete:

Complete

Comments:

PAHs have not been evaluated for this site. BTEX had been evaluated with all results being non-detect. Therefore, this pathway is potentially complete.

2. Inhalation of Indoor Air

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



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



If both boxes are checked, label this pathway complete:

Complete

Comments:

This site had not been evaluated for PAHs. There is a building within 30 horizontal feet and 100 vertical feet, however this building is not regularly occupied. Therefore, this pathway is potentially complete.

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

Dermal Exposure to Contaminants in Groundwater and Surface Water

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

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

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

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

Comments:

There are no surface water bodies on or adjacent to the site. Groundwater at the site is not used for household purposes. Groundwater at the site is believed to be deeper than 20 feet bgs. It is unlikely any construction project would continue to this depth. Therefore, this pathway is incomplete.

Inhalation of Volatile Compounds in Tap Water

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

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

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

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

Comments:

The groundwater at the site is not used for indoor purposes.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM₁₀). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

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

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

Comments:

Heavy metals are not a contaminant of concern at this site. This pathway is incomplete.

Direct Contact with Sediment

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

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

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

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

Comments:

There are no surface water bodies on or adjacent to the site. This pathway is incomplete.

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

[Empty rectangular box for providing other comments]

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Beaver Creek Pad 1A

Completed By: Weston Solutions, Inc.

Date Completed: September 13, 2012

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

(1) Media	(2) Transport Mechanisms
<input type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input type="checkbox"/> Migration to subsurface <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Runoff or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Ground-water	<input checked="" type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Surface Water	<input type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Sedimentation <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Sediment	<input type="checkbox"/> Direct release to sediment <i>check sediment</i> <input type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

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

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

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

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or Industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil <input type="checkbox"/> Inhalation of Fugitive Dust	F	C/F	I	C/F	F	F	
<input checked="" type="checkbox"/> groundwater	<input checked="" type="checkbox"/> Ingestion of Groundwater <input checked="" type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	F	C/F	I	C/F	F	F	
<input type="checkbox"/> air	<input checked="" type="checkbox"/> Inhalation of Outdoor Air <input checked="" type="checkbox"/> Inhalation of Indoor Air <input type="checkbox"/> Inhalation of Fugitive Dust	F	C/F	I	C/F	F	F	
<input type="checkbox"/> surface water	<input type="checkbox"/> Ingestion of Surface Water <input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water							
<input type="checkbox"/> sediment	<input type="checkbox"/> Direct Contact with Sediment							
<input checked="" type="checkbox"/> biota	<input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods	F				F	F	