



LABORATORY TEST RESULTS

FILE NUMBER: 52137-2013-2615

COMPANY: Transportation Safety Board of Canada

SAMPLE NAME: NATX 310533 A
 DATE SAMPLED: 26-Jul-13
 SAMPLE DESCRIPTION: Oil

LABORATORY I.D.: 52137-2013-2615-1-342
 DATE RECEIVED: 30-Jul-13

TEST DESCRIPTION	RESULTS	UNIT OF MEASURE	TEST METHOD	DATE ANALYZED	TECH
Pensky-Martens Flash Point	< -5	°C	ASTM D-93	30-Jul-13	JC
Atmospheric Distillation		°C (AET Corrected)	ASTM D-86	30-Jul-13	SP
Initial Boiling Point	48.0				
5 % Off	82.0				
10 % Off	101.5				
15 % Off	118.0				
20 % Off	134.0				
25 % Off	150.0				
30 % Off	168.0				
35 % Off	186.5				
40 % Off	204.5				
45 % Off	231.5				
50 % Off	253.0				
55 % Off	274.0				
60 % Off	297.0				
65 % Off	327.5				
70 % Off	351.5				
75 % Off	367.5				
80 % Off	369.5				
85 % Off	372.5				
90 % Off	375.5				
Crack Point	376.5				
Final Boiling Point	376.5				
Percent Recovery	94				
Percent Residue	6				
Percent Loss	0				

CORE LABORATORIES
 2810 - 12th Street N.E.
 CALGARY, ALBERTA T2E 7P7



LABORATORY TEST RESULTS

FILE NUMBER: 52137-2013-2615

COMPANY: Transportation Safety Board of Canada

SAMPLE NAME: NATX 310595 A
 DATE SAMPLED: 26-Jul-13
 SAMPLE DESCRIPTION: Oil

LABORATORY I.D.: 52137-2013-2615-2-343
 DATE RECEIVED: 30-Jul-13

TEST DESCRIPTION	RESULTS	UNIT OF MEASURE	TEST METHOD	DATE ANALYZED	TECH
Pensky-Martens Flash Point	< -5	°C	ASTM D-93	30-Jul-13	JC
Atmospheric Distillation		°C (AET Corrected)	ASTM D-86	30-Jul-13	SP
Initial Boiling Point	50.0				
5 % Off	85.5				
10 % Off	105.5				
15 % Off	122.5				
20 % Off	138.0				
25 % Off	154.0				
30 % Off	175.0				
35 % Off	196.5				
40 % Off	217.0				
45 % Off	240.5				
50 % Off	261.5				
55 % Off	286.0				
60 % Off	314.5				
65 % Off	343.5				
70 % Off	361.5				
75 % Off	366.5				
80 % Off	369.5				
85 % Off	373.5				
90 % Off	375.5				
Crack Point	375.5				
Final Boiling Point	375.5				
Percent Recovery	93				
Percent Residue	7				
Percent Loss	0				

CORE LABORATORIES
 2810 - 12th Street N.E.
 CALGARY, ALBERTA T2E 7P7

Report of Analysis

This report may only be reproduced in its entirety

Reported: 25-Sep-2013
Revision: 2013-1

Report To:

Transportation Safety Board of Canada
1901 Research Road
Ottawa, Ontario, K1A 1K8

Attention: Dr. Sylvie Dionne

E-mail: sylvie.dionne@tsb-bst.gc.ca

Fax: 613- 998-5572

Invoice To:

Transportation Safety Board of Canada
1901 Research Road
Ottawa, Ontario K1A 1K8

Attention: Dr. Sylvie Dionne

E-mail:

Fax:

Order Id: FL13_1205

Contract #:

Contract Name:

PO#:

Page 1 of 2

Lab Sample Number	Client's Reference Matrix; Date Received	Test	Method	Analysis Parameter	Result	Notes
FL13_1205-001	TSB CAR 1 Crude Oil; 02-Aug-2013	ASTM D3828	Method B	Corrected Flash Point	<-30.0 °C	1
		ASTM D7169		Simulated Distillation	See Attached	
FL13_1205-002	TSB CAR 2 Crude Oil; 02-Aug-2013	ASTM D3828	Method B	Corrected Flash Point	<-30.0 °C	1
		ASTM D7169		Simulated Distillation	See Attached	
FL13_1205-003	TSB CAR 3 Crude Oil; 02-Aug-2013	ASTM D3828	Method B	Corrected Flash Point	<-30.0 °C	1
		ASTM D7169		Simulated Distillation	See Attached	
FL13_1205-004	TSB CAR 4 Crude Oil; 02-Aug-2013	ASTM D3828	Method B	Corrected Flash Point	<-30.0 °C	1
		ASTM D7169		Simulated Distillation	See Attached	

Results relate only to items tested.

Report of Analysis

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Reported: 25-Sep-2013
Revision: 2013-1

Report To:

Transportation Safety Board of Canada
1901 Research Road
Ottawa, Ontario, K1A 1K8

Attention: Dr. Sylvie Dionne
E-mail: sylvie.dionne@tsb-bst.gc.ca
Fax: 613- 998-5572

Invoice To:

Transportation Safety Board of Canada
1901 Research Road
Ottawa, Ontario K1A 1K8

Attention: Dr. Sylvie Dionne
E-mail:
Fax:

Order Id: FL13_1205


Contract #:
Contract Name:
PO#:

Lab Sample Number	Client's Reference Matrix; Date Received	Test	Method	Analysis Parameter	Result	Notes
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Remarks and Notes

- The containers for samples TSB CAR 1 and TSB CAR 3 were leaking upon arrival.

Results relate only to items tested.

Approved by: 
 Susan Brown
 Specification Analytical Coordinator

Contact Information
 Portfolio Manager: Dan Wispinski
 Phone: (780) 450-5108
 Email: dan.wispinski@albertainnovates.ca

File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-001.D\FL13-1205-001_FID1_A.CDF
 Sample: FL13-1205-001
 Parameter: HTSD7169

Sep-13, 07:02:34
 Operator:

Boiling Point Table (%Off)

ASTM D7169

Carbon (0) Channel

<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>
IBP	< 36.1	39.00	234.8	77.00	444.2
2.00	39.4	40.00	239.9	78.00	451.5
3.00	66.5	41.00	245.0	79.00	459.2
4.00	75.8	42.00	249.7	80.00	467.2
5.00	83.8	43.00	254.3	81.00	475.2
6.00	89.6	44.00	259.6	82.00	483.7
7.00	95.3	45.00	264.3	83.00	492.8
8.00	98.4	46.00	269.3	84.00	502.0
9.00	100.4	47.00	273.9	85.00	511.6
10.00	101.6	48.00	279.8	86.00	522.1
11.00	105.9	49.00	285.8	87.00	534.5
12.00	110.6	50.00	290.1	88.00	547.3
13.00	113.0	51.00	295.0	89.00	562.2
14.00	115.8	52.00	300.1	90.00	578.0
15.00	125.0	53.00	303.8	91.00	596.8
16.00	128.2	54.00	309.0	92.00	619.1
17.00	132.8	55.00	314.4	93.00	648.5
18.00	137.6	56.00	318.4	94.00	697.3
19.00	141.4	57.00	324.0		
20.00	145.4	58.00	329.6		
21.00	149.7	59.00	334.7		
22.00	155.0	60.00	340.7		
23.00	158.5	61.00	345.9		
24.00	163.4	62.00	351.7		
25.00	166.4	63.00	357.1		
26.00	172.1	64.00	363.1		
27.00	176.7	65.00	368.8		
28.00	181.3	66.00	374.8		
29.00	187.2	67.00	380.8		
30.00	193.2	68.00	387.0		
31.00	196.9	69.00	393.1		
32.00	201.6	70.00	399.6		
33.00	207.3	71.00	405.6		
34.00	212.1	72.00	412.0		
35.00	215.8	73.00	418.0		
36.00	220.0	74.00	424.1		
37.00	225.3	75.00	430.6		
38.00	230.0	76.00	437.2		

Recovery: 94.15 @707.8C
Analysis Area: 1.08194e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2053
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.5472

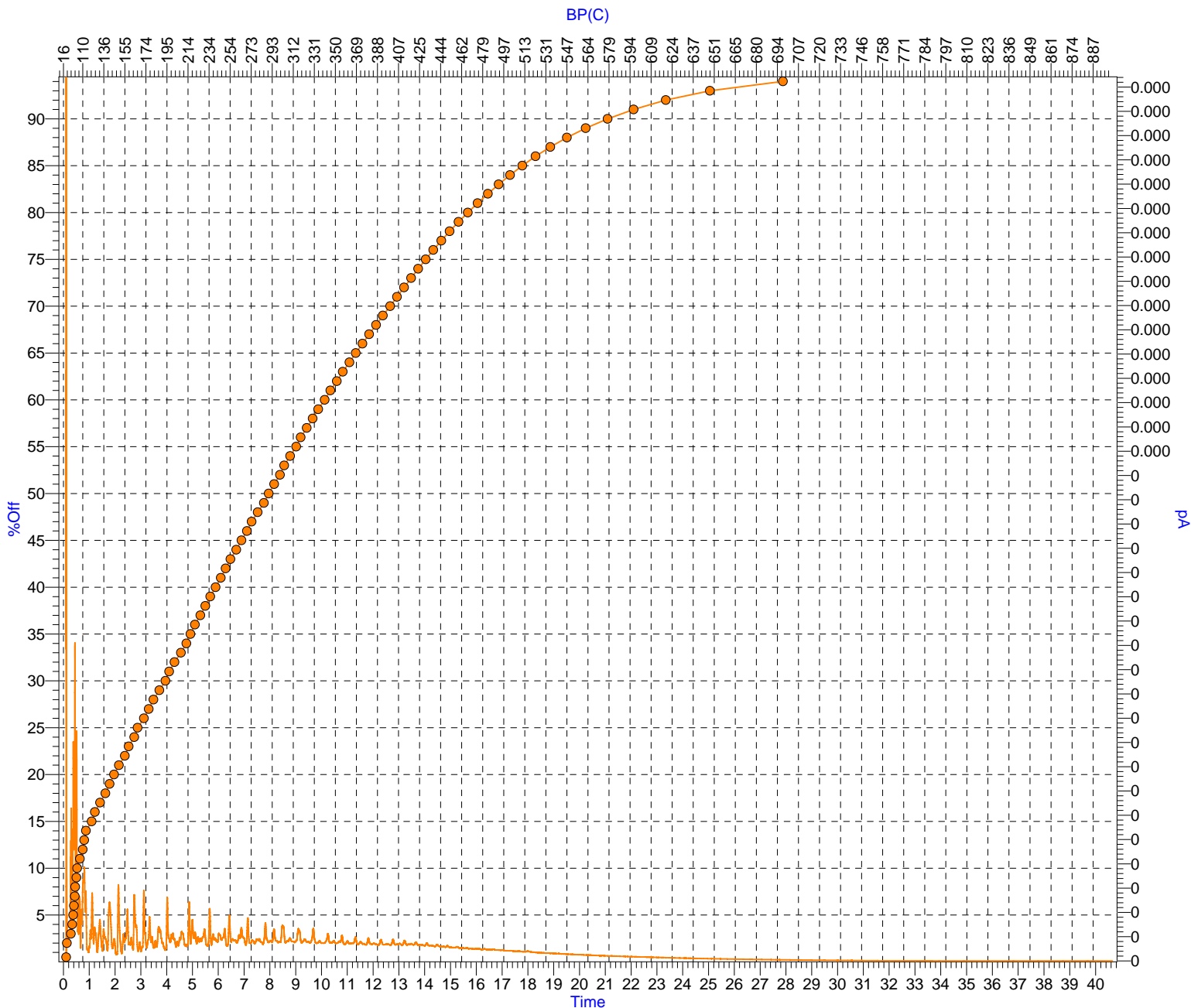
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 Sample: FL13-1205-001
 Parameter: HTSD7169

Distillation Chart

ASTM D7169

Carbon (0) Channel



Recovery: 94.15 @707.8C
Analysis Area: 1.08194e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2053
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.5472

Response Factor: 1.40081e-01
R.Time File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RT-INITR.D\RT-INITR_FID1_A.CDF
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File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-002.D\FL13-1205-002_FID1_A.CDF
Sample: FL13-1205-002
Parameter: HTSD7169

Sep-13, 10:02:04
Operator:

Boiling Point Table (%Off)

ASTM D7169
Carbon (0) Channel

<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>
IBP	< 36.1	39.00	229.4	77.00	455.2
2.00	37.9	40.00	234.4	78.00	463.9
3.00	62.7	41.00	239.4	79.00	472.7
4.00	73.1	42.00	244.2	80.00	481.8
5.00	81.4	43.00	249.0	81.00	491.8
6.00	86.5	44.00	253.9	82.00	501.8
7.00	93.5	45.00	259.3	83.00	512.2
8.00	97.0	46.00	264.0	84.00	524.1
9.00	99.8	47.00	269.0	85.00	537.3
10.00	100.7	48.00	273.9	86.00	551.5
11.00	104.3	49.00	279.8	87.00	567.5
12.00	108.8	50.00	285.9	88.00	585.2
13.00	111.6	51.00	290.6	89.00	606.1
14.00	113.9	52.00	295.6	90.00	632.8
15.00	122.1	53.00	301.2	91.00	673.2
16.00	125.9	54.00	305.7		
17.00	130.6	55.00	311.1		
18.00	135.3	56.00	316.2		
19.00	140.0	57.00	321.8		
20.00	141.9	58.00	327.7		
21.00	148.5	59.00	332.8		
22.00	150.3	60.00	339.0		
23.00	156.3	61.00	344.8		
24.00	160.1	62.00	350.7		
25.00	163.6	63.00	356.6		
26.00	167.3	64.00	363.0		
27.00	172.1	65.00	369.1		
28.00	176.7	66.00	375.7		
29.00	181.4	67.00	382.1		
30.00	187.0	68.00	389.0		
31.00	192.1	69.00	395.7		
32.00	196.2	70.00	402.5		
33.00	200.8	71.00	409.6		
34.00	206.4	72.00	416.6		
35.00	210.8	73.00	423.6		
36.00	215.1	74.00	431.0		
37.00	219.3	75.00	438.7		
38.00	224.5	76.00	446.8		

Recovery: 91.52 @707.8C
Analysis Area: 1.02733e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.099 min.
Start Signal: 0.000 pA
Sample Amt: 0.2033
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.7227

Response Factor: 1.40081e-01
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R.Factor File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RF-INIT.D\RF-INIT_FID1_A.CDF
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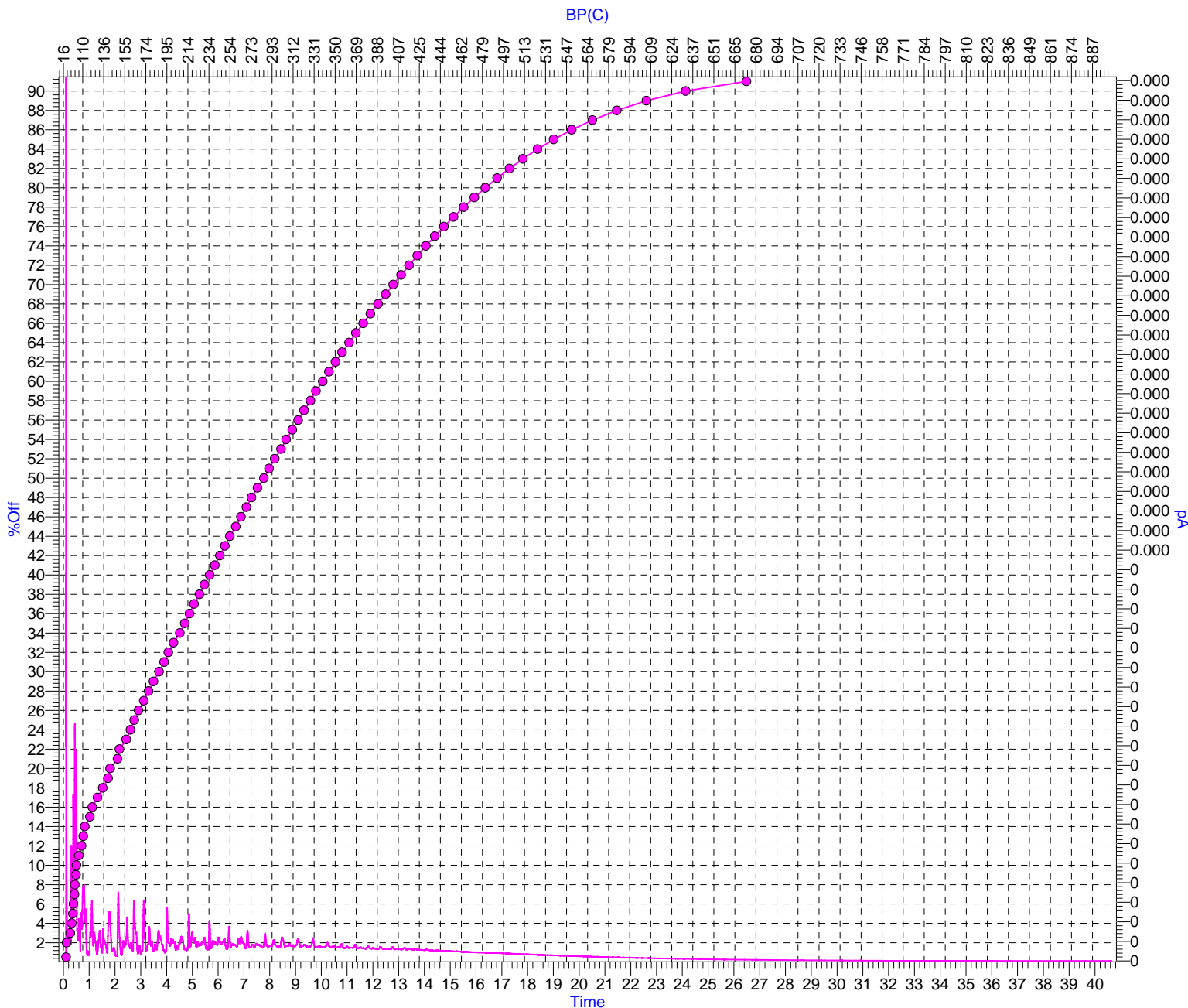
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 Sample: FL13-1205-002
 Parameter: HTSD7169

Sep-13, 10:02:04
 Operator:

Distillation Chart

ASTM D7169

Carbon (0) Channel



Recovery: 91.52 @707.8C
Analysis Area: 1.02733e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.099 min.
Start Signal: 0.000 pA
Sample Amt: 0.2033
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.7227

Response Factor: 1.40081e-01
R.Time File: O:\SimDDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RT-INITR.D\RT-INITR_FID1_A.CDF
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Blank File: O:\SimDDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\BLANK4B.D\BLANK4B_FID1_A.CDF

File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-003.D\FL13-1205-003_FID1_A.CDF Sep-13, 13:01:55
 Sample: FL13-1205-003 Operator:
 Parameter: HTSD7169

Boiling Point Table (%Off)

ASTM D7169

Carbon (0) Channel

<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>
IBP	< 36.1	40.00	234.5	78.00	457.3
3.00	45.3	41.00	239.7	79.00	466.0
4.00	67.7	42.00	244.3	80.00	474.5
5.00	77.2	43.00	249.1	81.00	483.6
6.00	83.8	44.00	254.0	82.00	493.6
7.00	90.5	45.00	259.4	83.00	503.5
8.00	95.3	46.00	264.0	84.00	514.2
9.00	98.9	47.00	268.9	85.00	526.2
10.00	100.4	48.00	273.9	86.00	539.5
11.00	102.5	49.00	279.6	87.00	554.4
12.00	107.5	50.00	285.6	88.00	570.7
13.00	110.9	51.00	290.3	89.00	589.8
14.00	113.2	52.00	295.3	90.00	612.7
15.00	118.1	53.00	300.8	91.00	643.0
16.00	125.5	54.00	305.4	92.00	692.8
17.00	129.3	55.00	310.6		
18.00	134.4	56.00	315.8		
19.00	139.7	57.00	321.1		
20.00	141.8	58.00	326.8		
21.00	148.4	59.00	331.8		
22.00	150.4	60.00	337.8		
23.00	156.4	61.00	343.6		
24.00	160.4	62.00	349.2		
25.00	163.7	63.00	355.2		
26.00	168.0	64.00	361.1		
27.00	172.3	65.00	367.2		
28.00	177.1	66.00	373.3		
29.00	182.5	67.00	379.7		
30.00	187.4	68.00	386.0		
31.00	193.2	69.00	392.6		
32.00	196.6	70.00	399.3		
33.00	201.1	71.00	405.9		
34.00	206.6	72.00	412.7		
35.00	211.3	73.00	419.4		
36.00	215.3	74.00	426.4		
37.00	219.7	75.00	433.6		
38.00	224.7	76.00	441.2		
39.00	229.6	77.00	449.1		

Recovery: 92.36 @720.0C
Analysis Area: 1.16473e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2302
R.Factor Date: 9/23/2013

End Time: 29.304 min.
End Signal: 0.000 pA
Solvent Amt: 12.8022

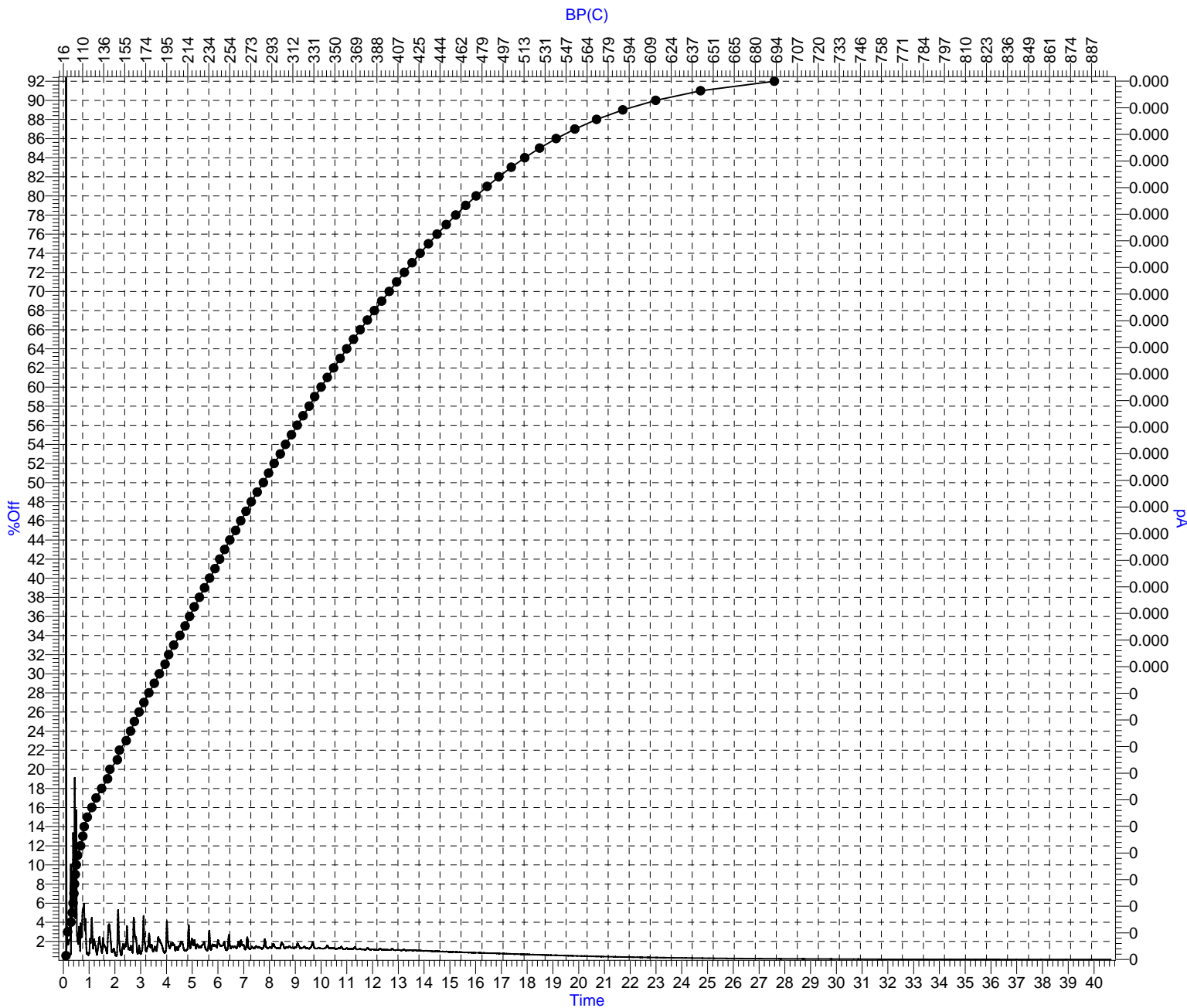
Response Factor: 1.40081e-01
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Blank File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\BLANK5B.D\BLANK5B_FID1_A.CDF

File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-003.D\FL13-1205-003_FID1_A.CDF
 Sample: FL13-1205-003
 Parameter: HTSD7169

Distillation Chart

ASTM D7169

Carbon (0) Channel



Recovery: 92.36 @720.0C
Analysis Area: 1.16473e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2302
R.Factor Date: 9/23/2013

End Time: 29.304 min.
End Signal: 0.000 pA
Solvent Amt: 12.8022

Response Factor: 1.40081e-01
R.Time File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RT-INITR.D\RT-INITR_FID1_A.CDF
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Blank File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\BLANK5B.D\BLANK5B_FID1_A.CDF

File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-004.D\FL13-1205-004_FID1_A.CDF
 Sample: FL13-1205-004
 Parameter: HTSD7169

Sep-13, 16:01:13
 Operator:

Boiling Point Table (%Off)

ASTM D7169

Carbon (0) Channel

<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>	<u>%Off</u>	<u>BP(C)</u>
IBP	< 36.1	40.00	231.7	78.00	454.7
3.00	44.9	41.00	236.4	79.00	463.3
4.00	67.0	42.00	241.4	80.00	472.1
5.00	75.0	43.00	246.1	81.00	481.2
6.00	83.0	44.00	251.4	82.00	491.2
7.00	88.1	45.00	255.9	83.00	501.4
8.00	94.3	46.00	261.2	84.00	512.0
9.00	97.6	47.00	265.4	85.00	524.1
10.00	100.0	48.00	270.1	86.00	537.7
11.00	100.9	49.00	275.9	87.00	552.7
12.00	105.4	50.00	281.6	88.00	569.6
13.00	110.0	51.00	287.1	89.00	589.2
14.00	112.3	52.00	292.3	90.00	613.0
15.00	115.0	53.00	297.2	91.00	645.4
16.00	124.2	54.00	302.3	92.00	701.4
17.00	127.5	55.00	307.4		
18.00	132.4	56.00	312.7		
19.00	136.9	57.00	317.5		
20.00	140.8	58.00	323.2		
21.00	144.0	59.00	329.0		
22.00	149.1	60.00	334.3		
23.00	153.7	61.00	340.4		
24.00	157.4	62.00	346.0		
25.00	162.8	63.00	351.9		
26.00	164.8	64.00	357.7		
27.00	171.2	65.00	363.9		
28.00	173.6	66.00	370.0		
29.00	178.5	67.00	376.4		
30.00	185.0	68.00	382.9		
31.00	188.8	69.00	389.6		
32.00	194.7	70.00	396.2		
33.00	198.5	71.00	402.9		
34.00	203.2	72.00	409.8		
35.00	208.0	73.00	416.7		
36.00	213.6	74.00	423.6		
37.00	216.9	75.00	430.8		
38.00	221.2	76.00	438.4		
39.00	226.6	77.00	446.4		

Recovery: 92.09 @707.8C
Analysis Area: 1.06899e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2096
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.6780

Response Factor: 1.40081e-01
R.Time File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RT-INITR.D\RT-INITR_FID1_A.CDF
R.Factor File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RF-INIT.D\RF-INIT_FID1_A.CDF
Blank File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\BLANK6B.D\BLANK6B_FID1_A.CDF

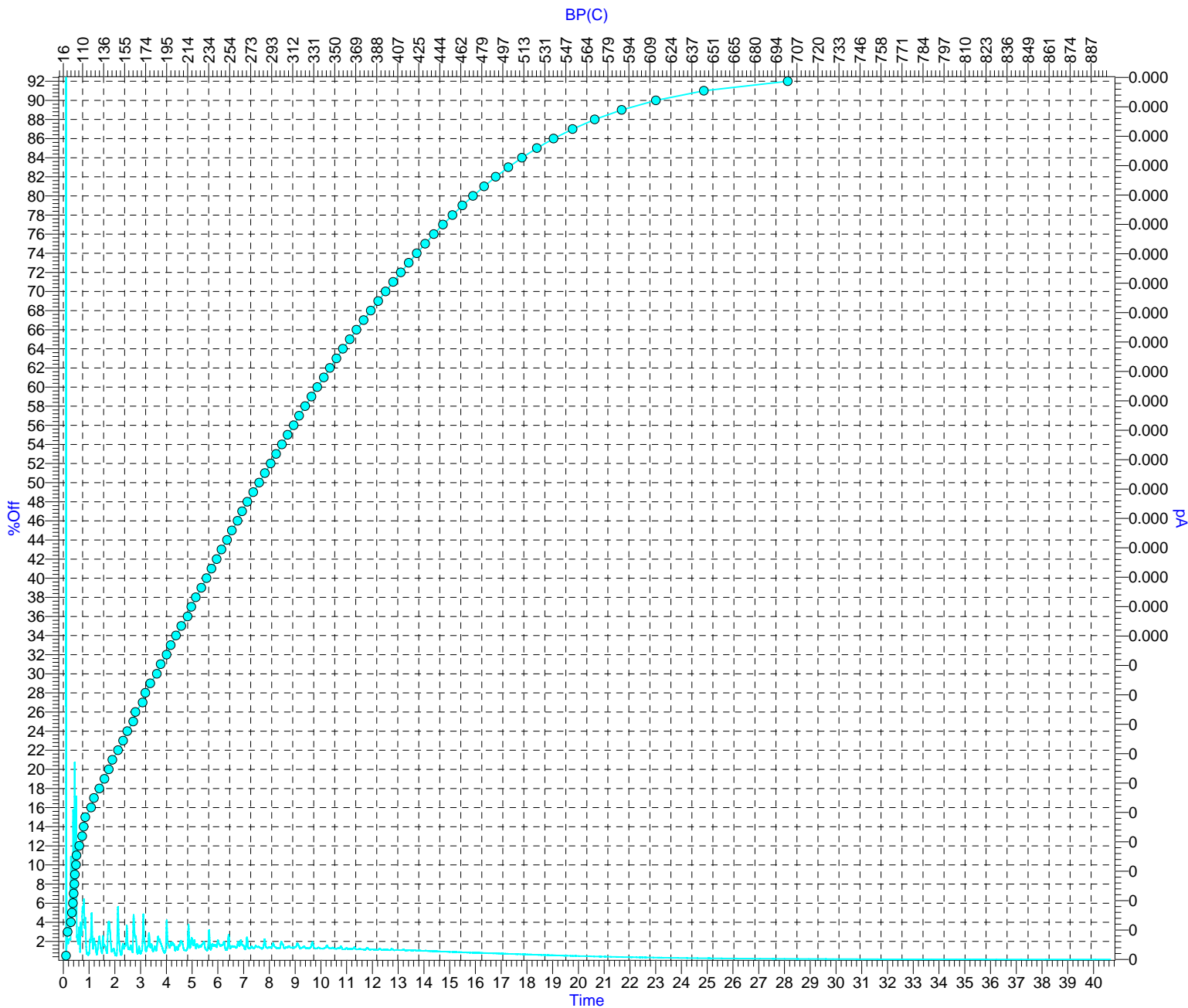
File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\FL13-1205-004.D\FL13-1205-004_FID1_A.CDF
 Sample: FL13-1205-004
 Parameter: HTSD7169

Sep-13, 16:01:13
 Operator:

Distillation Chart

ASTM D7169

Carbon (0) Channel



Recovery: 92.09 @707.8C
Analysis Area: 1.06899e-01
Detector RF: 5.68108e-08
R.Time Date: 9/23/2013

Start Time: 0.098 min.
Start Signal: 0.000 pA
Sample Amt: 0.2096
R.Factor Date: 9/23/2013

End Time: 28.558 min.
End Signal: 0.000 pA
Solvent Amt: 12.6780

Response Factor: 1.40081e-01
R.Time File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RT-INITR.D\RT-INITR_FID1_A.CDF
R.Factor File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\RF-INIT.D\RF-INIT_FID1_A.CDF
Blank File: O:\SimDData\HPChem\1\data\FL13-1205F 2013-09-20 17-07-04\BLANK6B.D\BLANK6B_FID1_A.CDF



Attention: SYLVIE DIONNE

TRANSPORTATION SAFETY BOARD OF CANADA
OTTAWA
1901 RESEARCH ROAD
OTTAWA , ON
CANADA K1A 1K8

Report Date: 2013/08/16

Job/Sample	Analysis Type	Well Name/Sample ID	Sample Point
B366426/ HB6491	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310533-B
B366426/ HB6492	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310595-B
B366426/ HB6493	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310406
B366426/ HB6494	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	WFIX 130629
B366426/ HB6495	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	PROX 44211
B366426/ HB6496	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310425
B366426/ HB6497	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	ACFX 73452
B366426/ HB6498	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310572
B366426/ HB6499	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA R13D0054	NATX 310487
B366426/ HB6500	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA FARNHAM R13D0054	NATX 303425
B366426/ HB6501	Certificate of Analysis	TRANSPORTATION SAFETY BOARD OF CANADA FARNHAM R13D0054	PROX 44169

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Victoria Martinek, Project Manager
Email: VMartinek@maxxam.ca
Phone# (780) 378-8554

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports.

Report Distribution

0 Reports(B366426)SYLVIE DIONNE TRANSPORTATION SAFETY BOARD OF CANADA 1901 RESEARCH ROAD OTTAWA , CANADA



CERTIFICATE OF ANALYSIS

B366426:HB6491

MaxxiD Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD OF CANADA R13D0054 N/A TRANSPORTATION SAFETY BOARD OF CANA

Well Name Initials of Sampler Sampling Company

Field or Area Pool or Zone Sample Point Container Identity Percent Full

NATX 310533-B GLASS BOTTLE

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/07/17 2013/08/01 2013/08/16 2013/08/16 APC,KMS

Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

PARAMETER DESCRIPTION	Result	unit	Method
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Atmospheric Distillation

Distillation Residue	32.6	vol%	ASTM D86
Distillation Recovery	66.4	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	32.4	vol%	ASTM D86
Distillation Kerosene	15.2	vol%	ASTM D86

Distillation Analysis

Initial Boiling Point	46.0	°C	ASTM D86
5 Vol Percent	97.9	°C	ASTM D86
10 Vol Percent	118.4	°C	ASTM D86
15 Vol Percent	135.9	°C	ASTM D86
20 Vol Percent	149.0	°C	ASTM D86
25 Vol Percent	167.2	°C	ASTM D86
30 Vol Percent	193.9	°C	ASTM D86
35 Vol Percent	214.8	°C	ASTM D86
40 Vol Percent	237.9	°C	ASTM D86
45 Vol Percent	261.6	°C	ASTM D86
50 Vol Percent	285.6	°C	ASTM D86
55 Vol Percent	311.4	°C	ASTM D86
60 Vol Percent	336.5	°C	ASTM D86
65 Vol Percent	350.4	°C	ASTM D86
Final Boiling Point	350.4	°C	ASTM D86

Physical Properties

Closed Cup Flash point	<-35	°C	ASTM D93
------------------------	------	----	----------

** Information not supplied by client -- data derived from LSD information Results relate only to items tested

Remarks:
Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6492

MaxxID

Client ID

Meter Number

Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name

LSD

Well ID

TRANSPORTATION SAFETY BOARD OF CANADA R13D0054

N/A

TRANSPORTATION SAFETY BOARD OF CANA

Well Name

Initials of Sampler

Sampling Company

NATX 310595-B

GLASS BOTTLE

Field or Area

Pool or Zone

Sample Point

Container Identity

Percent Full

Test Recovery

Interval

Elevations (m)

Sample Gathering Point

Solution Gas

Test Type

No.

Multiple Recovery

From:

To:

KB

GRD

Well Fluid Status

Well Status Mode

Production Rates

Gauge Pressures kPa

Temperature °C

Well Status Type

Well Type

Water m3/d

Oil m3/d

Gas 1000m3/d

Source

As Received

Source

As Received

Gas or Condensate Project

Licence No.

2013/07/17

2013/08/01

2013/08/16

2013/08/16

APC,KMS

Date Sampled Start

Date Sampled End

Date Received

Date Reported

Date Reissued

Analyst

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	23.8	vol%	ASTM D86
Distillation Recovery	75.2	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	34.7	vol%	ASTM D86
Distillation Kerosene	15.2	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	45.5	°C	ASTM D86
5 Vol Percent	92.2	°C	ASTM D86
10 Vol Percent	112.9	°C	ASTM D86
15 Vol Percent	129.2	°C	ASTM D86
20 Vol Percent	144.2	°C	ASTM D86
25 Vol Percent	161.3	°C	ASTM D86
30 Vol Percent	181.4	°C	ASTM D86
35 Vol Percent	205.5	°C	ASTM D86
40 Vol Percent	227.7	°C	ASTM D86
45 Vol Percent	251.9	°C	ASTM D86
50 Vol Percent	274.7	°C	ASTM D86
55 Vol Percent	299.0	°C	ASTM D86
60 Vol Percent	323.8	°C	ASTM D86
65 Vol Percent	347.0	°C	ASTM D86
70 Vol Percent	353.7	°C	ASTM D86
75 Vol Percent	371.4	°C	ASTM D86
Final Boiling Point	373.1	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6493

<i>MaxxID</i>	<i>Client ID</i>	<i>Meter Number</i>	<i>Laboratory Number</i>
TRANSPORTATION SAFETY BOARD OF CANADA			
<i>Operator Name</i>		<i>LSD</i>	<i>Well ID</i>
TRANSPORTATION SAFETY BOARD OF CANADA R13D0054		N/A	TRANSPORTATION SAFETY BOARD OF CANA
<i>Well Name</i>		<i>Initials of Sampler</i>	<i>Sampling Company</i>
		NATX 310406	GLASS BOTTLE
<i>Field or Area</i>	<i>Pool or Zone</i>	<i>Sample Point</i>	<i>Container Identity</i> <i>Percent Full</i>
<i>Test Recovery</i>		<i>Interval</i>	<i>Elevations (m)</i>
<i>Test Type</i>	<i>No.</i>	<i>Multiple Recovery</i>	<i>Sample Gathering Point</i>
		From: _____ To: _____	KB _____ GRD _____
			<i>Well Fluid Status</i> <i>Well Status Mode</i>
<i>Production Rates</i>		<i>Gauge Pressures kPa</i>	<i>Temperature °C</i>
<i>Water m3/d</i>	<i>Oil m3/d</i>	<i>Source</i> <i>As Received</i>	23.0
			<i>Well Status Type</i> <i>Well Type</i>
			<i>Gas or Condensate Project</i> <i>Licence No.</i>
2013/07/23	2013/08/01	2013/08/16	2013/08/16
<i>Date Sampled Start</i>	<i>Date Sampled End</i>	<i>Date Received</i>	<i>Date Reported</i> <i>Date Reissued</i>
			APC,KMS
			<i>Analyst</i>

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	26.2	vol%	ASTM D86
Distillation Recovery	72.8	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	35.9	vol%	ASTM D86
Distillation Kerosene	15.0	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	46.2	°C	ASTM D86
5 Vol Percent	91.5	°C	ASTM D86
10 Vol Percent	111.0	°C	ASTM D86
15 Vol Percent	126.6	°C	ASTM D86
20 Vol Percent	141.7	°C	ASTM D86
25 Vol Percent	157.8	°C	ASTM D86
30 Vol Percent	176.7	°C	ASTM D86
35 Vol Percent	199.5	°C	ASTM D86
40 Vol Percent	223.4	°C	ASTM D86
45 Vol Percent	246.7	°C	ASTM D86
50 Vol Percent	269.7	°C	ASTM D86
55 Vol Percent	293.3	°C	ASTM D86
60 Vol Percent	317.7	°C	ASTM D86
65 Vol Percent	339.9	°C	ASTM D86
70 Vol Percent	350.9	°C	ASTM D86
Final Boiling Point	350.9	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93
** Information not supplied by client -- data derived from LSD information Results relate only to items tested			

Remarks:

Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6494

MaxxID Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD OF CANADA R13D0054 N/A TRANSPORTATION SAFETY BOARD OF CANA

Well Name Initials of Sampler Sampling Company

Field or Area Pool or Zone Sample Point Container Identity Percent Full

WFIX 130629 GLASS BOTTLE

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/07/23 2013/08/01 2013/08/16 2013/08/16 APC,KMS

Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

2013/07/23 2013/08/01 2013/08/16 2013/08/16 APC,KMS

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	32.9	vol%	ASTM D86
Distillation Recovery	66.1	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	32.1	vol%	ASTM D86
Distillation Kerosene	15.0	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	46.7	°C	ASTM D86
5 Vol Percent	101.2	°C	ASTM D86
10 Vol Percent	121.5	°C	ASTM D86
15 Vol Percent	138.0	°C	ASTM D86
20 Vol Percent	154.0	°C	ASTM D86
25 Vol Percent	171.5	°C	ASTM D86
30 Vol Percent	194.3	°C	ASTM D86
35 Vol Percent	217.3	°C	ASTM D86
40 Vol Percent	240.9	°C	ASTM D86
45 Vol Percent	264.0	°C	ASTM D86
50 Vol Percent	288.0	°C	ASTM D86
55 Vol Percent	314.6	°C	ASTM D86
60 Vol Percent	339.8	°C	ASTM D86
65 Vol Percent	353.8	°C	ASTM D86
Final Boiling Point	353.8	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6495

<i>MaxxiD</i>	<i>Client ID</i>	<i>Meter Number</i>	<i>Laboratory Number</i>
TRANSPORTATION SAFETY BOARD OF CANADA			
<i>Operator Name</i>		<i>LSD</i>	<i>Well ID</i>
TRANSPORTATION SAFETY BOARD OF CANADA R13D0054		N/A	TRANSPORTATION SAFETY BOARD OF CANA
<i>Well Name</i>		<i>Initials of Sampler</i>	<i>Sampling Company</i>
		PROX 44211	GLASS BOTTLE
<i>Field or Area</i>	<i>Pool or Zone</i>	<i>Sample Point</i>	<i>Container Identity</i> <i>Percent Full</i>
<i>Test Recovery</i>		<i>Interval</i>	<i>Elevations (m)</i>
<i>Test Type</i>	<i>No.</i>	<i>Multiple Recovery</i>	<i>Sample Gathering Point</i>
			<i>Well Fluid Status</i>
			<i>Well Status Mode</i>
<i>Production Rates</i>		<i>Gauge Pressures kPa</i>	<i>Temperature °C</i>
<i>Water m3/d</i>	<i>Oil m3/d</i>	<i>Gas 1000m3/d</i>	<i>Source</i> <i>As Received</i>
			<i>Well Status Type</i>
			<i>Well Type</i>
			<i>Gas or Condensate Project</i>
			<i>Licence No.</i>
2013/07/23	2013/08/01	2013/08/16	2013/08/16
<i>Date Sampled Start</i>	<i>Date Sampled End</i>	<i>Date Received</i>	<i>Date Reported</i> <i>Date Reissued</i>
			APC,KMS
			<i>Analyst</i>

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	23.1	vol%	ASTM D86
Distillation Recovery	75.9	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	34.1	vol%	ASTM D86
Distillation Kerosene	15.2	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	48.5	°C	ASTM D86
5 Vol Percent	94.0	°C	ASTM D86
10 Vol Percent	115.4	°C	ASTM D86
15 Vol Percent	132.0	°C	ASTM D86
20 Vol Percent	147.9	°C	ASTM D86
25 Vol Percent	164.3	°C	ASTM D86
30 Vol Percent	186.6	°C	ASTM D86
35 Vol Percent	207.6	°C	ASTM D86
40 Vol Percent	232.2	°C	ASTM D86
45 Vol Percent	254.3	°C	ASTM D86
50 Vol Percent	277.0	°C	ASTM D86
55 Vol Percent	300.6	°C	ASTM D86
60 Vol Percent	326.4	°C	ASTM D86
65 Vol Percent	350.4	°C	ASTM D86
70 Vol Percent	356.9	°C	ASTM D86
75 Vol Percent	362.3	°C	ASTM D86
Final Boiling Point	362.4	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93
** Information not supplied by client -- data derived from LSD information Results relate only to items tested			

Remarks:
Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6499

MaxxiD Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD OF CANADA R13D0054 N/A TRANSPORTATION SAFETY BOARD OF CANA

Well Name Initials of Sampler Sampling Company

NATX 310487 GLASS BOTTLE

Field or Area Pool or Zone Sample Point Container Identity Percent Full

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/07/23 2013/08/01 2013/08/16 2013/08/16 APC,KMS
 Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	31.7	vol%	ASTM D86
Distillation Recovery	67.3	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	33.7	vol%	ASTM D86
Distillation Kerosene	14.5	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	46.3	°C	ASTM D86
5 Vol Percent	95.7	°C	ASTM D86
10 Vol Percent	117.5	°C	ASTM D86
15 Vol Percent	134.4	°C	ASTM D86
20 Vol Percent	150.7	°C	ASTM D86
25 Vol Percent	167.7	°C	ASTM D86
30 Vol Percent	187.4	°C	ASTM D86
35 Vol Percent	209.8	°C	ASTM D86
40 Vol Percent	235.1	°C	ASTM D86
45 Vol Percent	259.6	°C	ASTM D86
50 Vol Percent	281.8	°C	ASTM D86
55 Vol Percent	307.1	°C	ASTM D86
60 Vol Percent	333.1	°C	ASTM D86
65 Vol Percent	349.5	°C	ASTM D86
Final Boiling Point	350.3	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6500

MaxxiD Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD OF CANADA FARNHAM R13D0054 N/A TRANSPORTATION SAFETY BOARD OF CANA

Well Name Initials of Sampler Sampling Company

Field or Area Pool or Zone Sample Point Container Identity Percent Full

NATX 303425 GLASS BOTTLE

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/07/25 2013/08/01 2013/08/16 2013/08/16 APC,KMS

Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

2013/07/25 2013/08/01 2013/08/16 2013/08/16 APC,KMS

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	33.8	vol%	ASTM D86
Distillation Recovery	65.2	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	31.3	vol%	ASTM D86
Distillation Kerosene	14.9	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	46.2	°C	ASTM D86
5 Vol Percent	101.1	°C	ASTM D86
10 Vol Percent	121.8	°C	ASTM D86
15 Vol Percent	139.9	°C	ASTM D86
20 Vol Percent	157.9	°C	ASTM D86
25 Vol Percent	176.5	°C	ASTM D86
30 Vol Percent	198.5	°C	ASTM D86
35 Vol Percent	220.5	°C	ASTM D86
40 Vol Percent	244.7	°C	ASTM D86
45 Vol Percent	268.2	°C	ASTM D86
50 Vol Percent	293.2	°C	ASTM D86
55 Vol Percent	318.5	°C	ASTM D86
60 Vol Percent	344.4	°C	ASTM D86
65 Vol Percent	361.1	°C	ASTM D86
Final Boiling Point	361.1	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

Distillation Corrected to 101.3 kPa



CERTIFICATE OF ANALYSIS

B366426:HB6501

MaxxiD Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD OF CANADA FARNHAM R13D0054 N/A TRANSPORTATION SAFETY BOARD OF CANA

Well Name Initials of Sampler Sampling Company

Field or Area Pool or Zone Sample Point Container Identity Percent Full

PROX 44169 GLASS BOTTLE

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/07/25 2013/08/01 2013/08/16 2013/08/16 APC,KMS
 Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

PARAMETER DESCRIPTION	Result	unit	Method
Atmospheric Distillation			
Distillation Residue	32.8	vol%	ASTM D86
Distillation Recovery	66.2	vol%	ASTM D86
Distillation Loss	1.0	vol%	ASTM D86
Distillation Naptha	32.2	vol%	ASTM D86
Distillation Kerosene	15.1	vol%	ASTM D86
Distillation Analysis			
Initial Boiling Point	46.3	°C	ASTM D86
5 Vol Percent	97.0	°C	ASTM D86
10 Vol Percent	118.9	°C	ASTM D86
15 Vol Percent	136.3	°C	ASTM D86
20 Vol Percent	151.9	°C	ASTM D86
25 Vol Percent	172.0	°C	ASTM D86
30 Vol Percent	194.7	°C	ASTM D86
35 Vol Percent	216.1	°C	ASTM D86
40 Vol Percent	239.0	°C	ASTM D86
45 Vol Percent	263.0	°C	ASTM D86
50 Vol Percent	287.5	°C	ASTM D86
55 Vol Percent	312.2	°C	ASTM D86
60 Vol Percent	337.6	°C	ASTM D86
65 Vol Percent	350.6	°C	ASTM D86
Final Boiling Point	351.0	°C	ASTM D86
Physical Properties			
Closed Cup Flash point	<-35	°C	ASTM D93

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

Distillation Corrected to 101.3 kPa



Attention: WENDY BRYSON

TRANSPORTATION SAFETY BOARD OF CANADA
OTTAWA
1901 RESEARCH ROAD
OTTAWA , ON
CANADA K1A 1K8

Report Date: 2013/10/17

Job/Sample	Analysis Type	Well Name/Sample ID	Sample Point
B391775/ HS9845	Certificate of Analysis	TRANSPORTATION SAFETY BOARD	NATX 310572-C-TOP
B391775/ HS9846	Certificate of Analysis	TRANSPORTATION SAFETY BOARD	NATX 310572-C-BOT
B391775/ HS9847	Certificate of Analysis	TRANSPORTATION SAFETY BOARD	PROX 44211-C-TOP
B391775/ HS9848	Certificate of Analysis	TRANSPORTATION SAFETY BOARD	PROX 44211-C-BOT

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Victoria Martinek, Project Manager
Email: VMartinek@maxxam.ca
Phone# (780) 378-8554

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports.

Report Distribution

0	Reports(B391775)WENDY BRYSON	TRANSPORTATION SAFETY BOARD OF CANADA	1901 RESEARCH ROAD	OTTAWA , CANADA
0	Reports(B391775)SYLVIE DIONNE	TRANSPORTATION SAFETY BOARD OF CANADA	1901 RESEARCH ROAD	OTTAWA , CANADA

Date of Issue: 2013/10/17

Page 1 of 5



CERTIFICATE OF ANALYSIS

B391775:HS9845

MaxxID Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD N/A TRANSPORTATION SAFETY BOARD

Well Name Initials of Sampler Sampling Company

NATX 310572-C-TOP GLASS BOTTLE

Field or Area Pool or Zone Sample Point Container Identity Percent Full

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/10/07 2013/10/17 2013/10/17 SK1,NH4,KL9,MPW,BS7
 Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

PARAMETER DESCRIPTION	Result	unit	Method
Density Analysis			
Absolute Density @ 15 °C	815.9	kg/m3	ASTM D5002
Measured Relative Density @ 15 °C	0.8166	N/A	ASTM D5002
API Gravity @ 15 °C	41.8	N/A	
Heat of Combustion			
Measured Gross Heat of Combustion	19247	BTU/lb	ASTM D240
Physical Properties			
Pour Point	<-65	°C	ASTM D5853
Reid Vapour Pressure	66.1	kPa	ASTM D323A
Total Sulphur (S)	0.096	mass%	ASTM D4294
Viscosity Analysis			
Viscosity @ 20°C	2.882	cSt	ASTM D7042
Viscosity @ 30°C	2.295	cSt	ASTM D7042
Viscosity @ 10°C	3.639	cSt	ASTM D7042
Viscosity @ 40°C	1.910	cSt	ASTM D7042

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

SAMPLE DATE NOT RECORDED
Viscosity at 10C was extrapolated from 20, 30, 40C.



CERTIFICATE OF ANALYSIS

B391775:HS9846

MaxxID _____ Client ID _____ Meter Number _____ Laboratory Number _____

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name _____ LSD _____ Well ID _____

TRANSPORTATION SAFETY BOARD _____ N/A _____ TRANSPORTATION SAFETY BOARD _____

Well Name _____ Initials of Sampler _____ Sampling Company _____

Field or Area _____ Pool or Zone _____ Sample Point _____ NATX 310572-C-BOT _____ Container Identity _____ Percent Full _____

Test Recovery _____

Test Type _____ No. _____ Multiple Recovery _____

Interval _____ Elevations (m) _____ Sample Gathering Point _____ Solution Gas _____

From: _____ To: _____ KB _____ GRD _____ Well Fluid Status _____ Well Status Mode _____

Production Rates _____ Gauge Pressures kPa _____ Temperature °C _____ Well Status Type _____ Well Type _____

Water m3/d _____ Oil m3/d _____ Gas 1000m3/d _____ Source _____ As Received _____ Source _____ As Received _____ 23.0 _____ Gas or Condensate Project _____ Licence No. _____

2013/10/07 _____ 2013/10/17 _____ 2013/10/17 _____ SK1,NH4,KL9,MPW,BS7

Date Sampled Start _____ Date Sampled End _____ Date Received _____ Date Reported _____ Date Reissued _____ Analyst _____

PARAMETER DESCRIPTION	Result	unit	Method
-----------------------	--------	------	--------

Density Analysis

Absolute Density @ 15 °C	816.5	kg/m3	ASTM D5002
Measured Relative Density @ 15 °C	0.8172	N/A	ASTM D5002
API Gravity @ 15 °C	41.7	N/A	

Heat of Combustion

Measured Gross Heat of Combustion	18445	BTU/lb	ASTM D240
-----------------------------------	-------	--------	-----------

Physical Properties

Pour Point	<-65	°C	ASTM D5853
Reid Vapour Pressure	64.3	kPa	ASTM D323A
Total Sulphur (S)	0.096	mass%	ASTM D4294

Viscosity Analysis

Viscosity @ 20°C	2.982	cSt	ASTM D7042
Viscosity @ 30°C	2.467	cSt	ASTM D7042
Viscosity @ 10°C	3.720	cSt	ASTM D7042
Viscosity @ 40°C	2.080	cSt	ASTM D7042

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

SAMPLE DATE NOT RECORDED
Viscosity at 10C was extrapolated from 20, 30, 40C.



CERTIFICATE OF ANALYSIS

B391775:HS9847

MaxxID _____ Client ID _____ Meter Number _____ Laboratory Number _____

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name _____ LSD _____ Well ID _____

TRANSPORTATION SAFETY BOARD _____ N/A _____ TRANSPORTATION SAFETY BOARD _____

Well Name _____ Initials of Sampler _____ Sampling Company _____

Field or Area _____ Pool or Zone _____ PROX 44211-C-TOP _____ GLASS BOTTLE _____

Sample Point _____ Container Identity _____ Percent Full _____

Test Recovery _____ Interval _____ Elevations (m) _____ Sample Gathering Point _____ Solution Gas _____

Test Type _____ No. _____ Multiple Recovery _____ From: _____ To: _____ KB _____ GRD _____ Well Fluid Status _____ Well Status Mode _____

Production Rates _____ Gauge Pressures kPa _____ Temperature °C _____ Well Status Type _____ Well Type _____

Water m3/d _____ Oil m3/d _____ Gas 1000m3/d _____ Source _____ As Received _____ Source _____ As Received _____ 23.0 _____ Gas or Condensate Project _____ Licence No. _____

2013/10/07 _____ 2013/10/17 _____ 2013/10/17 _____ SK1,NH4,KL9,MPW,BS7

Date Sampled Start _____ Date Sampled End _____ Date Received _____ Date Reported _____ Date Reissued _____ Analyst _____

PARAMETER DESCRIPTION	Result	unit	Method
Density Analysis			
Absolute Density @ 15 °C	821.9	kg/m3	ASTM D5002
Measured Relative Density @ 15 °C	0.8226	N/A	ASTM D5002
API Gravity @ 15 °C	40.5	N/A	
Heat of Combustion			
Measured Gross Heat of Combustion	19416	BTU/lb	ASTM D240
Physical Properties			
Pour Point	<-65	°C	ASTM D5853
Reid Vapour Pressure	62.3	kPa	ASTM D323A
Total Sulphur (S)	0.117	mass%	ASTM D4294
Viscosity Analysis			
Viscosity @ 20°C	3.259	cSt	ASTM D7042
Viscosity @ 30°C	2.665	cSt	ASTM D7042
Viscosity @ 10°C	4.100	cSt	ASTM D7042
Viscosity @ 40°C	2.230	cSt	ASTM D7042

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

SAMPLE DATE NOT RECORDED
Viscosity at 10C was extrapolated from 20, 30, 40C.



CERTIFICATE OF ANALYSIS

B391775:HS9848

MaxxID Client ID Meter Number Laboratory Number

TRANSPORTATION SAFETY BOARD OF CANADA

Operator Name LSD Well ID

TRANSPORTATION SAFETY BOARD N/A TRANSPORTATION SAFETY BOARD

Well Name Initials of Sampler Sampling Company

Field or Area Pool or Zone Sample Point Container Identity Percent Full

PROX 44211-C-BOT GLASS BOTTLE

Test Recovery Interval Elevations (m) Sample Gathering Point Solution Gas

Test Type No. Multiple Recovery From: To: KB GRD Well Fluid Status Well Status Mode

Production Rates Gauge Pressures kPa Temperature °C Well Status Type Well Type

Water m3/d Oil m3/d Gas 1000m3/d Source As Received Source As Received Gas or Condensate Project Licence No.

2013/10/07 2013/10/17 2013/10/17 MS7,SK1,KL9,MPW,BS7
 Date Sampled Start Date Sampled End Date Received Date Reported Date Reissued Analyst

PARAMETER DESCRIPTION	Result	unit	Method
Density Analysis			
Absolute Density @ 15 °C	821.8	kg/m3	ASTM D5002
Measured Relative Density @ 15 °C	0.8225	N/A	ASTM D5002
API Gravity @ 15 °C	40.5	N/A	
Heat of Combustion			
Measured Gross Heat of Combustion	19164	BTU/lb	ASTM D240
Physical Properties			
Pour Point	<-65	°C	ASTM D5853
Reid Vapour Pressure	62.4	kPa	ASTM D323A
Total Sulphur (S)	0.117	mass%	ASTM D4294
Viscosity Analysis			
Viscosity @ 20°C	3.220	cSt	ASTM D7042
Viscosity @ 30°C	2.548	cSt	ASTM D7042
Viscosity @ 10°C	4.078	cSt	ASTM D7042
Viscosity @ 40°C	2.205	cSt	ASTM D7042

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

SAMPLE DATE NOT RECORDED
Viscosity at 10C was extrapolated from 20, 30, 40C.



October 11, 2013

Sylvie Dionne
Transportation Safety Board of Canada
1901 Research Road
Ottawa, Ontario
K1A 1K8

**RE: Analytical Report for Transportation Safety Board of Canada Project: N/A
CASSEN Work Order No. 2505040**

Dear Sylvie,

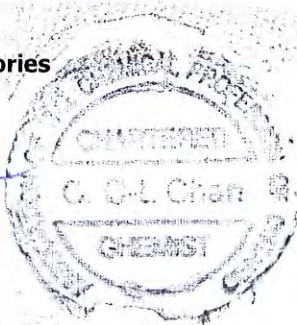
We have completed the analysis of the 4 Bulk Liquid samples that you submitted on October 04, 2013 for the determination of BTEX using gas chromatography mass spectrometry. Results of the analysis are summarized in the attached report, which includes the method description and quality control data.

Sylvie, please feel free to give me a call at (416) 679-9663 should you need any clarification. Thank you for using our services.

Sincerely,

CASSEN Testing Laboratories

Cecilia Chan, M.Sc., C.Chem
Laboratory Director



Determination of Target Analytes in Bulk Liquids, Using Gas Chromatography/Mass Spectrometry

Brief Description of the Method:

The sample was diluted with appropriate solvent then injected directly into a capillary column of GC/MS system for quantification of the target analytes.

CASSEN method #: M.3005.R0

Method Reference:

"Characteristics of Spilled Oils, Fuels, and Petroleum Products: 1. Composition and Properties of Selected Oils", EPA 600/R-03/072, July 2003

Analytical System:

Instrument:

GC/MS System:	Varian Model CP-3800 Gas Chromatograph coupled with Varian Saturn 2200 MS/MS system
Autosampler:	Varian CP 8400 Autosampler
Data System:	Varian MS-Workstation Data Review system
LIM System:	CAS-LIMS Laboratory Information System

Sampling Media: Bulk Liquid



CASSEN Testing Laboratories

51 International Blvd., Toronto, Ontario, M9W 6H3
Tel: (416) 679-9663 Fax: (416) 679-9668 Web: www.cassen.ca

Analytical Results

Date: October 10, 2013

Organization: Transportation Safety Board of Canada
Address: 1901 Research Road, Ottawa, Ontario, K1A 1K8
Contact: Sylvie Dionne
Project: N/A

Work Order No.: 2505040
Date Received: October 04, 2013

Analysis Requested: BTEX
CASSEN Method: M.3005.R0
Reference Method: EPA 600/R-03/072
Sampling Media: Bulk Sample
No. of Samples: 4
No. of Blanks: 0

Sample Identification: R13D0054-BTEX-1
Mass (g): 0.8152
Date Sampled: August 07, 2013
Date Analyzed: October 08, 2013

#	Analyte	CAS	Analytical Results		
			Total (ug)	(ug/g)	(ppm)
1	Benzene	000071-43-2	1510	1850	1850
2	Toluene	000108-88-3	2580	3170	3170
3	Ethylbenzene	000100-41-4	693	850	850
4	m/p-Xylene	000106-42-3	2850	3500	3500
5	o-Xylene	000095-47-6	1350	1660	1660

Sample Identification: R13D0054-BTEX-2
Mass (g): 0.8167
Date Sampled: August 07, 2013
Date Analyzed: October 08, 2013

#	Analyte	CAS	Analytical Results		
			Total (ug)	(ug/g)	(ppm)
1	Benzene	000071-43-2	1410	1720	1720
2	Toluene	000108-88-3	2340	2870	2870
3	Ethylbenzene	000100-41-4	627	768	768
4	m/p-Xylene	000106-42-3	2690	3300	3300
5	o-Xylene	000095-47-6	1270	1560	1560

Sample Identification: R13D0054-BTEX-3
Mass (g): 0.8161
Date Sampled: August 07, 2013
Date Analyzed: October 08, 2013

#	Analyte	CAS	Analytical Results		
			Total (ug)	(ug/g)	(ppm)
1	Benzene	000071-43-2	1470	1800	1800
2	Toluene	000108-88-3	2380	2920	2920
3	Ethylbenzene	000100-41-4	644	789	789
4	m/p-Xylene	000106-42-3	2700	3310	3310
5	o-Xylene	000095-47-6	1320	1620	1620

Notes:

- 1) <: Less than the indicated instrument detection limit (IDL).
- 2) N.A.: Information not available or not applicable.
- 3) The results have been lab blank subtracted.
- 4) This **Certificate of Analysis** shall not be reproduced except in full, without written approval of the laboratory. These analytical results pertain only to the samples as received in the laboratory. No responsibility or liability is assumed for the manner in which the results are used.



CASSEN Testing Laboratories

51 International Blvd., Toronto, Ontario, M9W 6H3
Tel: (416) 679-9663 Fax: (416) 679-9668 Web: www.cassen.ca

Analytical Results

Date: October 10, 2013

Organization: Transportation Safety Board of Canada
Address: 1901 Research Road, Ottawa, Ontario, K1A 1K8
Contact: Sylvie Dionne
Project: N/A

Work Order No.: 2505040
Date Received: October 04, 2013

Sample Identification: R13D0054-BTEX-4
Mass (g): 0.8201

Date Sampled: August 07, 2013
Date Analyzed: October 08, 2013

#	Analyte	CAS	Analytical Results		
			Total (ug)	(ug/g)	(ppm)
1	Benzene	000071-43-2	1200	1470	1470
2	Toluene	000108-88-3	2270	2770	2770
3	Ethylbenzene	000100-41-4	699	852	852
4	m/p-Xylene	000106-42-3	2370	2890	2890
5	o-Xylene	000095-47-6	1230	1500	1500

Notes:

- 1) <: Less than the indicated instrument detection limit (IDL).
- 2) N.A.: Information not available or not applicable.
- 3) The results have been lab blank subtracted.
- 4) This *Certificate of Analysis* shall not be reproduced except in full, without written approval of the laboratory. These analytical results pertain only to the samples as received in the laboratory. No responsibility or liability is assumed for the manner in which the results are used.



CASSEN Testing Laboratories

51 International Blvd., Toronto, Ontario, M9W 6H3
Tel: (416) 679-9663 Fax: (416) 679-9668 Web: www.cassen.ca

Analytical Results

Date: October 10, 2013

Organization: Transportation Safety Board of Canada
Address: 1901 Research Road, Ottawa, Ontario, K1A 1K8
Contact: Sylvie Dionne
Project: N/A

Work Order No.: 2505040
Date Received: October 04, 2013

Quality Control Batch #: 12285-153

#	Analyte	CAS	Uncertainty %	IDL (ug)
1	Benzene	000071-43-2	8.91	0.00005
2	Toluene	000108-88-3	7.80	0.00005
3	Ethylbenzene	000100-41-4	12.05	0.00005
4	m/p-Xylene	000106-42-3	11.52	0.00005
5	o-Xylene	000095-47-6	10.87	0.00005

Notes:

Analyst:

Matthew Yao, M.Sc., Chemist

Reviewer:

Queenie Yip, B.Sc., C/Chem., Senior Chemist



Notes:

- 1) <: Less than the indicated instrument detection limit (IDL).
- 2) N.A.: Information not available or not applicable.
- 3) The results have been lab blank subtracted.
- 4) This **Certificate of Analysis** shall not be reproduced except in full, without written approval of the laboratory. These analytical results pertain only to the samples as received in the laboratory. No responsibility or liability is assumed for the manner in which the results are used.



CASSEN Testing Laboratories

Division of CASSEN Group Inc.

ANALYTICAL SERVICES REQUEST FORM

51 International Blvd.
Toronto, ON M9W 6H3
Tel: (416) 679-9663
Fax: (416) 679-9668
Toll Free: 1-866-423-3001
Web: www.cassen.ca

FOR CASSEN USE ONLY
CASSEN Work Order No:

2505040

Send Report To: Check if this is a new address

Company: Transportation Safety Board of Canada
Address: 1901 Research Road
City: Ottawa Province: Ontario
Attention: Sylvie Dionne Postal Code: K1A1K8
Phone: 613-949-3949 Fax: 613-998-5572
Email: Sylvie.Dionne@tsb-bst.gc.ca

Invoice To (if different): Check if this is a new address

Company: Transportation Safety Board of Canada
Address: 1901 Research Road
City: Ottawa Province: Ontario
Attention: Wendy Bryson Postal Code: K1A1K8
Phone: 613-990-0776 Fax: 613-998-5572
Email: Wendy.Bryson@tsb-bst.gc.ca

Required Turnaround Time

Regular Routine Analysis Turnaround Time (5 Days)*

Open Characterization with Interpretation Requires 8 Days* TAT

Rush Analysis Options
(Please Call Ahead)

8 Hours

24 Hours

48 Hours

72 Hours

Project Name / Number

Sampled By:

P.O. Number:

Sampling Data Sheet Attached

Client Sample Number Description/Identification	Date Sampled (DD/MM/YYYY)	Sample Type	Active Sample Volume (L)	Passive Sample Time (mins)	Analysis Requested	Comment
R13D0054-BTEX-1	07/08/2013	crude oil			BTEX using GC/MS	
R13D0054-BTEX-2	07/08/2013	crude oil			BTEX using GC/MS	
R13D0054-BTEX-3	07/08/2013	crude oil			BTEX using GC/MS	
R13D0054-BTEX-4	07/08/2013	crude oil			BTEX using GC/MS	

Special Instructions

As discussed with Cecilia Chan, we require a detection limit of 0.1 ppm (benzene) and 1 ppm (toluene, ethyl benzene, m,p,o-xylene).

CHAIN OF CUSTODY

Relinquished by:

John Ferguson

Signature

Date (DD/MM/YYYY)

04/10/13

Time

9:30 AM

Sample Condition Upon Receipt

Acceptable

Received by Lab:

C. Resutco

Signature

04/10/13

9:30 AM

Other (Explain Below)

Sample Condition Additional Comments:

* Working days only, please consult the laboratory regarding workload. Samples received after 3:00PM will be treated as next day's samples. CASSEN's terms and conditions form a part of this contract for services. (See forms section of our website)