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27 January 2015

Ms. Jing Liu
Toxic Cleanup Program
Washington State Department of Ecology
3190 160th Avenue SE
Bellevue, Washington 98008

Subject: Quarterly Groundwater Monitoring Event Report, November 2014
Cornet Bay Marina
Oak Harbor, Washington
K/J 1396010.00

Dear Ms. Liu:

This letter report presents the findings of the second quarterly groundwater monitoring event that was performed following completion of remediation activities at the Cornet Bay Marina (site) in November 2014. The site is located at the northern end of Whidbey Island, Island County, Washington and bounded on the west by Cornet Bay and on the east by Cornet Bay Road. A site vicinity map is included as Figure 1.

The work documented in this letter report was performed on behalf of the Washington State Department of Ecology (Ecology) in support of a cleanup action completed at the site. The work performed includes the second quarterly groundwater monitoring of six site monitoring wells.

Background

In January 1989, a release occurred from ruptured underground fuel lines and caused impacts to soil and groundwater behind the wooden bulkhead at the site. After discovery of the release, the original underground storage tanks (USTs) and piping were emptied and removed. Following removal of the old tanks and piping, a two-compartment 12,000-gallon aboveground storage tank (AST) (9,000-gallon gasoline and 3,000-gallon diesel) and steel piping were installed. The tank was installed in a belowground reinforced concrete vault near the footprint of the former UST excavation. The location of the tank vault is shown on Figure 2 (attached).

In February 1993, a Consent Decree (Ecology Site Cleanup No. 2011; Consent Decree No. 93-2-00018-3) was established between Ecology and the Cornet Bay Marina site owner/operator (Mr. Milton Woods). The consent decree required an investigation and cleanup of the site in accordance with the requirements of Model Toxics Control Act (MTCA) [Washington Administrative Code (WAC) 173-340].

In August 2011, Ecology authorized Kennedy/Jenks Consultants to prepare an remedial investigation/feasibility study (RI/FS) Work Plan (Work Plan) to collect supplemental information regarding the distribution of affected soil and groundwater, assess the potential for vapor intrusion at the onsite building, and evaluate overall site conditions with the intent to identify and select a cleanup action for the site.

The Work Plan was implemented from August through December 2011 and documented in the RI/FS report dated July 2013. The preferred remedial alternative identified in the FS included replacement of a dilapidated wooden bulkhead with a new steel sheet pile bulkhead, and removal and disposal of contaminated soil. Following completion of the RI/FS, the following activities were performed in support of implementing the selected remedial alternative:

- Preparation of a cleanup action plan (CAP) dated July 2013 that summarized the key elements of the remedial action.

- Extensive permitting activities, including a State of Washington National Pollutant Discharge Elimination System (NPDES) permit, a Construction Stormwater General Permit (CSGP), and a U.S. Army Corps of Engineers (Corps) Nationwide Permit (NWP).

- Preparation of an Engineering Design Report (EDR) dated September 2013. The EDR provided details regarding the cleanup requirements, engineering design concepts and criteria, and plans for confirmational monitoring.

- Preparation of construction issue specifications and plans (Project Documents) for implementation by Ecology's selected remediation contractor.

The remedial action field work was completed from December 2013 through June 2014 by Ecology's selected remediation contractor (Glacier Environmental, Inc. of Mukilteo, Washington). The substantive remedial activities (including summary of performance monitoring results) for the remedial action are summarized in the Construction Completion Report (CCR) dated October 2014.

Following completion of the remedial action, four new groundwater monitoring wells (MW-1R, MW-2R, MW-4R, and MW-10R) were installed at the site on 13 August 2014 (refer to Figure 3, attached). The four new wells replaced a prior monitoring well that had been abandoned as part of the cleanup activities. Each of the new wells and two previously installed monitoring wells (MW-7 and MW-9) were developed to remove fine-grained sediments from the filter-pack. Following development, each of the wells was surveyed by KPG to identify top of casing elevation.

Scope of Work

Quarterly Groundwater Monitoring

The second quarterly monitoring event was performed on 25 November 2014. Field activities performed included the following:

- Groundwater level monitoring was conducted by gauging each of six site monitoring wells using an electronic water level depth probe. The groundwater elevation at each well was calculated by measuring the depth to water (to +/- 0.01 foot) and subtracting this measurement from the surveyed monitoring well casing elevations. Water levels were measured from 1133 to 1156; within approximately 1.5 hours of low tide at Cornet Bay.

- Groundwater sampling was performed using low-flow purging and sampling techniques with wells purged at a rate of approximately 0.03 to 0.07 gallon per minute using a peristaltic pump. Field parameter monitoring included temperature, pH, specific conductance, dissolved oxygen, oxidation/reduction potential (ORP), and relative turbidity. With the exception of well MW-1R that experienced slow recharge, purging continued until the field parameters indicated stable conditions (refer to Table 1).

- Groundwater samples were collected from the six monitoring wells and submitted to Analytical Resources, Incorporated (ARI) in Tukwila, Washington for the following analyses:

    - Gasoline-range organics (GRO) using Ecology Method Northwest Total Petroleum Hydrocarbons as Gasoline (NWTPH-Gx).

    - Diesel-range organics (DRO) using Ecology Method Northwest Total Petroleum Hydrocarbons as Diesel Extended (NWTPH-Dx).

    - Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Method SW8260C.

- Quality assurance/quality control (QA/QC) samples were also collected including:

    - One field duplicate sample (well MW-2R-1) was collected and analyzed for each of the primary chemical of concern (COC) analytes (GRO, DRO, and BTEX) from well MW-2R.

    - Trip blanks were included with the initial shipment (26 November 2014) to the analytical laboratory.

- Groundwater samples were also collected for analysis of selected monitored natural attenuation (MNA) parameters, including nitrate/nitrite, ammonia, sulfate, sulfide, dissolved iron (field filtered), and methane.

Groundwater Purge and Sample forms are included in Attachment A.

Monitoring Results

Groundwater Elevation Results

The results of water level monitoring are summarized in Table 2 and a potentiometric surface elevation map of site groundwater is provided on Figure 3. Based on historical water level monitoring data, site groundwater levels are tidally influenced (especially near the bulkhead) and a steep hydraulic gradient exist from east to west (toward Cornet Bay) at low tide. During high tide, a gradient reversal occurs adjacent to the waterfront areas. The current water level monitoring results obtained on 25 November 2014, collected after completion of the remedial action, indicate groundwater gradient conditions are consistent with historical monitoring results.

Analytical Results

As indicated above, groundwater samples for the six site wells were submitted for GRO, DRO, and BTEX compounds. The analytical results of groundwater samples collected during the second quarterly monitoring event are summarized in Table 3. All analyte concentrations (including GRO, DRO, and BTEX) in groundwater samples were below detectable levels for each well.

As site groundwater discharges to surface water and is not used for potable consumption, compliance with groundwater cleanup levels for the site are based on comparison to applicable, relevant, and appropriate requirement (ARARs) or other relevant screening criteria. All analyte concentrations of groundwater in each well were below the MTCA Method A, Clean Water Act (CWA), and the National Oceanic and Atmospheric Administration's (NOAA) *Screening Quick Reference Tables* (SQUIRT) groundwater cleanup levels. Comparison of site groundwater with these ARARs and screening levels demonstrate the remedial action completed in June 2014 was successful in removing contaminated site soils that could impact surface water in Cornet Bay. Groundwater laboratory analytical results are summarized in Table 3 and the laboratory analytical reports are provided in Attachment B.

As indicated above, site groundwater samples were also submitted for analysis of baseline MNA parameters (identified above) to assess natural biodegradation of possible residual hydrocarbon compounds (refer to Table 1). The results indicate conducive conditions in site groundwater to support natural biodegradation.

Kennedy/Jenks Consultants appreciates the opportunity to provide continued support to Ecology on this project. Should you have any questions regarding the information contained herein, please do not hesitate to contact us at (253) 835-6400.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Ty C. Schreiner, L.Hg.
Project Manager

Enclosures:

Tables
Table 1 – Water Quality and Geochemical Parameters
Table 2 – Groundwater Elevation Data
Table 3 – Groundwater Analytical Results

Figures
Figure 1 – Site Location
Figure 2 – Site Plan
Figure 3 – Groundwater Potentiometric Surface Map, November 2014

Attachments
Attachment A – Groundwater Purge and Sample Forms
Attachment B – Laboratory Analytical Reports

Tables

Table 1: Water Quality and Geochemical Parameters

		Water Quality Parameters[a]						Geochemical Parameters					
Monitoring Well ID	Sample Collection Date	pH	Conductivity (mS/cm)	Turbidity (NTU)	Temperature (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Nitrate+ Nitrite (mg-N/L)	Ammonia (mg-N/L)	Sulfate (mg/L)	Sulfide (mg/L)	Methane (µg/L)	Dissolved Iron (mg/L)
MW-1R	9/18/2014	6.79	1.920	22.2	20.44	4.37	111	0.180	1.17	64.5	0.050 U	11.8	---[b]
MW-2R	8/15/2014	6.77	1.260	28.8	17.42	6.15	79	1.320	0.116	64.3	0.050 U	0.7 U	0.05 U
MW-4R	8/15/2014	7.25	1.400	32.9	16.24	3.51	-18	0.714	0.022	96.0	0.050 U	13.2	0.05 U
MW-7	8/14/2014	6.67	0.673	16.3	17.47	2.16	-175	0.024	14.5	19.7	0.050 U	1,160	14.4
MW-9	8/14/2014	6.91	0.693	17.0	17.82	2.95	10	0.010 U	0.376	10.8	0.050 U	0.7 U	0.05 U
MW-10R	8/15/2014	7.03	2.160	165.0	18.23	7.73	-30	0.084	4.61	98.6	0.100	5,180	2.07
MW-1R	11/25/2014	7.23	0.957[c]	32[c]	11.8	4.46[c]	61.9[c]	16.3	0.026	80.0	0.050 U	0.7 U	0.05 U
MW-2R	11/25/2014	7.11	0.267	80	11.0	9.82	205.0	0.654	0.018	20.4	0.098	0.7 U	0.15
MW-4R	11/25/2014	7.38	0.308	6.7	11.0	9.85	251.1	2.21	0.034	42.5	0.050 U	0.7 U	0.05 U
MW-7	11/25/2014	7.11	0.455	0.90	11.5	0.16	-115.4	0.012	10.9	24.1	0.050 U	1,760	12.9
MW-9	11/25/2014	7.14	0.676	5.2	12.7	0.26	-7.0	0.010 U	0.266	12.8	0.050 U	323	0.58
MW-10R	11/25/2014	6.83	1.608	10	12.2	0.32	108.0	0.010 U	3.10	211	0.059	3,000	1.99

Notes:

(a) Water quality parameter readings at the completion of purging and prior to sampling.
(b) Well was not sampled for dissolved iron due to slow recharge.
(c) Well sampled prior to water quality parameter stabilization due to slow recharge.

mS/cm = milli-Siemens per centimeter
NTU = nephelometric turbidity unit
°C = degrees Celsius
mg/L = milligrams per liter
ORP = oxidation-reduction potential
mV = millivolt
mg-N/L = milligram nitrogen per liter
mg/L = milligrams per liter
µg/L = micrograms per liter
"U" = Not detected at or above laboratory reporting limits

Table 2: Summary of Groundwater Elevation Data

Monitoring Well ID	Measurement Date	Top of PVC Well Elevation[(a)] (feet amsl)[(b)]	Depth to Groundwater (feet)	Groundwater Elevation (feet amsl)
MW-1R	8/15/2014	14.19	8.98	5.21
MW-2R	8/15/2014	13.87	7.80	6.07
MW-4R	8/15/2014	13.76	5.61	8.15
MW-7	8/14/2014	13.66	2.59	11.07
MW-9	8/14/2014	12.83	3.28	9.55
MW-10R	8/15/2014	13.42	4.19	9.23
MW-1R	11/25/2014	14.19	4.81	9.38
MW-2R	11/25/2014	13.87	6.72	7.15
MW-4R	11/25/2014	13.76	4.86	8.90
MW-7	11/25/2014	13.66	0.47	13.19
MW-9	11/25/2014	12.83	1.84	10.99
MW-10R	11/25/2014	13.42	3.57	9.85

Notes:

(a) Casing elevations were surveyed on 15 August 2014 by KPG, Inc. of Tacoma, Washington.

(b) amsl = above mean sea level

Table 3: Groundwater Analytical Results

Monitoring Well ID	Sample Collection Date	Total Petroleum Hydrocarbons (µg/L)[a]			Volatile Organic Compounds (µg/L)[b]			
		Gasoline	Diesel	Oil	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-1R	8/18/2014	250 U	100 U	200 U	1.0 U	1.0 U	1.0 U	3.0 U
MW-2R	8/15/2014	250 U	100 U	200 U	1.5	1.0 U	1.0 U	3.0 U
MW-4R	8/15/2014	250 U	100 U	200 U	1.0 U	1.0 U	1.0 U	3.0 U
MW-7	8/14/2014	250 U	100 U	200 U	1.0 U	1.0 U	1.0 U	3.0 U
MW-9	8/14/2014	250 U	100 U	200 U	1.0 U	1.0 U	1.0 U	3.0 U
MW-10R	8/15/2014	250 U / 250 U	100 U / 100 U	200 U / 200 U	1.0 U / 1.0 U	1.0 U / 1.0 U	1.0 U / 1.0 U	3.0 U / 3.0 U
MW-1R	11/25/2014	250 U	100 U	200 U	0.20 U	0.20 U	0.20 U	0.60 U
MW-2R	11/25/2014	250 U / 250 U	100 U / 100 U	200 U / 200 U	0.20 U/0.20 U	0.20 U/0.20 U	0.20 U/0.20 U	0.60 U/0.60 U
MW-4R	11/25/2014	250 U	100 U	200 U	0.20 U	0.20 U	0.20 U	0.60 U
MW-7	11/25/2014	250 U	100 U	200 U	0.20 U	0.20 U	0.20 U	0.60 U
MW-9	11/25/2014	250 U	100 U	200 U	0.20 U	0.20 U	0.20 U	0.60 U
MW-10R	11/25/2014	250 U	100 U	200 U	0.20 U	0.20 U	0.20 U	0.60 U
MTCA Method A Cleanup Level		1,000[c]	500	500	51[d]	15,000[d]	2,100[d]	1,000
NOAA SQUIRT Marine Values Chronic Effects		NA	NA	NA	110[e]	215[e]	25[e]	NA

Notes:

(a) Samples were analyzed for diesel- and heavy oil-range, hydrocarbons using Northwest Total Petroleum Hydrocarbon (TPH) Method NWTPH-Dx with Acid/Silica Gel Clean-up and for gasoline-range hydrocarbons using Northwest TPH Method NWTPH-G.

(b) Select aromatic volatile organic compounds (VOC) analyzed by Method SW8260C.

(c) Cleanup level without presence of benzene.

(d) Cleanup level is based on Clean Water Act - CWA 303(c)(4)(B).

(e) Value based on NOAA Screening Quick Reference Tables (SQUIRT).

µg/L = micrograms per liter.

"U" = Not detected at or above laboratory reporting limits or limits of quantitation.

Where two values are displayed, the second is the analytical result for a field duplicate sample.

MTCA = Washington State Department of Ecology Model Toxics Control Act (WAC 173-340).

NOAA = National Oceanic and Atmostpheric Administration

"NA" = Not measured, Not available, or Not applicable.

Figures

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N

0 0.5 1

Miles

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Cornet Bay Marina

Site Location

1396010*00
January 2015

Figure 1

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Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

- Approximate Property Boundary
- Former Timber Bulkhead and Current Sheet Pile Bulkhead

NOTE:
Approximate property boundary obtained from Survery performed on 17 November 2011.Boundary located on east portion of site is identified as right-of-way. Aerials Express 0.3 to 0.6m resolution imagery for metropolitan areas and the best available United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP) imagery and enhanced versions of United States Geological Survey (USGS) Digital Ortho Quarter Quad (DOQQ) imagery for other areas. For more information on this map, visit us online at http://goto.arcgisonline.com/maps/World_Imagery

N

0 50 100

Scale: Feet
1 inch = 50 feet

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Washington State Department of Ecology
Cornet Bay Marina

Site Plan

1396010*00
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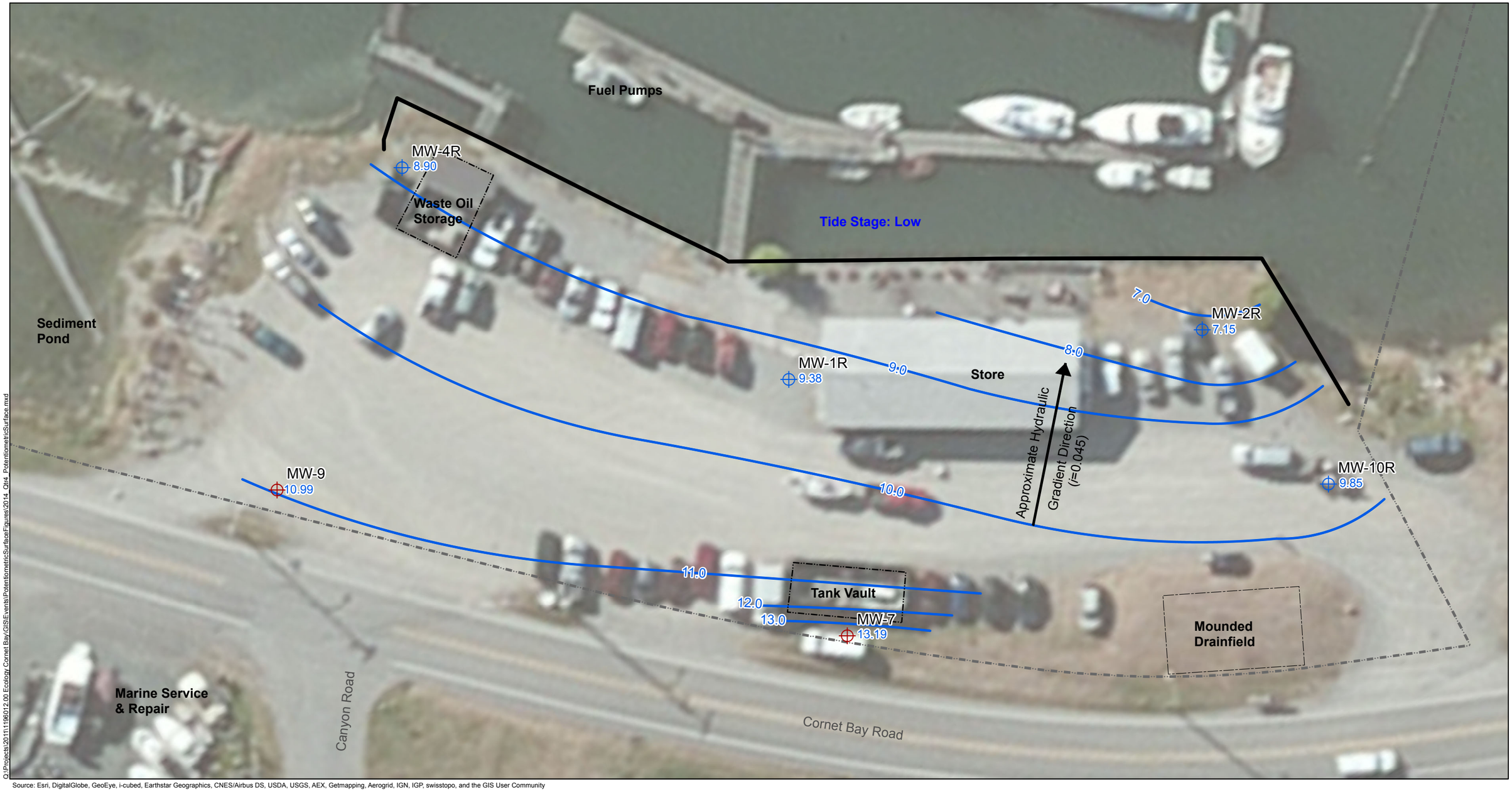
Figure 2



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Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

- MW-9 — Existing Monitoring Well (With November 2014 Groundwater Level Elevation, feet above MSL)
- MW-1R — 2014 Monitoring Well (With November 2014 Groundwater Level Elevation, feet above MSL)
- 8.0 — Groundwater Elevation Contour (Elevation, feet above MSL)
- Former Timber Bulkhead and Current Sheet Pile Bulkhead
- Approximate Property Boundary

Note:

1. Approximate property boundary obtained from survey performed on 17 November 2011. Boundary located on east portion of site is identified as right-of-way.

2. Water level measurements made on 25 November 2014 within approximately 1.5 hours of low tide (1320).

N

0 30 60

Scale: Feet

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Cornet Bay Marina

Groundwater Potentiometric Surface Map November 2014

1396010*00
January 2015

Figure 3

Attachment A

Groundwater Purge and Sample Forms

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-1R

PROJECT NUMBER: 139601B.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 4.81 @ 1133 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Heron Little Dipper PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 1723 PURGE DEPTH (FT) ~8.00

TIME END PURGE:

TIME SAMPLED: 1750

COMMENTS: Stopped Purge at 1730. Resumed 1735.
Need ~3.3 L to fill sample containers & 1.2 L for Just Dx/Bx/BTEX.
Need ~2 ft water column / 5.5 ft

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	10.20		4.51		5.69		0.16	0.64	1.44		~0.9

TIME	1725	1730	1738	1743						
VOLUME PURGED ~~(GAL)~~ L	~0.5	~1.5	~2.0	~3.0						
PURGE RATE ~~(GPH)~~ LPM	~0.25	~0.15	→	→						
TEMPERATURE (°C)	12.3	12.2	11.6	11.8						
pH	7.15	7.20	7.21	7.23						
SPECIFIC CONDUCTIVITY (micromhos/cm) uS/cm (uncorrected)	965	1022	993	957						
DISSOLVED OXYGEN (mg/L)	3.78	3.43	4.11	4.46						
eH(MV)Pt-AgCl ref.	10.2	38.5	54.6	61.9						
TURBIDITY/COLOR	3.5	6.0	20	32						
ODOR	No	→	→	→						
DEPTH OF PURGE INTAKE (FT)	~8.0	→	→	→						
DEPTH TO WATER DURING PURGE (FT)	4.96	5.47	5.80	6.15						
NUMBER OF CASING VOLUMES REMOVED				~1						
DEWATERED?	No	→	→	→						

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-1R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

SAMPLE DATA:
TIME SAMPLED: Ref to Pg 1 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT:

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-1R	2	Amber	No	No	mL(500)	32 NTV	slight brown	Yes	NWTPH-Dx	
↓	2	Voa	↓	↓	40mL	↓	↓	↓	Methane	
	5	Voa	HCL	No	40mL				NWTPH-Gx/BTEX	
	1	Poly	No	No	500mL				SO_4	NO_2, & NO_3
	1	↓	ZnAc	↓	↓				Sulfide	
	1		H_2SO_4						Ammonia	
↓	1	↓	HNO_3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:
TOTAL DISCHARGE (GAL): ~3L COMMENTS:

DISPOSAL METHOD: Onsite 55-gal

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES (NO)

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:
WEATHER CONDITIONS: Raining, Cloudy

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? Well running dry, recharge rate ≠ to lowest setting on low flow peristaltic pump. Sampled well prior to WQ stabilization due to well running dry.

cc: Project Manager: Ty Schreiner
Job File:
Other:

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-2R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 6.72 @ 1156 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Heron Little Dipper PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 1843 PURGE DEPTH (FT) ~9.0

TIME END PURGE:

TIME SAMPLED: 2000

COMMENTS:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)		DEPTH TO WATER (FT)		WATER COLUMN (FT)		MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6		CASING VOLUME (GAL)
	10.67	-	6.68	=	0.16	X	0.16	0.64	1.44	=	~0.64

TIME		1852	1901	1906	1913	1918	1924	1929	1937	1943	1947	1952	1955
VOLUME PURGED (GAL) L	~0.5	~2	~4	~5.5	~7	~8.5	~10.0	~11.5	~14	~15.5	~16.0	~17.5	~18
PURGE RATE (GPM) LPM	~0.25	→											→
TEMPERATURE (°C)	10.7	11.0	10.9	10.9	11.0	11.1	10.9	11.0	10.9	10.8	10.9	10.9	11.0
pH	7.76	7.25	7.19	7.17	7.14	7.13	7.14	7.12	7.14	7.13	7.12	7.10	7.11
SPECIFIC CONDUCTIVITY (uS/cm micromhos/cm) (uncorrected)	216.2	195.8	208.4	217.2	235.1	236.9	239.0	242.2	249.4	242.8	257.3	274.7	266.7
DISSOLVED OXYGEN (mg/L)	10.30	10.16	9.89	9.97	9.78	9.72	9.83	9.79	9.96	10.00	9.92	9.80	9.82
eH(MV)Pt-AgCl ref.	145.6	150.4	160.8	167.2	173.6	178.1	183.0	187.6	193.4	197.4	200.4	204.2	205.0
TURBIDITY/COLOR NTU	200	160	140	120	100	100	100	90	95	95	80	85	80
ODOR	No	→											→
DEPTH OF PURGE INTAKE (FT)	~9.0	→											→
DEPTH TO WATER DURING PURGE (FT)	6.45	6.50	6.50	6.52	6.54	6.55	6.58	6.62	6.66	6.72	6.74	6.80	6.82
NUMBER OF CASING VOLUMES REMOVED			1	2		3	4		5	6		7	
DEWATERED?	No	→											→

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-2R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

SAMPLE DATA: → Ref to pg 1

TIME SAMPLED: _____ COMMENTS: _____

DEPTH SAMPLED (FT): _____

SAMPLING EQUIPMENT: _____

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-2R	2	Amber	No	No	500mL	80 NTU	Slight tan	Yes	NWTPH-Dx	
↓	2	Voa	↓	↓	40mL	↓	↓	↓	Methane	
↓	5	↓	HCL	↓	↓	↓	↓	↓	NWTPH-Gx/BTEX	
↓	1	Poly	No	↓	500mL	↓	↓	↓	SO_4, NO_2, & NO_3	
↓	1	↓	ZnAc	↓	↓	↓	↓	↓	Sulfide	
↓	1	↓	H_2SO_4	↓	↓	↓	↓	↓	Ammonia	
↓	1	↓	HNO_3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (~~GAL~~): ~18 L COMMENTS: _____

DISPOSAL METHOD: 2 Onsite 55-gal _____

DRUM DESIGNATION(S)/VOLUME PER (GAL): _____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: _____

GENERAL:

WEATHER CONDITIONS: Cloudy, slight rain

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? _____

cc: Project Manager: Ty Schreiner

Job File: _____

Other: _____

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Ecology Cornet Bay WELL NUMBER: MW-4R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 4.86 @ 1140 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Water Level Meter (Little Dipper) PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 1224 PURGE DEPTH (FT) 8.00

TIME END PURGE:

TIME SAMPLED: 1315

COMMENTS:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	10.39		4.89		5.5		0.16	0.64	1.44		0.88

TIME (Start 1224)	1226	1231	1236	1242	1247	1252	1258	1305	1310	1313
VOLUME PURGED (gal) L	~0.5	~2.5	~2.5	~3.75	5.25	--	~8.0	~10	11.5	~12
PURGE RATE (gpm) LPM	~0.25	→	→	→	→	→	→	→	→	→
TEMPERATURE (°C)	10.7	10.6	10.7	10.9	11.0	10.9	10.9	10.9	11.0	11.0
pH	7.33	7.28	7.30	7.32	7.33	7.35	7.35	7.37	7.38	7.38
SPECIFIC CONDUCTIVITY (uncorrected) uS/cm (micromhos/cm)	302.4	304.0	303.4	305.2	304.7	305.7	306.7	306.4	307.8	307.6
DISSOLVED OXYGEN (mg/L)	9.83	9.82	9.84	9.37	9.38	9.32	9.76	9.85	9.70	9.85
eH(MV)Pt-AgCl ref.	232.1	234.7	236.0	238.0	239.9	243.0	245.8	248.1	250.0	251.1
TURBIDITY/COLOR NTU	8.6	15	20	21	19	14	11	8.7	6.8	6.7
ODOR	No	→	→	→	→	→	→	→	→	→
DEPTH OF PURGE INTAKE (FT) below TOC	8.00	→	→	→	→	→	→	→	→	→
DEPTH TO WATER DURING PURGE (FT)	5.33	5.50	5.54	5.58	5.59	5.60	5.60	5.58	5.60	5.60
NUMBER OF CASING VOLUMES REMOVED				1						
DEWATERED?	No	→	→	→	→	→	→	→	→	→

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-4R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

SAMPLE DATA: → Ref to Pg 1

TIME SAMPLED: _____ COMMENTS: _____

DEPTH SAMPLED (FT): _____

SAMPLING EQUIPMENT: _____

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-4R	2	Amber	None	No	500mL	6.7	Clear	Yes	NWTPH-Dx	
↓	2	Vou	↓	↓	40mL	↓	↓	↓	Methane	
↓	5	↓	HCL	↓	↓	↓	↓	↓	NWTPH-Gx/BTEX	
↓	1	Poly	No	↓	500mL	↓	↓	↓	SO_4, NO_2, & NO_3	
↓	1	↓	Zn Ac	↓	↓	↓	↓	↓	Sulfide	
↓	1	↓	H_2SO_4	↓	↓	↓	↓	↓	Ammonia	
↓	1	↓	HNO_3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE ~~(GAL)~~ L: ~12 L COMMENTS: _____

DISPOSAL METHOD: Onsite 55-gal

DRUM DESIGNATION(S)/VOLUME PER (GAL): _____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES (NO)

WELL CASING OK?: (YES) NO

COMMENTS: _____

GENERAL:

WEATHER CONDITIONS: Cloudy, Raining

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? _____

cc: Project Manager: Ty Schreiner

Job File: _____

Other: _____

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Ecology Cornet Bay Marina WELL NUMBER: MW-7

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 0.47 @ 1148 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Heron Little Dipper PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 1547 PURGE DEPTH (FT) ~7.0

TIME END PURGE:

TIME SAMPLED: 1630

COMMENTS:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	~~0.39~~ 13.77		0.39		13.38		0.16	0.64	1.44		~2.14

TIME	1549	1554	1600	1610	1617	1624			
VOLUME PURGED ~~(GAL)~~ L	~0.5	~2.0	~3.5	~6.0	~8.0	~10.0			
PURGE RATE (GPM) LPM	~0.25	→							
TEMPERATURE (°C)	11.6	11.4	11.5	11.4	11.3	11.5			
pH	7.09	7.10	7.11	7.11	7.11	7.11			
SPECIFIC CONDUCTIVITY (uS/cm micromhos/cm) (uncorrected)	444.7	443.6	448.0	448.0	455.1	455.4			
DISSOLVED OXYGEN (mg/L)	0.48	0.27	0.19	0.17	0.17	0.16			
eH(MV)Pt-AgCl ref.	-85.9	-98.2	-105.5	-111.2	-113.6	-115.4			
TURBIDITY/COLOR	9.7	7.1	4.9	3.6	1.9	0.90			
ODOR	No	→							
DEPTH OF PURGE INTAKE (FT)	~7.0	→							
DEPTH TO WATER DURING PURGE (FT)	1.15	1.33	1.43	1.50	1.51	1.51			
NUMBER OF CASING VOLUMES REMOVED			1/4	1/2	3/4	# 1			
DEWATERED?	No	→							

F-43.1 (5-89)

(ISGO.I) Page 1 of 2

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-7

PROJECT NUMBER: 1398010.00 PERSONNEL: MJW

SAMPLE DATA: – Ref to Pg 1

TIME SAMPLED: 1630 COMMENTS:

DEPTH SAMPLED (FT):

SAMPLING EQUIPMENT:

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-7	2	Amber	No	No	500mL	0.90	Clear	Yes	NWTPH-Dx	
	2	Voa	↓		40mL				Methane	
	5	↓	HCL		↓				NWTPH-	6x/BTEX
	1	Poly	No		500mL				SO4,	NO2, & NO3
	1		ZnAc						Sulfide	
	1		H2SO4	↓					Ammonia	
↓	1	↓	HNO3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ~10.0 L COMMENTS:

DISPOSAL METHOD: Onsite 55-gal

DRUM DESIGNATION(S)/VOLUME PER (GAL):

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES (NO)

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:

WEATHER CONDITIONS: Cloudy, Raining

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

cc: Project Manager: Ty Schreiner
Job File:
Other:

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Ecology Cornet Bay WELL NUMBER: MW-9

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 1.84 @ 1145 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Heron Little Dipper PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 1407 PURGE DEPTH (FT) ~~~7.0~~ ~9.0'

TIME END PURGE:

TIME SAMPLED: 1515

COMMENTS:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	13.17		0.90		12.27		0.16	0.64	1.44		~~7~~ ~2.0

TIME	1410	1415	1420	1425	1435	1440	1450	1458	1504	1508	1511	
VOLUME PURGED ~~(GAL)~~ L	~1.0	~2.5	~4.0	~5.5	~7.5	~8.5	~11	~12	~13	~14	~15	
PURGE RATE ~~(GPH)~~ LPM	~0.25	→	→	→	0.15	→	→	→	→	→	→	
TEMPERATURE (°C)	11.9	11.9	11.8	11.8	12.2	12.3	12.8	12.5	12.7	12.9	12.7	
pH	7.14	7.15	7.15	7.09	7.10	7.13	7.15	7.15	7.15	7.15	7.14	
SPECIFIC CONDUCTIVITY (uncorrected) uS/cm (micromhos/cm)	608.9	625.8	589.1	580.6	635.0	640.0	653	668	675	670	676	
DISSOLVED OXYGEN (mg/L) 0.63	~~1.5~~	0.63	1.34	1.87	0.87	0.60	0.39	0.33	0.30	0.28	0.26	
eH(MV)Pt-AgCl ref.	120.7	74.9	48.6	23.4	-28.7	-1.0	-0.7	-4.7	-6.4	-6.5	-7.0	
TURBIDITY/COLOR	6.9	8.0	24	55	45	20	14	11	6.4	6.0	5.2	
ODOR	No	→	→	→	→	→	→	→	→	→	→	
DEPTH OF PURGE INTAKE (FT)	~7.0	→	→	→	~9.0	→	→	→	→	→	→	
DEPTH TO WATER DURING PURGE (FT)	3.50	3.81	4.30	5.33	6.34	6.43	6.56	6.57	6.57	6.58	6.59	
NUMBER OF CASING VOLUMES REMOVED						1					~2	
DEWATERED?	No	→	→	→	→	→	→	→	→	→	→	

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-9

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

SAMPLE DATA: → Ref to Pg 1

TIME SAMPLED: ____ COMMENTS: ____

DEPTH SAMPLED (FT): ____

SAMPLING EQUIPMENT: ____

SAMPLE NO.	NO. OF CONTAIN-ERS	CON-TAINER TYPE	PRESER-VATIVE	FIELD FILTRA-TION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUS-TODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-9	2	Amber	No	No	500mL	5.2 NTU	Clear	Yes	NWTPH-Dx ~~w/sg~~	
↓	2	Voa	↓		40mL	↓	↓	↓	NWTPH-Gx/BTEX	
	5	↓	HCL		↓				Methane	
	1	Poly	No		500mL				SO4, NO2, & NO3	
	1		ZnAc						Sulfide	
	1		H_2SO_4	↓					Ammonia	
↓	1	↓	HNO_3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (~~GAL~~ L): ~15 L COMMENTS: ____

DISPOSAL METHOD: Onsite 55-gal

DRUM DESIGNATION(S)/VOLUME PER (GAL): ____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES (NO)

WELL CASING OK?: (YES) NO

COMMENTS: ____

GENERAL:

WEATHER CONDITIONS: Cloudy, Raining

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? ____

cc: Project Manager: Ty Schreiner

Job File: ____

Other: ____

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Ecology Cornet Bay WELL NUMBER: MW-10R

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 3.57 @ 1153 MEASURING POINT DESCRIPTION: TOC (North)

WATER LEVEL MEASUREMENT METHOD: Little Dipper Water Level Meter PURGE METHOD: Peristaltic Low Flow

TIME START PURGE: 2037 PURGE DEPTH (FT) ~~~7.0~~ ~9.0

TIME END PURGE:

TIME SAMPLED: 2115

COMMENTS: 2100 Stopped purge for one minute to ~~check~~ calculate casing volume.

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (FT)	-	DEPTH TO WATER (FT)	=	WATER COLUMN (FT)	X	MULTIPLIER FOR CASING DIAMETER (IN) 2	4	6	=	CASING VOLUME (GAL)
	10.49		3.28		7.21		0.16	0.64	1.44		~1.15

TIME	1039	2044	2049	2055	2100	2105	2110	2113			
VOLUME PURGED (~~GAL~~) L	~0.5	~2.0	~3.0	~4.0	~4.5	~5.0	~5.75	~6.0			
PURGE RATE (~~GPM~~) LPM	~0.25	→	~0.15	→	~0.10	→	→	→			
TEMPERATURE (°C)	11.9	11.7	11.3	11.6	11.7	11.9	12.4	12.2			
pH	6.82	6.86	6.88	6.84	6.82	6.85	6.84	6.83			
SPECIFIC CONDUCTIVITY (uS/cm micromhos/cm) (uncorrected)	1475	1500	1485	1565	1619	1556	1575	1608			
DISSOLVED OXYGEN (mg/L)	1.55	0.27	0.38	0.44	0.42	0.31	0.30	0.32			
eH(MV)Pt-AgCl ref.	205.6	168.2	149.3	104.0	84.0	80.7	100.2	108.0			
TURBIDITY/COLOR NTU	0.50 clear	10	23	22	17	10	11	10			
ODOR	No	—	—	—	—	—	—	→			
DEPTH OF PURGE INTAKE (FT)	~7.0	→	~8.0	~9.0	—	—	—	→			
DEPTH TO WATER DURING PURGE (FT)	4.33	5.60	6.40	7.45	7.65	7.83	8.05	8.10			
NUMBER OF CASING VOLUMES REMOVED					1						
DEWATERED?	No	—	—	—	—	—	—	→			

Groundwater Purge and Sample Form Date: 11/25/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Cornet Bay Marina WELL NUMBER: MW-10R (MW-10R)

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

SAMPLE DATA: → Ref to Pg 1

TIME SAMPLED: _____ COMMENTS: _____

DEPTH SAMPLED (FT): _____

SAMPLING EQUIPMENT: _____

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or L)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN-OF-CUSTODY AT 4°C?	ANALYSIS REQUEST (METHOD)	COMMENTS
MW-10R	2	Amber	No	No	500mL	10 NTV	clear	Yes	NWTPH-Dx	
↓	2	Voa	↓	↓	40mL	↓	↓	↓	Methane	
↓	5	↓	HCl	↓	↓	↓	↓	↓	NWTPH-Gx/BTEX	
↓	1	~~Hcl~~ Poly	No	↓	500mL	↓	↓	↓	SO4, NO2, & NO3	
↓	1	↓	ZnAc	↓	↓	↓	↓	↓	Sulfide	
↓	1	↓	H2SO4	↓	↓	↓	↓	↓	Ammonia	
↓ MW-10R	1	↓	HNO3	Yes	↓	↓	↓	↓	Diss Fe	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (GAL): ~6.0 L COMMENTS: _____

DISPOSAL METHOD: Onsite 55-gal

DRUM DESIGNATION(S)/VOLUME PER (GAL): _____

WELL HEAD CONDITIONS CHECKLIST (CIRCLE YES OR NO - IF NO, ADD COMMENTS):

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: _____

GENERAL:

WEATHER CONDITIONS: Cloudy, Slight Rain

TEMPERATURE (SPECIFY °C OR °F): ~45°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? _____

cc: Project Manager: T. Schreiner
Job File: _____
Other: _____

Attachment B

Laboratory Analytical Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

19 December 2014

Ty Schreiner
Kennedy Jenks Consultants
32001 32nd Ave S., Suite 100
Federal Way, WA 98001

RE: Client Project: Ecology Cornet Bay Marina, 1396010.00
ARI Job No: ZM54

Dear Ty:

Please find enclosed the original Chain-of-Custody (COC) record and the final results for the samples from the project referenced above. Seven water samples were received on November 26, 2014. The samples were analyzed for BETX, NWTPH-G, methane, NWTPH-Dx, dissolved iron and conventional parameters as instructed.

The percent recoveries for the surrogate, d4-1,2-dichloroethane, were high following the 12/4/14 BETX analyses of sample MW-2R-1 and the corresponding method blank and LCSD. Since no target compounds were detected in this sample or the MB, the high bias does not compromise any LOQ. No corrective actions were taken.

It was noted that the pH for sample MW-9 was measured at 6 following the initial BETX analysis of this sample. Since the sample was analyzed within 7 days of collection, the holding time for unpreserved samples was not compromised.

All samples were initially extracted for NWTPH-Dx on 12/2/14. The extract for sample MW-9 was lost prior to analysis and could not be recovered. This sample was re-extracted on 12/17/14. The re-extraction proceeded without incident of note. The results for the re-extraction only have been submitted.

There were no further analytical complications noted.

An electronic copy of this report and all supporting raw data will be kept on file at ARI. Should you have any questions regarding these results, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures
cc: file ZM54
MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: ZM54	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: Kennedy Jenks Consultants	Phone: (253) 835-6400	Date: 11/26/14	Ice Present? Yes
Client Contact: Ty Schreiner		No. of Coolers: 2	Cooler Temps: 2.9, 0.4
Client Project Name: Ecology Cornet Bay Marina			
Client Project #: 1396010.00	Samplers: MJW		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-Dx w/ SGC	NWTPH-Gx BTEX (8260)	Nitrate/ Nitrite	Ammonia	Sulfate/ Sulfide	Methane	Dissolved Iron (1)		Notes/Comments
					Analysis Requested								(1) Field Filtered
MW-1R	11/25/14	1750	GW	13	✓	✓	✓	✓	✓	✓	✓		
MW-2R		2000											
MW-4R		1315											
MW-7		1630											
MW-9		1515											
MW-10R		2115											
MW-2R-1		1900		7	✓	✓							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by (Signature)
	Printed Name: Matt Wilson	Printed Name: Rick Nelson	Printed Name:	Printed Name
	Company: K/J	Company: ARI	Company:	Company:
	Date & Time: 11/26/14 - 1100	Date & Time: 11/26/14 1120	Date & Time:	Date & Time

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Kennedy Jenks

Project Name: Ecology Cornet Bay Marina

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: ZM5Y

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	2.9	.4

Time: 1205

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 90817952

Cooler Accepted by: _____ Date: 11/26/14 Time: 1120

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	(Bubble Wrap) (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	11/17/14	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JM Date: 11/26/14 Time: 1225

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

ZM5Y : 00000

PRESERVATION VERIFICATION 11/26/14
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **ZM54**

Inquiry Number: NONE
Analysis Requested: 11/26/14
Contact: Schreiner, Ty
Client: Kennedy Jenks Consultants
Logged by: JM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Mark
VTSR: 11/26/14

Project #: 1396010.00
Project: Ecology Cornet Bay Marina
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	TPHD <2	Fe2+ <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
14-25951 **ZM54A**	MW-1R			P			DIS P						F			Y						
14-25952 **ZM54B**	MW-2R			P			DIS P						F			Y						
14-25953 **ZM54C**	MW-4R			P			DIS P						F			Y						
14-25954 **ZM54D**	MW-7			P			DIS P						F			Y						
14-25955 **ZM54E**	MW-9			P			DIS P						F			Y						
14-25956 **ZM54F**	MW-10R			P			DIS P						F			Y						
14-25957 **ZM54G**	MW-2R-1																					

P= pass F= fail

S2 only preserved with ZnOAc

Checked By JM Date 11/26/14

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: ZM54
Client: Kennedy Jenks Consultants
Project Event: 1396010.00
Project Name: Ecology Cornet Bay Marina

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-1R	ZM54A	14-25951	Water	11/25/14 17:50	11/26/14 11:20
2.	MW-2R	ZM54B	14-25952	Water	11/25/14 20:00	11/26/14 11:20
3.	MW-4R	ZM54C	14-25953	Water	11/25/14 13:15	11/26/14 11:20
4.	MW-7	ZM54D	14-25954	Water	11/25/14 16:30	11/26/14 11:20
5.	MW-9	ZM54E	14-25955	Water	11/25/14 15:15	11/26/14 11:20
6.	MW-10R	ZM54F	14-25956	Water	11/25/14 21:15	11/26/14 11:20
7.	MW-2R-1	ZM54G	14-25957	Water	11/25/14 19:00	11/26/14 11:20
8.	Trip Blank	ZM54H	14-25958	Water	11/25/14	11/26/14 11:20

ZM54 : COC01

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

EMPC Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

X Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**

Z Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-112814A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-112814A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 10:07

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	102%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-120414A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-120414A
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 12/04/14 11:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	130%
d8-Toluene	102%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C

Sample ID: MW-1R
SAMPLE

Lab Sample ID: ZM54A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 16:15

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-2R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54B
LIMS ID: 14-25952
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 16:42

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	102%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-4R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54C
LIMS ID: 14-25953
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 17:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	102%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-7**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54D
LIMS ID: 14-25954
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 17:37

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	112%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

ZM54-00021

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-9**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54E
LIMS ID: 14-25955
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 18:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery	
d4-1,2-Dichloroethane	117%
d8-Toluene	105%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-10R**
 SAMPLE

Lab Sample ID: ZM54F
LIMS ID: 14-25956
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 18:31

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	114%
d8-Toluene	101%
Bromofluorobenzene	99.8%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-2R-1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54G
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 12/04/14 11:36

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	123%
d8-Toluene	101%
Bromofluorobenzene	99.2%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blank**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54H
LIMS ID: 14-25958
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 15:47

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	103%

ZM54H : 14258.18

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-112814A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-112814A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 11/28/14 09:12
LCSD: 11/28/14 09:39

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	10.4	10.0	104%	10.1	10.0	101%	2.9%
Toluene	10.0	10.0	100%	9.69	10.0	96.9%	3.1%
Ethylbenzene	10.4	10.0	104%	9.91	10.0	99.1%	4.8%
m,p-Xylene	20.4	20.0	102%	19.5	20.0	97.5%	4.5%
o-Xylene	10.2	10.0	102%	9.72	10.0	97.2%	4.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	95.9%	98.4%
d8-Toluene	100%	99.7%
Bromofluorobenzene	103%	102%
d4-1,2-Dichlorobenzene	100%	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-120414A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-120414A
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized: MW
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 12/04/14 10:14
LCSD: 12/04/14 10:42

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	10.1	10.0	101%	10.3	10.0	103%	2.0%
Toluene	9.58	10.0	95.8%	10.1	10.0	101%	5.3%
Ethylbenzene	10.8	10.0	108%	10.9	10.0	109%	0.9%
m,p-Xylene	20.9	20.0	104%	21.3	20.0	106%	1.9%
o-Xylene	10.2	10.0	102%	10.6	10.0	106%	3.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	117%	123%
d8-Toluene	102%	103%
Bromofluorobenzene	101%	101%
d4-1,2-Dichlorobenzene	100%	99.6%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-112814A	Method Blank	10	103%	102%	102%	102%	0
LCS-112814A	Lab Control	10	95.9%	100%	103%	100%	0
LCSD-112814A	Lab Control Dup	10	98.4%	99.7%	102%	101%	0
ZM54A	MW-1R	10	110%	103%	101%	102%	0
ZM54B	MW-2R	10	106%	102%	101%	100%	0
ZM54C	MW-4R	10	110%	102%	100%	103%	0
ZM54D	MW-7	10	112%	103%	101%	100%	0
ZM54E	MW-9	10	117%	105%	102%	102%	0
ZM54F	MW-10R	10	114%	101%	99.8%	101%	0
MB-120414A	Method Blank	10	130%*	102%	99.0%	101%	1
LCS-120414A	Lab Control	10	117%	102%	101%	100%	0
LCSD-120414A	Lab Control Dup	10	123%*	103%	101%	99.6%	1
ZM54G	MW-2R-1	10	123%*	101%	99.2%	102%	1
ZM54H	Trip Blank	10	109%	103%	101%	103%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-120)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 14-25951 to 14-25958

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
Event: 1396010.00

Data Release Authorized:
Reported: 12/03/14

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-120114	Method Blank	12/01/14	1.0	Gasoline	< 0.25 U
14-25951		PID1		HC ID	---
				Trifluorotoluene	91.5%
				Bromobenzene	92.9%
ZM54A	MW-1R	12/01/14	1.0	Gasoline	< 0.25 U
14-25951		PID1		HC ID	---
				Trifluorotoluene	85.7%
				Bromobenzene	85.7%
ZM54B	MW-2R	12/01/14	1.0	Gasoline	< 0.25 U
14-25952		PID1		HC ID	---
				Trifluorotoluene	88.0%
				Bromobenzene	88.3%
ZM54C	MW-4R	12/01/14	1.0	Gasoline	< 0.25 U
14-25953		PID1		HC ID	---
				Trifluorotoluene	88.8%
				Bromobenzene	89.7%
ZM54D	MW-7	12/01/14	1.0	Gasoline	< 0.25 U
14-25954		PID1		HC ID	---
				Trifluorotoluene	92.7%
				Bromobenzene	94.8%
ZM54E	MW-9	12/01/14	1.0	Gasoline	< 0.25 U
14-25955		PID1		HC ID	---
				Trifluorotoluene	90.0%
				Bromobenzene	91.1%
ZM54F	MW-10R	12/01/14	1.0	Gasoline	< 0.25 U
14-25956		PID1		HC ID	---
				Trifluorotoluene	87.7%
				Bromobenzene	88.5%
ZM54G	MW-2R-1	12/01/14	1.0	Gasoline	< 0.25 U
14-25957		PID1		HC ID	---
				Trifluorotoluene	89.3%
				Bromobenzene	90.3%
ZM54H	Trip Blank	12/01/14	1.0	Gasoline	< 0.25 U
14-25958		PID1		HC ID	---
				Trifluorotoluene	89.1%
				Bromobenzene	90.1%

Gasoline values reported in mg/L (ppm)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG

Sample ID: LCS-120114
LAB CONTROL SAMPLE

Lab Sample ID: LCS-120114
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 12/03/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 12/01/14 13:14
LCSD: 12/01/14 13:44
Instrument/Analyst LCS: PID1/ML
LCSD: PID1/ML

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	0.86	1.00	86.0%	0.86	1.00	86.0%	0.0%

Reported in mg/L (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	91.5%	93.7%
Bromobenzene	90.8%	93.3%

ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: ZM54
Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
Event: 1396010.00

Client ID	TFT	BBZ	TOT OUT
MB-120114	91.5%	92.9%	0
LCS-120114	91.5%	90.8%	0
LCSD-120114	93.7%	93.3%	0
MW-1R	85.7%	85.7%	0
MW-2R	88.0%	88.3%	0
MW-4R	88.8%	89.7%	0
MW-7	92.7%	94.8%	0
MW-9	90.0%	91.1%	0
MW-10R	87.7%	88.5%	0
MW-2R-1	89.3%	90.3%	0
Trip Blank	89.1%	90.1%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(80-120)
(BBZ) = Bromobenzene	(80-120)	(80-120)

Log Number Range: 14-25951 to 14-25958

FORM II TPHG

ZM54 : 000211

Data File: /chem3/pid1.i/20141201-1.b/1201a004.d

Date : 01-DEC-2014 13:14

Client ID:

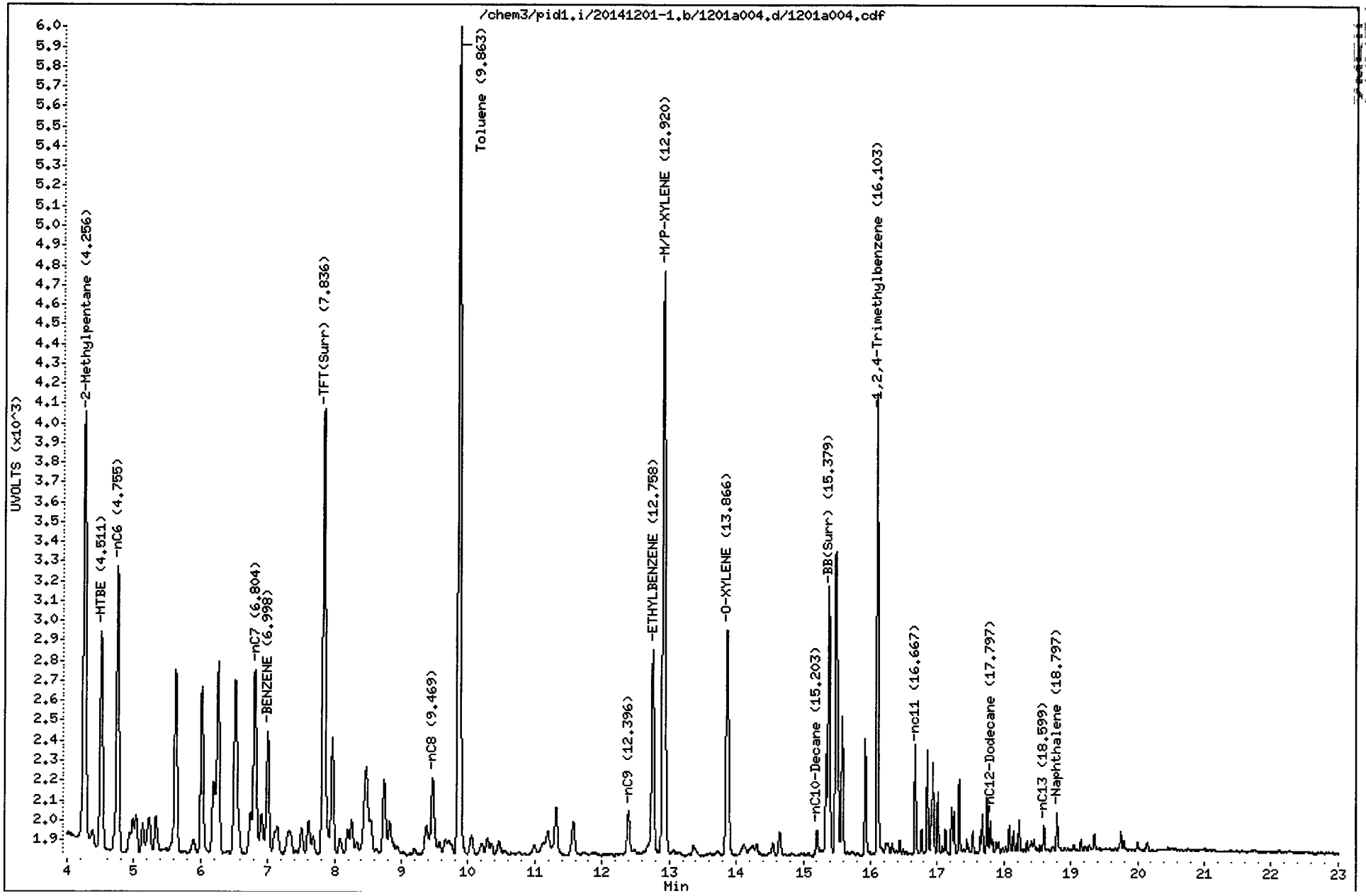
Sample Info: LCS1201

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

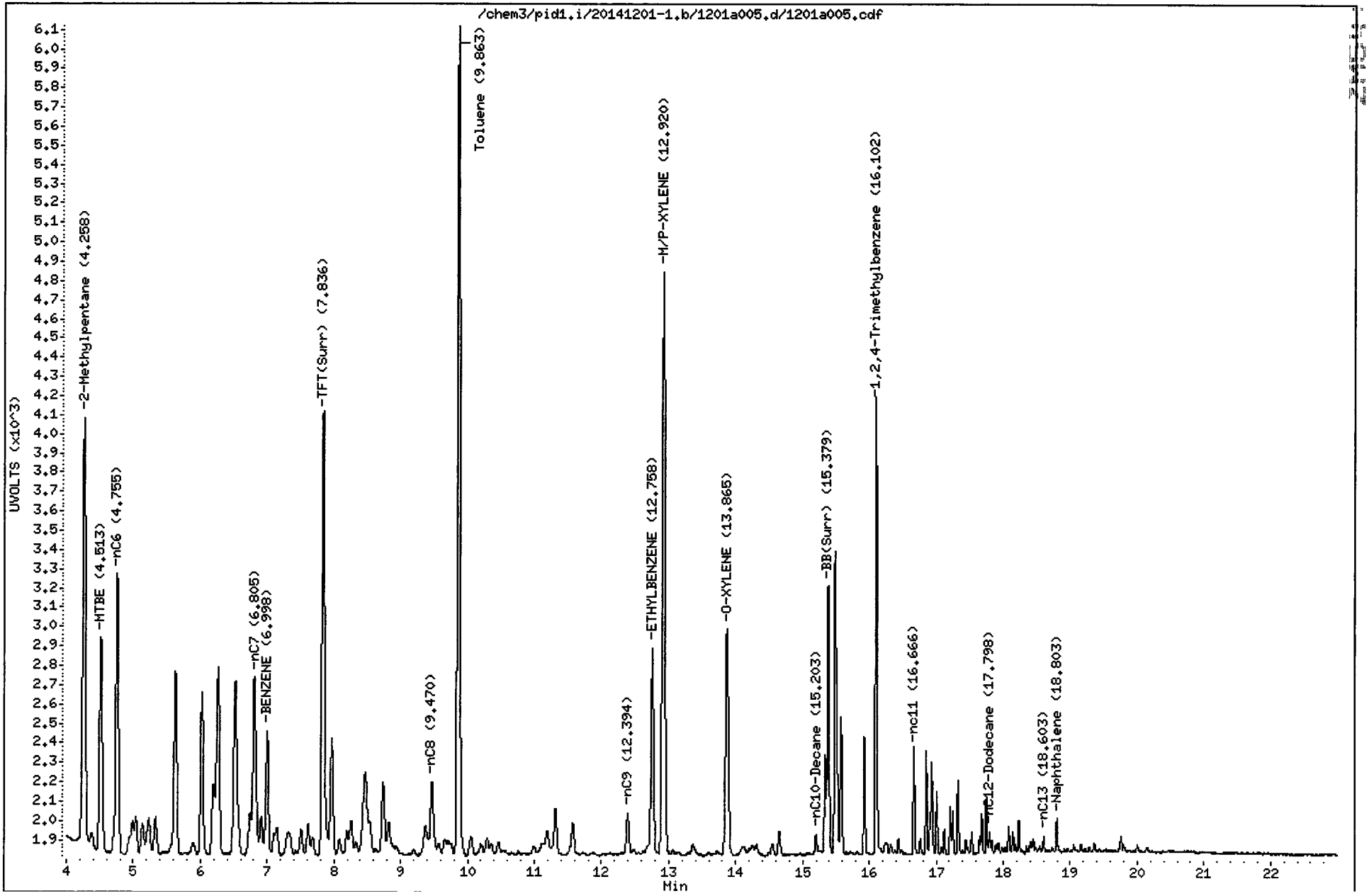
Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a005.d
Date : 01-DEC-2014 13:44
Client ID:
Sample Info: LCSD1201

Instrument: pid1.i
Operator: JW
Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid1.i/20141201-1.b/1201a006.d

Page 1

Date : 01-DEC-2014 14:15

Client ID:

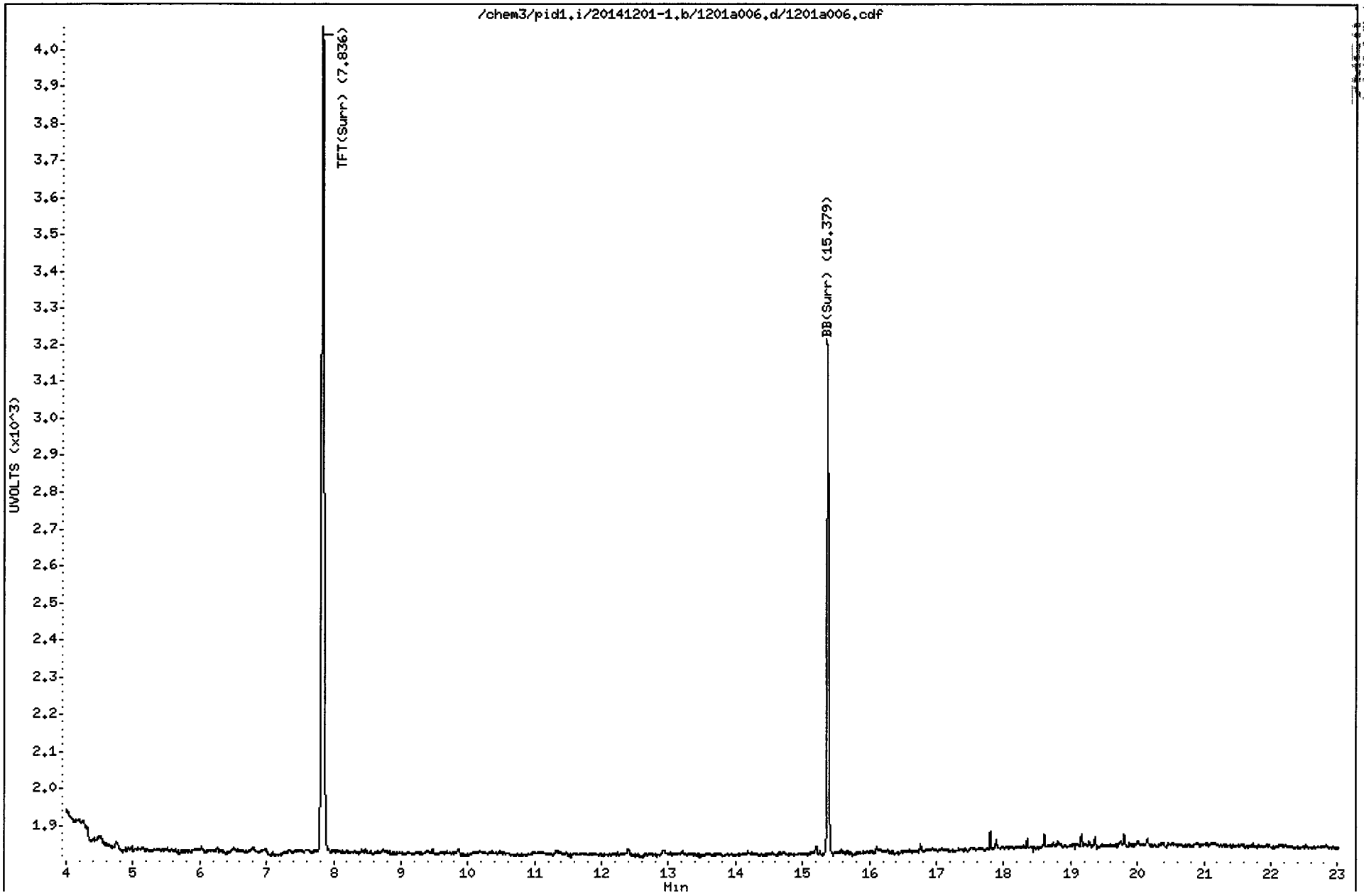
Instrument: pid1.i

Sample Info: MB1201

Operator: JW

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a015.d

Page 1

Date : 01-DEC-2014 19:12

Client ID: MW-1R

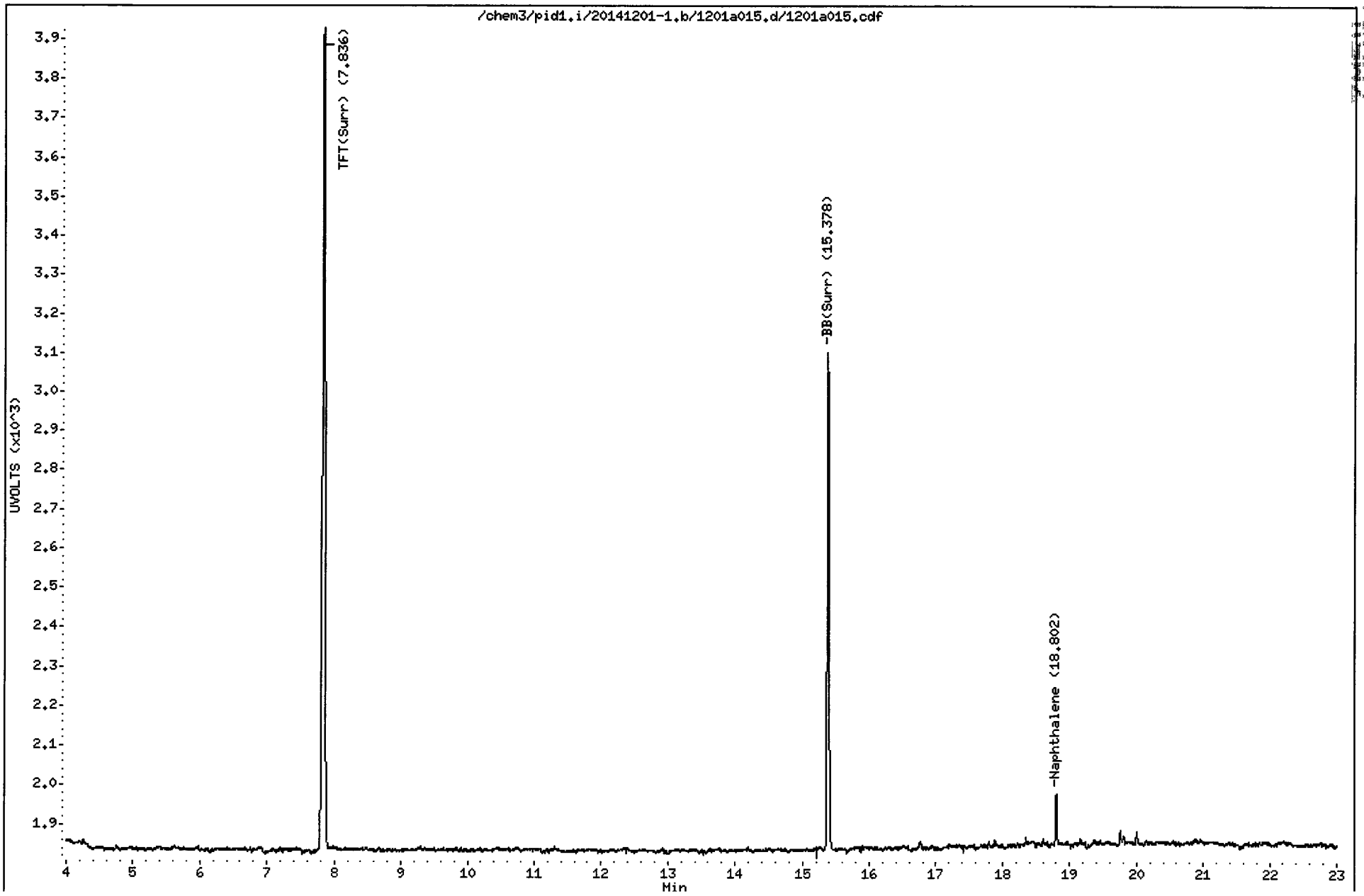
Instrument: pid1.i

Sample Info: ZM54A

Operator: JW

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a016.d

Date : 01-DEC-2014 19:43

Client ID: MW-2R

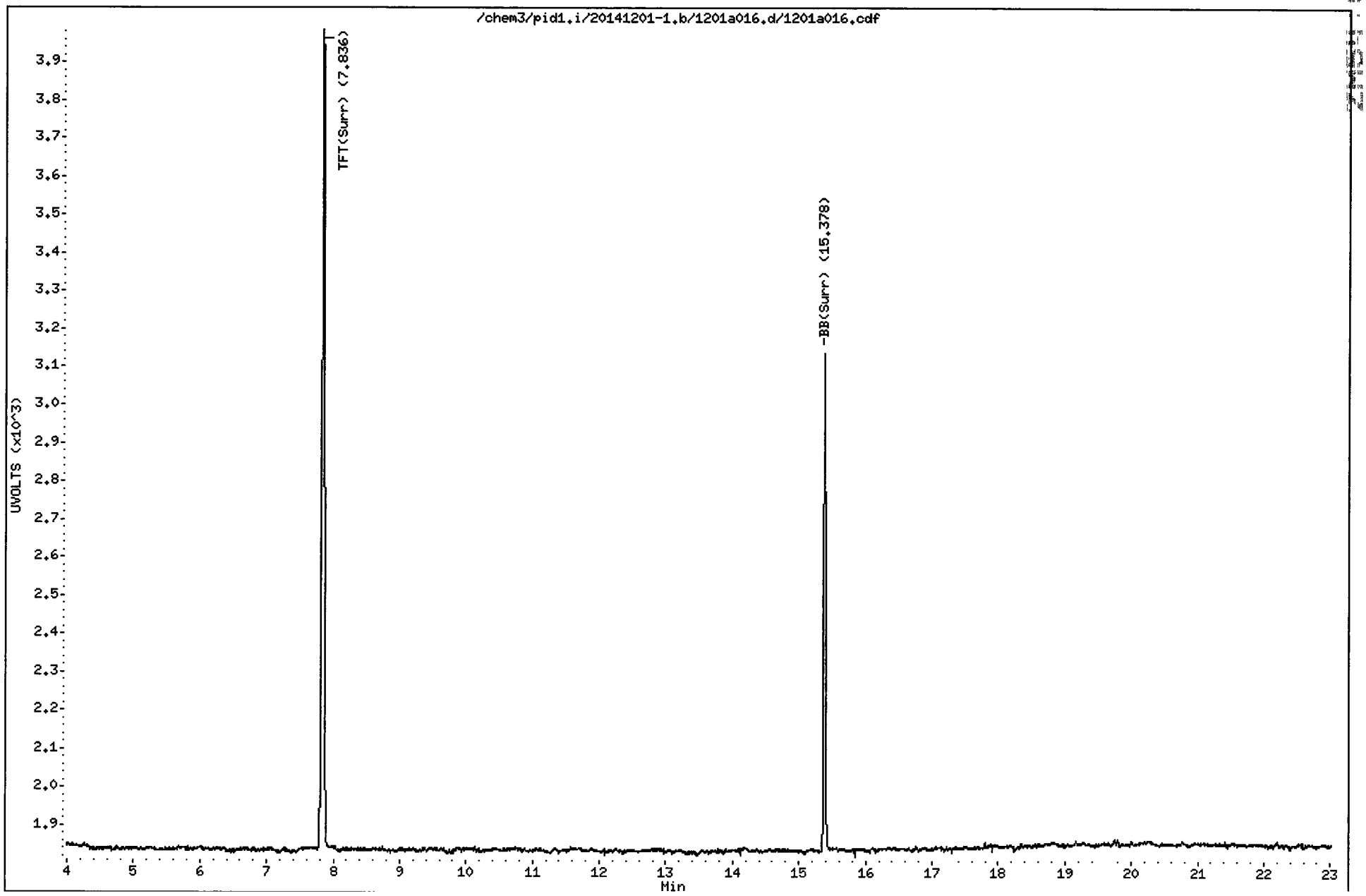
Sample Info: ZM54B

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a017.d

Date : 01-DEC-2014 20:13

Client ID: MW-4R

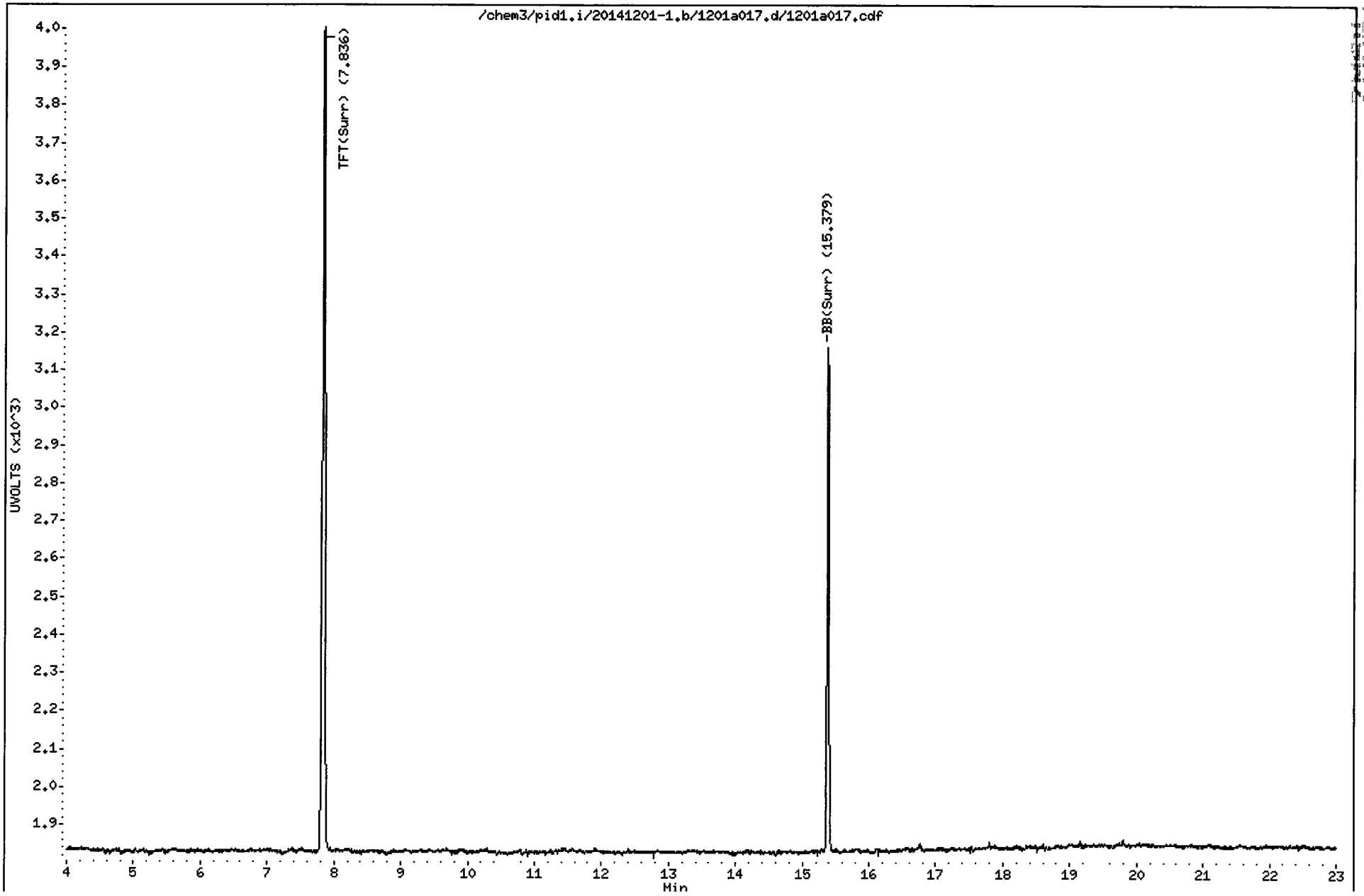
Sample Info: ZM54C

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a018.d

Date : 01-DEC-2014 20:44

Client ID: MW-7

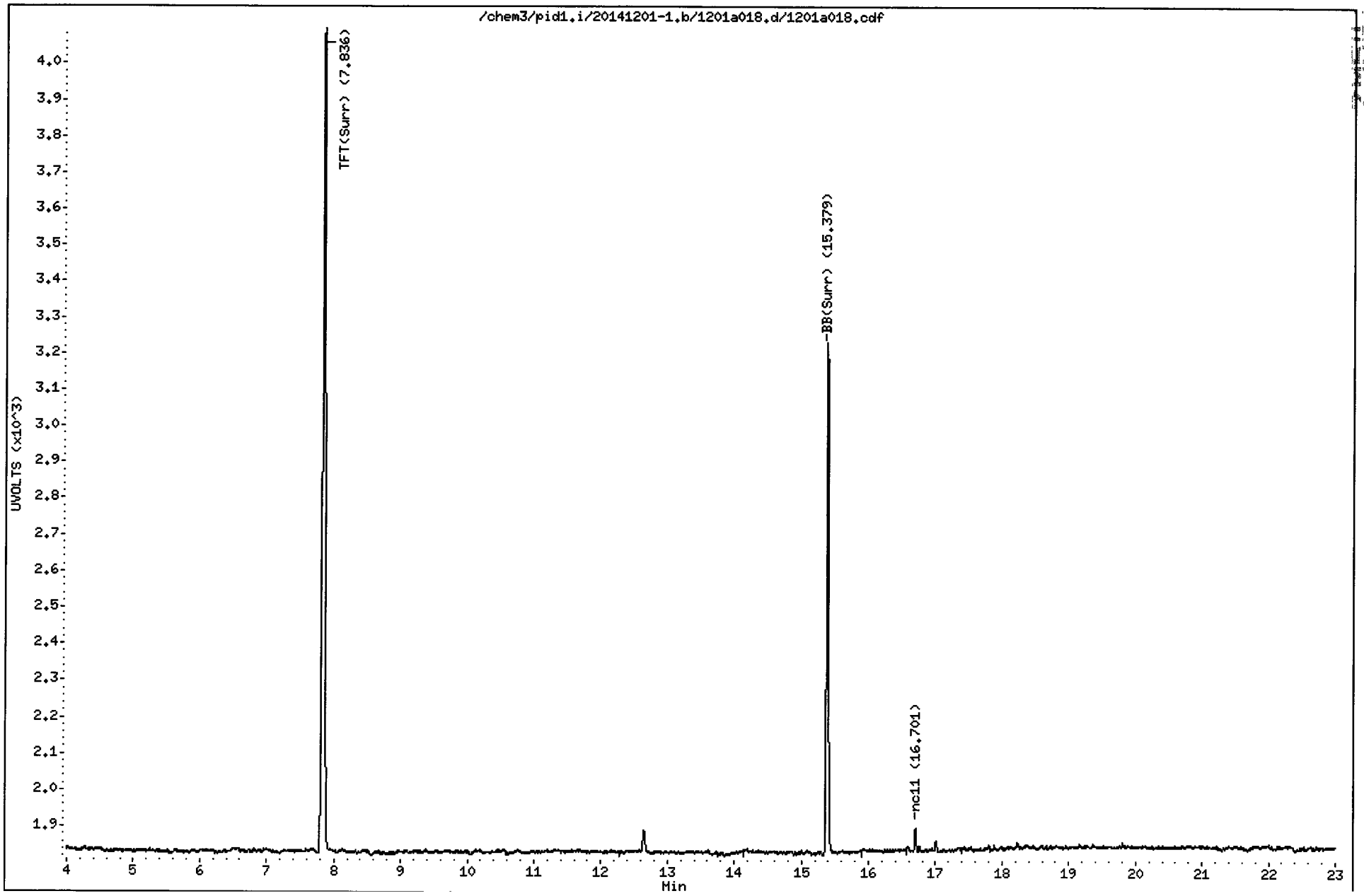
Sample Info: ZM54D

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a019.d

Page 1

Date : 01-DEC-2014 21:14

Client ID: MW-9

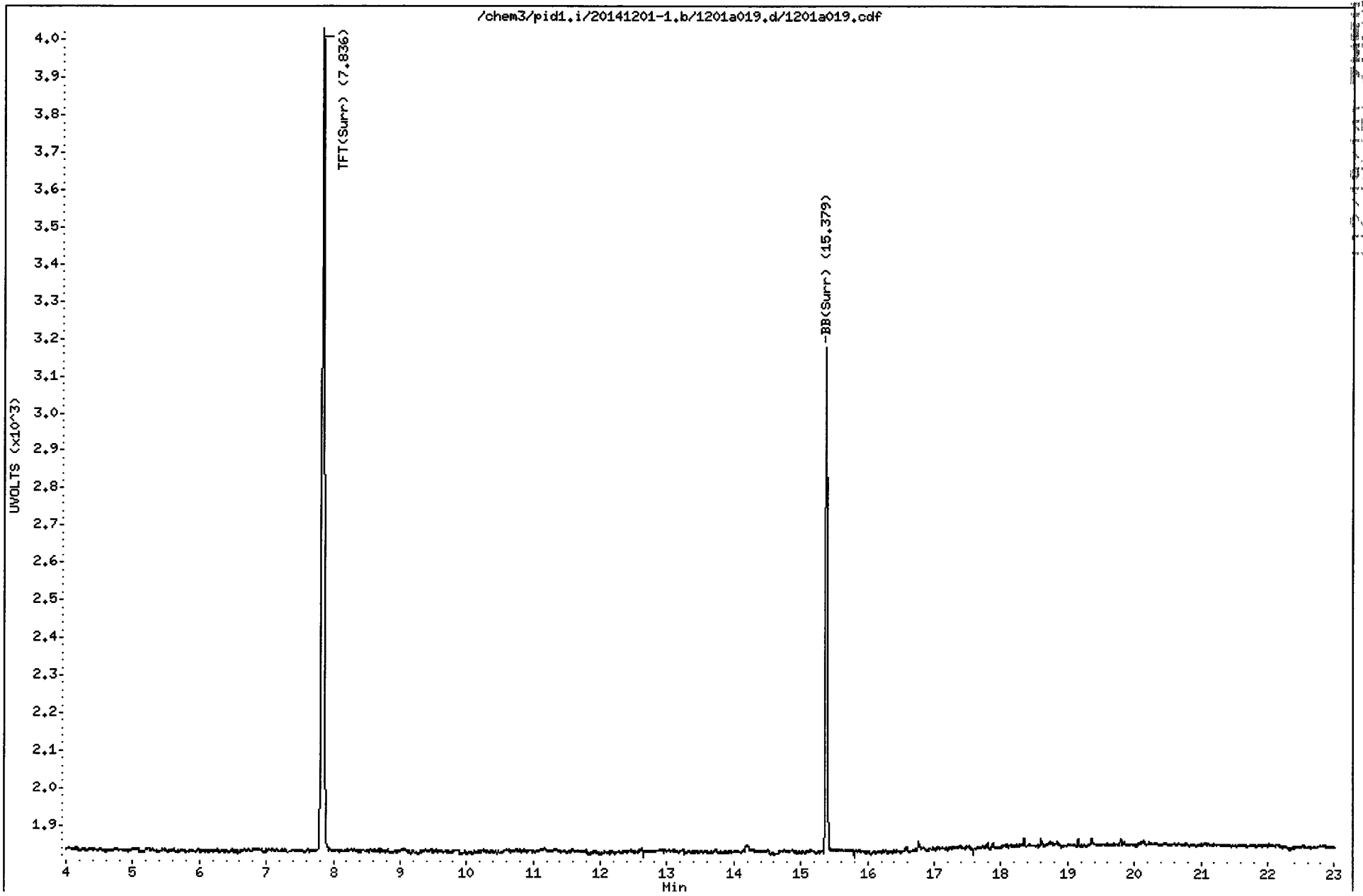
Instrument: pid1.i

Sample Info: ZM54E

Operator: JW

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a020.d

Date : 01-DEC-2014 21:45

Client ID: MW-10R

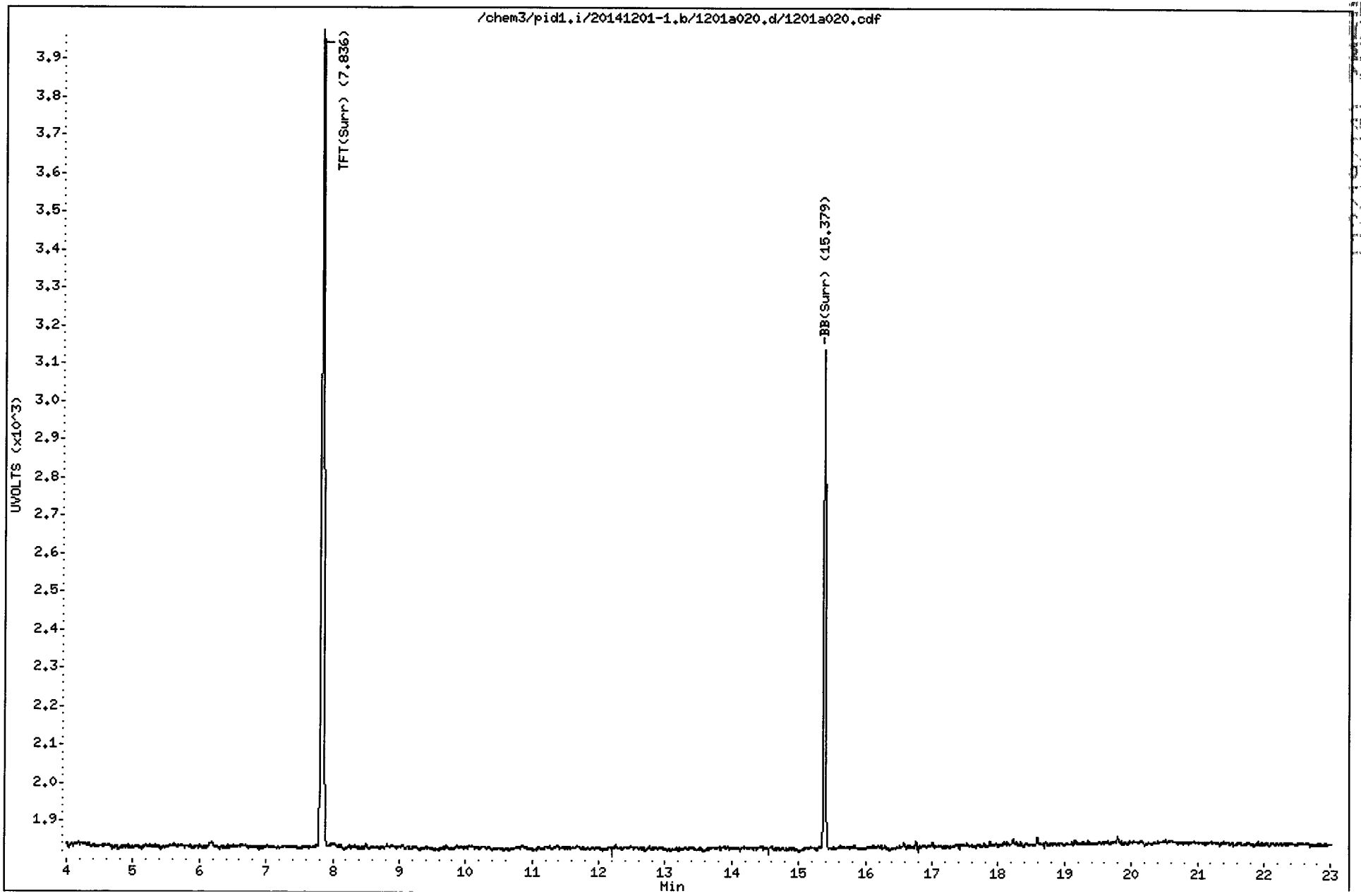
Sample Info: ZM54F

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a021.d

Date : 01-DEC-2014 22:15

Client ID: MW-2R-1

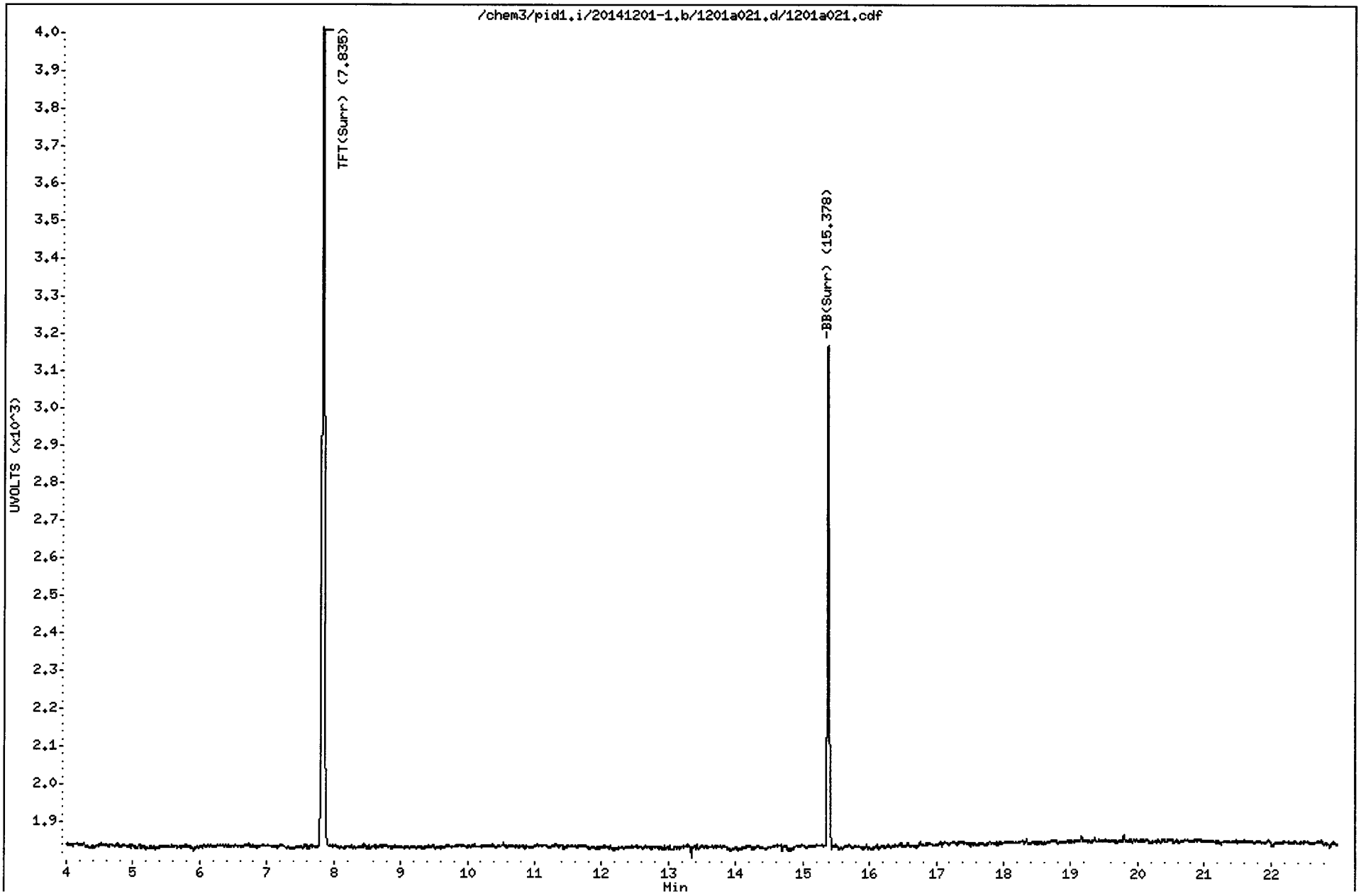
Instrument: pid1.i

Sample Info: ZM54G

Operator: JW

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20141201-1.b/1201a022.d

Date : 01-DEC-2014 22:46

Client ID: Trip Blank

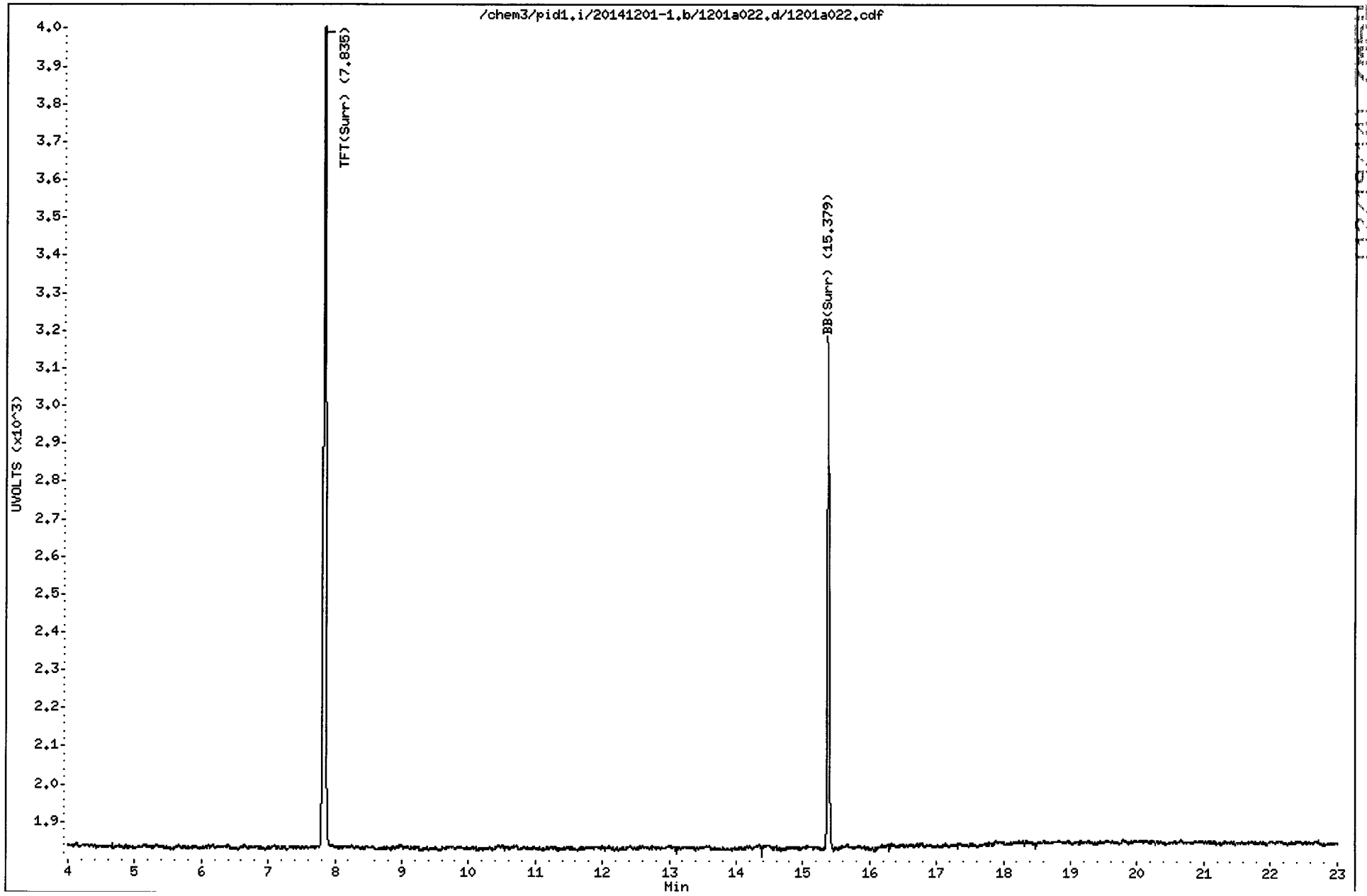
Sample Info: ZM54H

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: JW

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
METHANE ETHANE ETHENE

Modified RSK 175
Page 1 of 1
Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Received: 11/26/14

Data Release Authorized:
Reported: 12/02/14

ARI ID	Sample ID	Analysis Date	DL	Analyte	RL	Result
ZM54A	MW-1R	11/28/14	1.0	Methane	0.7	< 0.7 U
14-25951				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54B	MW-2R	11/28/14	1.0	Methane	0.7	< 0.7 U
14-25952				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54C	MW-4R	11/28/14	1.0	Methane	0.7	< 0.7 U
14-25953				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54D	MW-7	11/28/14	1.0	**Methane**	**0.7**	**1,760**
14-25954				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54E	MW-9	11/28/14	1.0	**Methane**	**0.7**	**323**
14-25955				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54F	MW-10R	11/28/14	1.0	**Methane**	**0.7**	**3,000**
14-25956				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
ZM54ADUP	MW-1R	11/28/14	1.0	Methane	0.7	< 0.7 U
				Ethane	1.2	< 1.2 U
				Ethene	1.1	< 1.1 U
112814MB	Method Blank	11/28/14	1.0	Methane	0.7	< 0.7 U
112814MB	Method Blank	11/28/14	1.0	Ethane	1.2	< 1.2 U
112814MB	Method Blank	11/28/14	1.0	Ethene	1.1	< 1.1 U

Reported in ug/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
METHANE ETHANE ETHENE

Modified RSK 175
Page 1 of 1
Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Received: 11/26/14

Data Release Authorized:
Reported: 12/02/14

ARI ID	Analysis Date	Analyte	Spike	Result	Recovery	RPD
112814LCS	11/28/14	Methane	654	676	103.3%	0.4%
112814LCSD				679	103.8%	
112814LCS	11/28/14	Ethane	1,230	1,280	104.3%	0.8%
112814LCSD				1,290	105.1%	
112814LCS	11/28/14	Ethene	1,150	1,160	101.3%	1.7%
112814LCSD				1,180	103.0%	

Reported in ug/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

RSK 175 WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	PRP	TOT OUT
ZM54A	MW-1R	96.1%	0
ZM54ADUP	MW-1R	96.1%	0
ZM54B	MW-2R	99.5%	0
ZM54C	MW-4R	102%	0
ZM54D	MW-7	101%	0
ZM54E	MW-9	103%	0
ZM54F	MW-10R	101%	0
MB-112814	Method Blank	99.5%	0
LCS-112814	Lab Control	101%	0
LCSD-112814	Lab Control Dup	102%	0

	LCS/MB LIMITS	QC LIMITS
(PRP) = Propane	(72-122)	(72-122)

Log Number Range: 14-25951 to 14-25956

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:
Page 1 of 1

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

Matrix: Water
Data Release Authorized:
Reported: 12/16/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-120214	Method Blank	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25951	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		98.3%
ZM54A	MW-1R	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25951	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		101%
ZM54B	MW-2R	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25952	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		95.5%
ZM54C	MW-4R	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25953	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		97.5%
ZM54D	MW-7	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25954	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		86.1%
ZM54F	MW-10R	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25956	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		94.9%
ZM54G	MW-2R-1	12/02/14	12/15/14	1.00	Diesel Range	0.10	< 0.10 U
14-25957	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		91.4%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

Client ID	OTER	TOT OUT
MB-120214	98.3%	0
LCS-120214	91.3%	0
MW-1R	101%	0
MW-2R	95.5%	0
MW-4R	97.5%	0
MW-7	86.1%	0
MW-10R	94.9%	0
MW-2R-1	91.4%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-25951 to 14-25957

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned

Sample ID: LCS-120214
LAB CONTROL

Lab Sample ID: LCS-120214
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized: MW
Reported: 12/16/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Date Extracted: 12/02/14
Date Analyzed: 12/15/14 18:43
Instrument/Analyst: FID/JLW

Sample Amount: 500 mL
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00

Range	Lab Control	Spike Added	Recovery
Diesel	2.55	3.00	85.0%

TPHD Surrogate Recovery	
o-Terphenyl	91.3%

Results reported in mg/L

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: ZM54
Matrix: Water
Project: Ecology Cornet Bay Marina
Date Received: 11/26/14
1396010.00

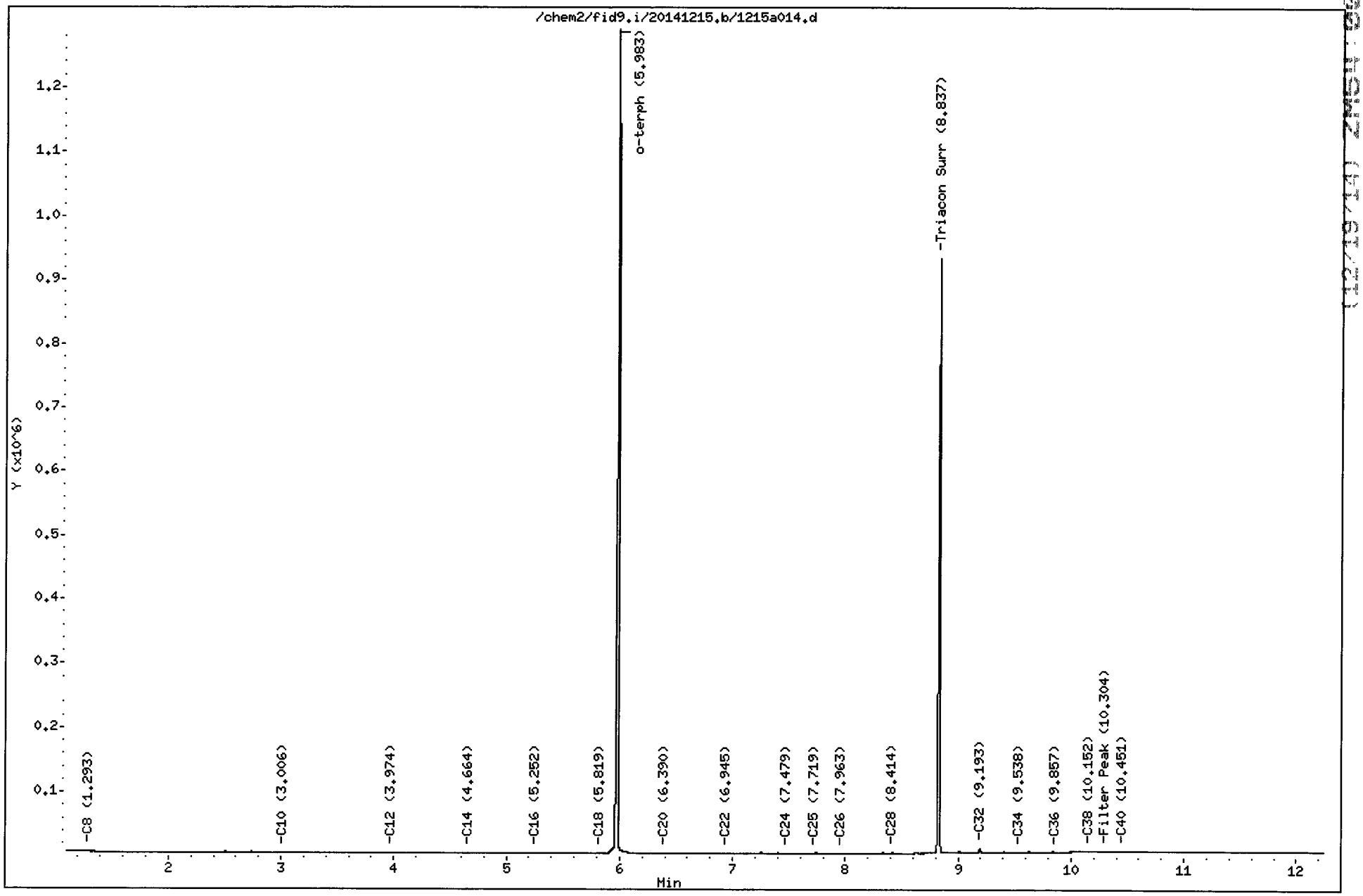
ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-25951-120214MB1	Method Blank	500 mL	1.00 mL	12/02/14
14-25951-120214LCS1	Lab Control	500 mL	1.00 mL	12/02/14
14-25951-ZM54A	MW-1R	500 mL	1.00 mL	12/02/14
14-25952-ZM54B	MW-2R	500 mL	1.00 mL	12/02/14
14-25953-ZM54C	MW-4R	500 mL	1.00 mL	12/02/14
14-25954-ZM54D	MW-7	500 mL	1.00 mL	12/02/14
14-25956-ZM54F	MW-10R	500 mL	1.00 mL	12/02/14
14-25957-ZM54G	MW-2R-1	500 mL	1.00 mL	12/02/14

Data File: /chem2/fid9.i/20141215.b/1215a014.d
Date : 15-DEC-2014 18:22
Client ID: ZM54MBW1
Sample Info: ZM54MBW1

Instrument: fid9.i

Operator: JW
Column diameter: 0.25

Column phase: RTX-1



Data File: /chem2/fid9.i/20141215.b/1215a015.d

Date : 15-DEC-2014 18:43

Client ID: ZM54LCSW1

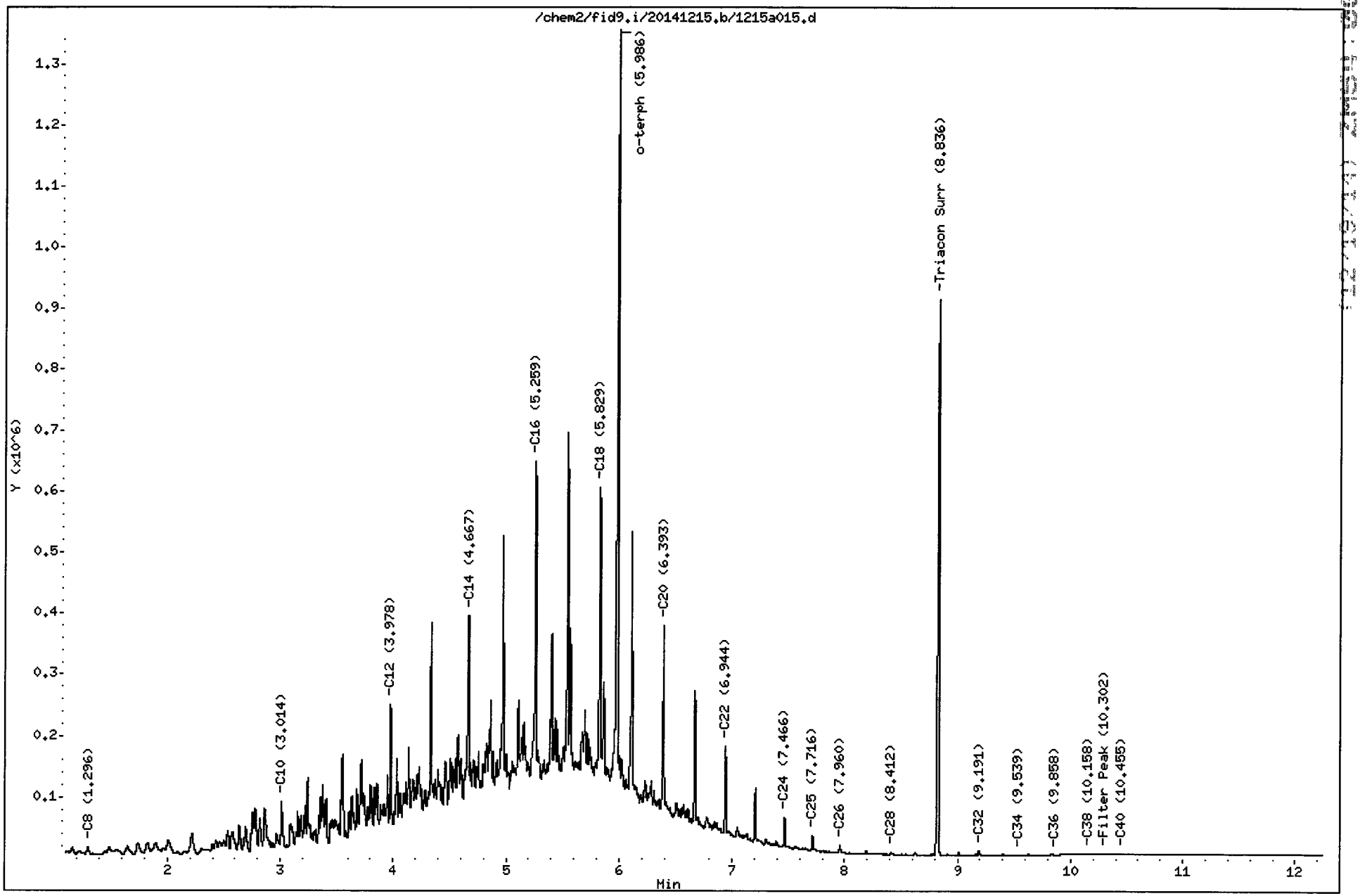
Sample Info: ZM54LCSW1

Column phase: RTX-1

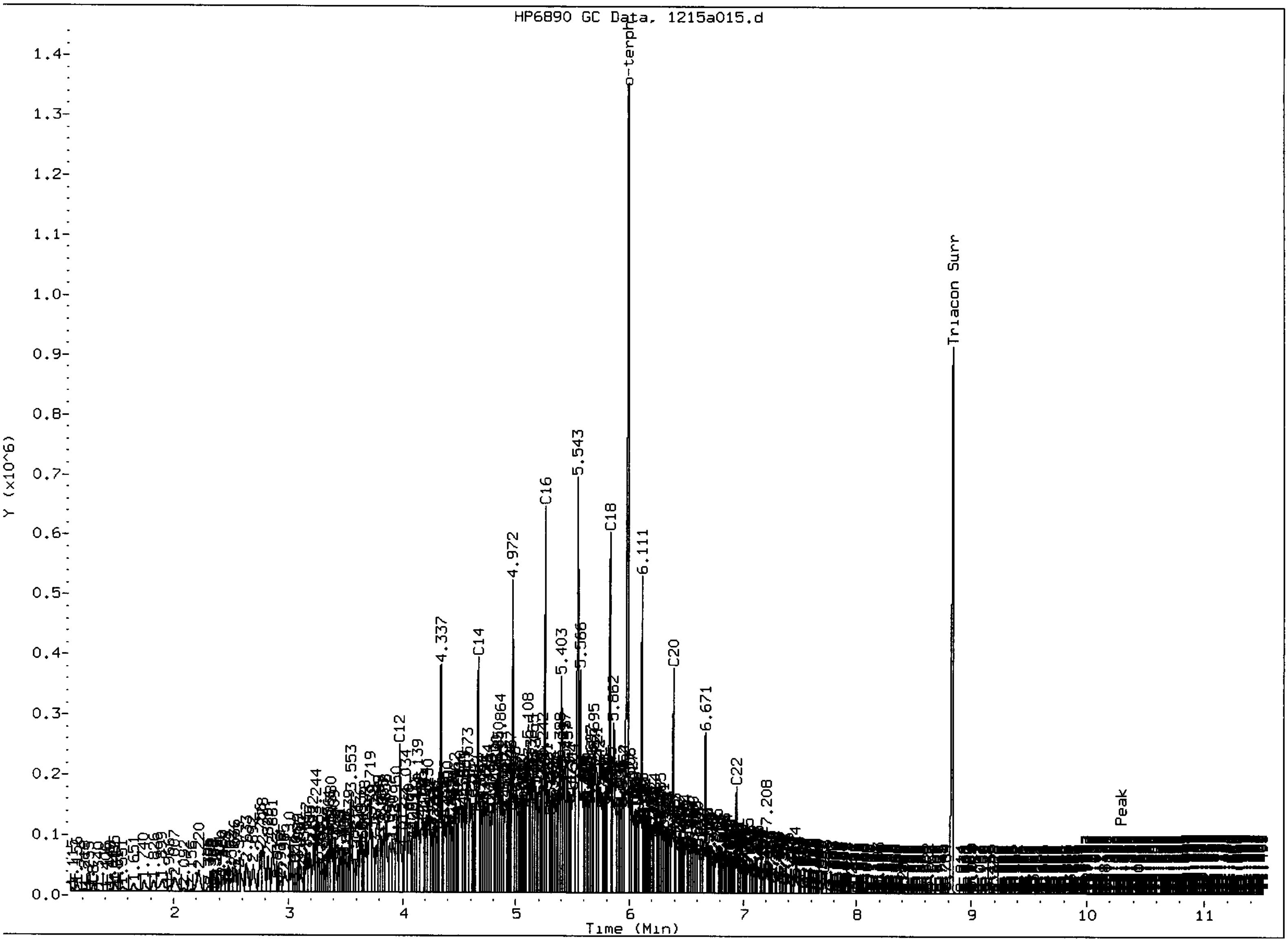
Instrument: fid9.i

Operator: JW

Column diameter: 0.25



FID:9A-2C/RTX-1 ZM54LCSW1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

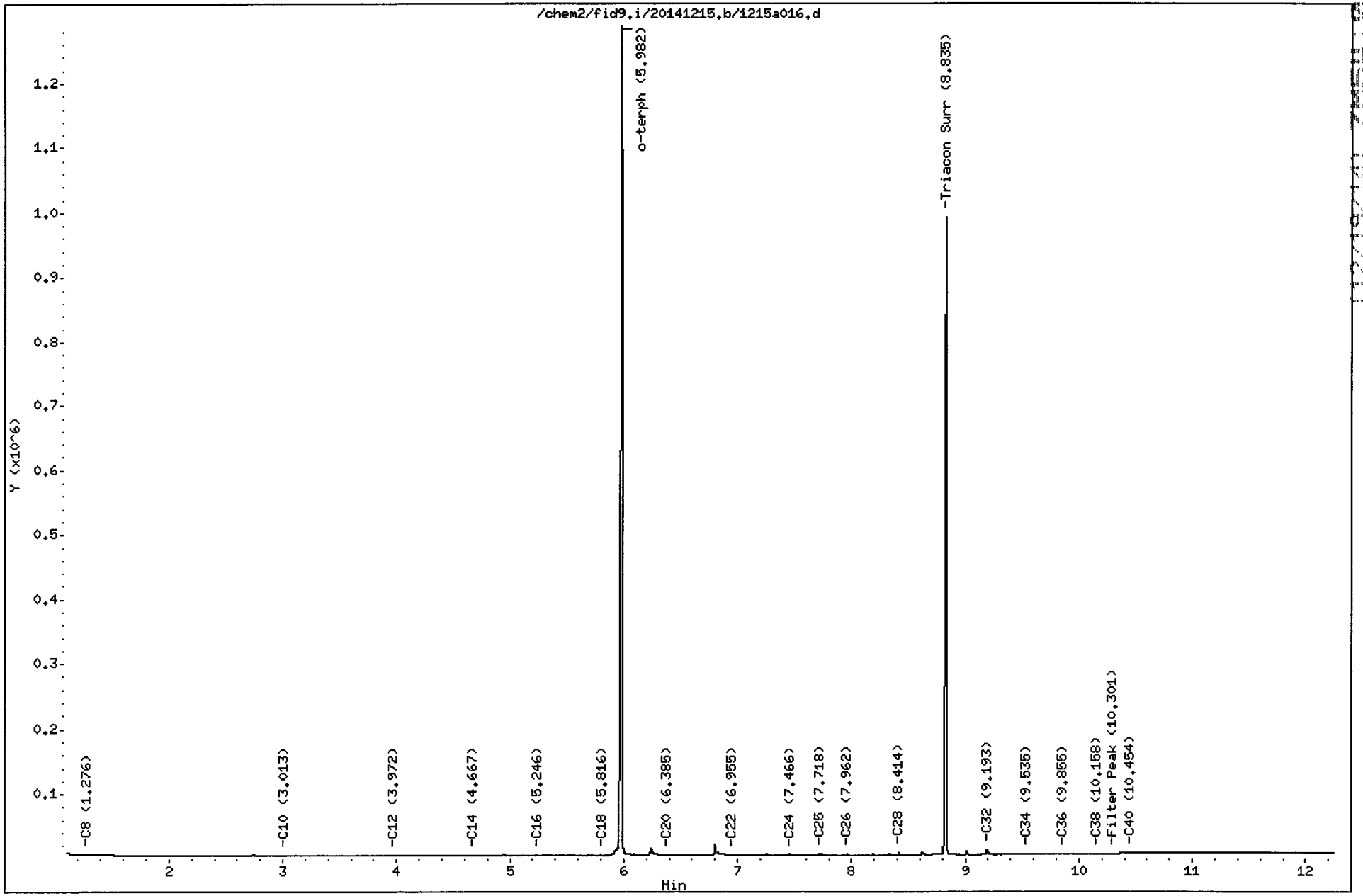
Analyst: TN Date: 12/16/14

Data File: /chem2/fid9.i/20141215.b/1215a016.d
Date : 15-DEC-2014 19:04
Client ID: MW-1R
Sample Info: ZM54A

Instrument: fid9.i

Operator: JW
Column diameter: 0.25

Column phase: RTX-1

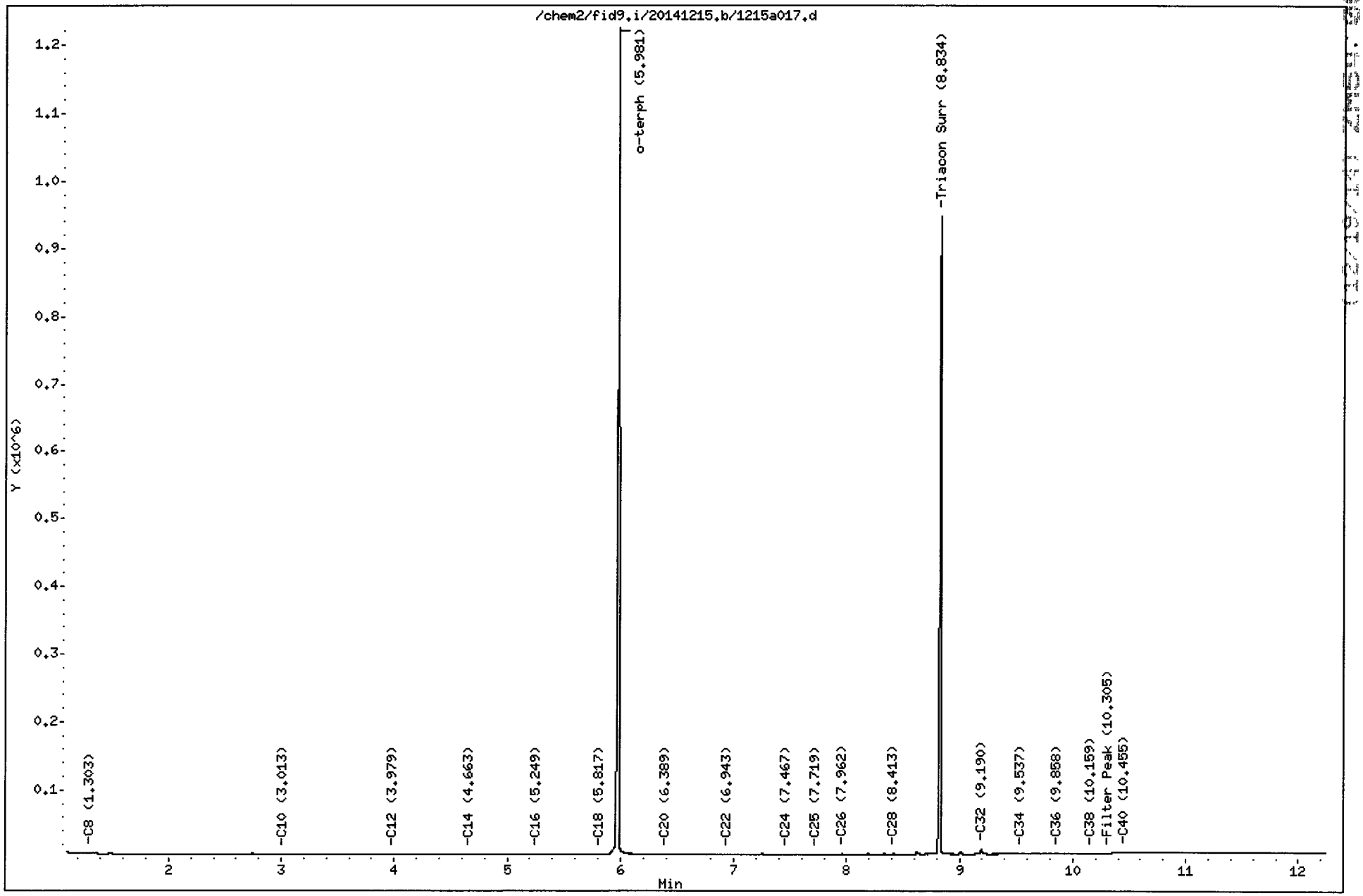


Data File: /chem2/fid9.i/20141215.b/1215a017.d
Date : 15-DEC-2014 19:25
Client ID: MW-2R
Sample Info: ZM54B

Instrument: fid9.i

Operator: JW
Column diameter: 0.25

Column phase: RTX-1



Data File: /chem2/fid9.i/20141215.b/1215a018.d

Date : 15-DEC-2014 19:45

Client ID: MW-4R

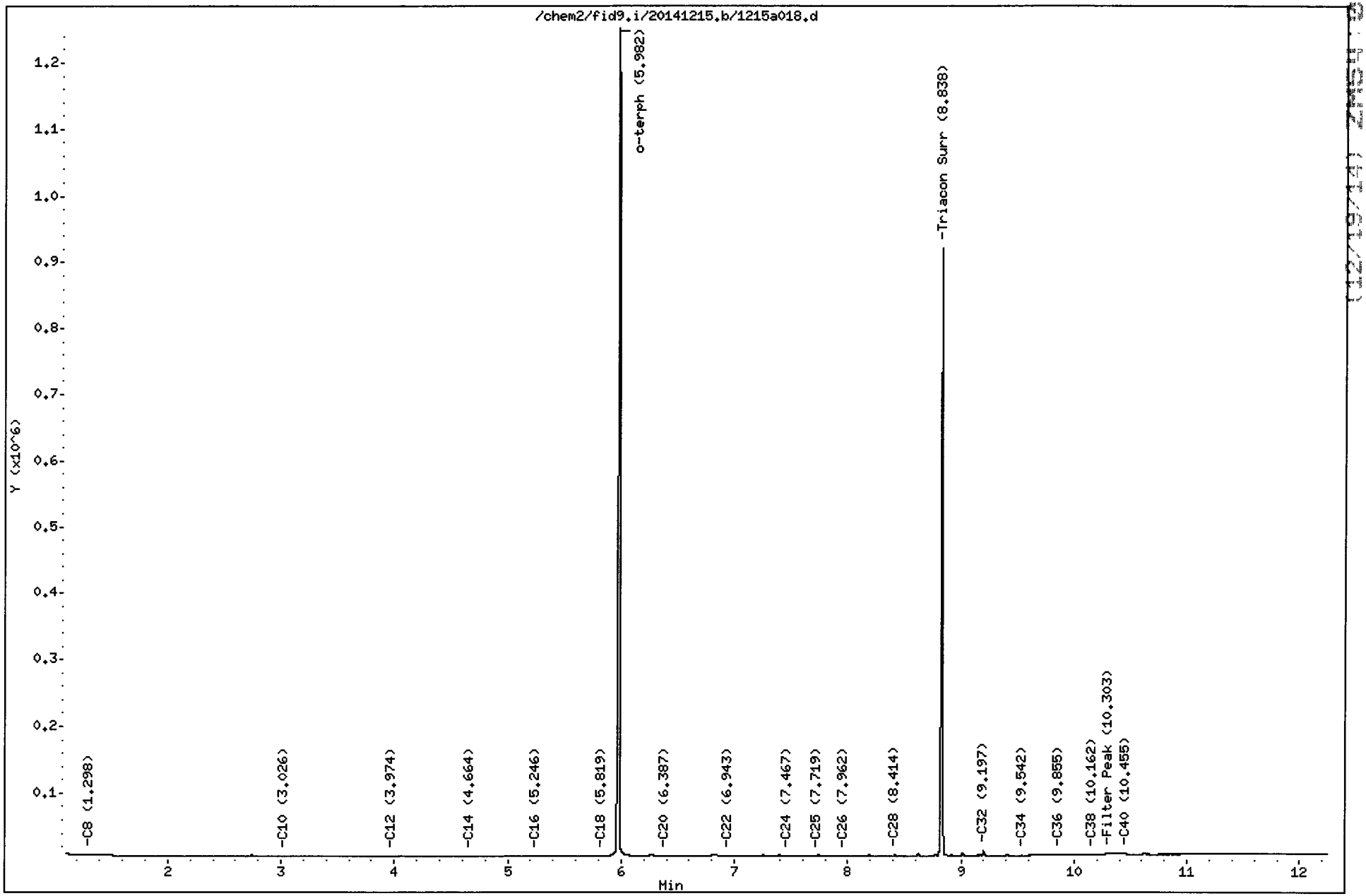
Sample Info: ZM54C

Instrument: fid9.i

Operator: JW

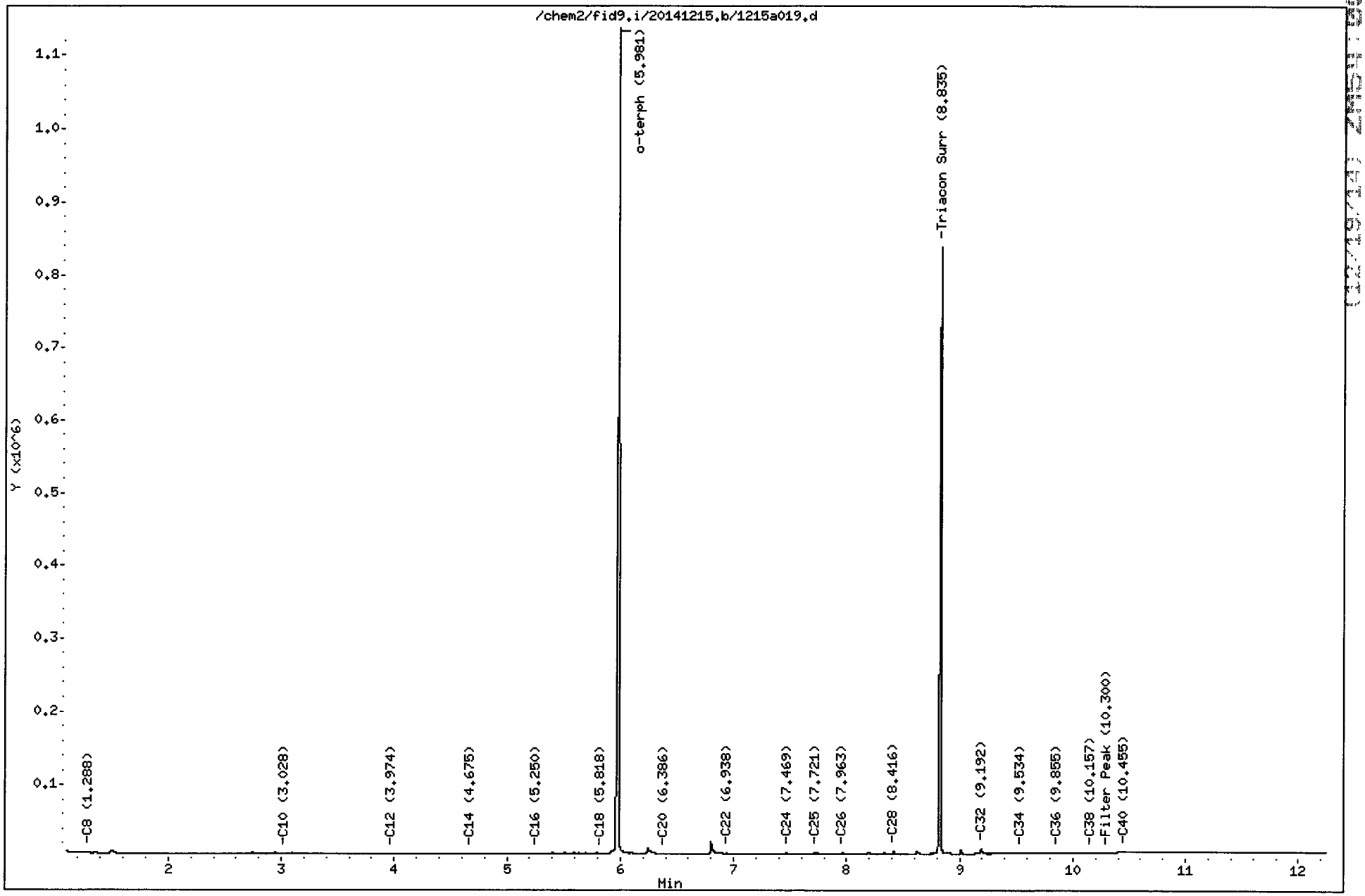
Column phase: RTX-1

Column diameter: 0.25



Data File: /chem2/fid9.i/20141215.b/1215a019.d
Date : 15-DEC-2014 20:06
Client ID: MW-7
Sample Info: ZM54D

Instrument: fid9.i
Operator: JW
Column phase: RTX-1
Column diameter: 0.25

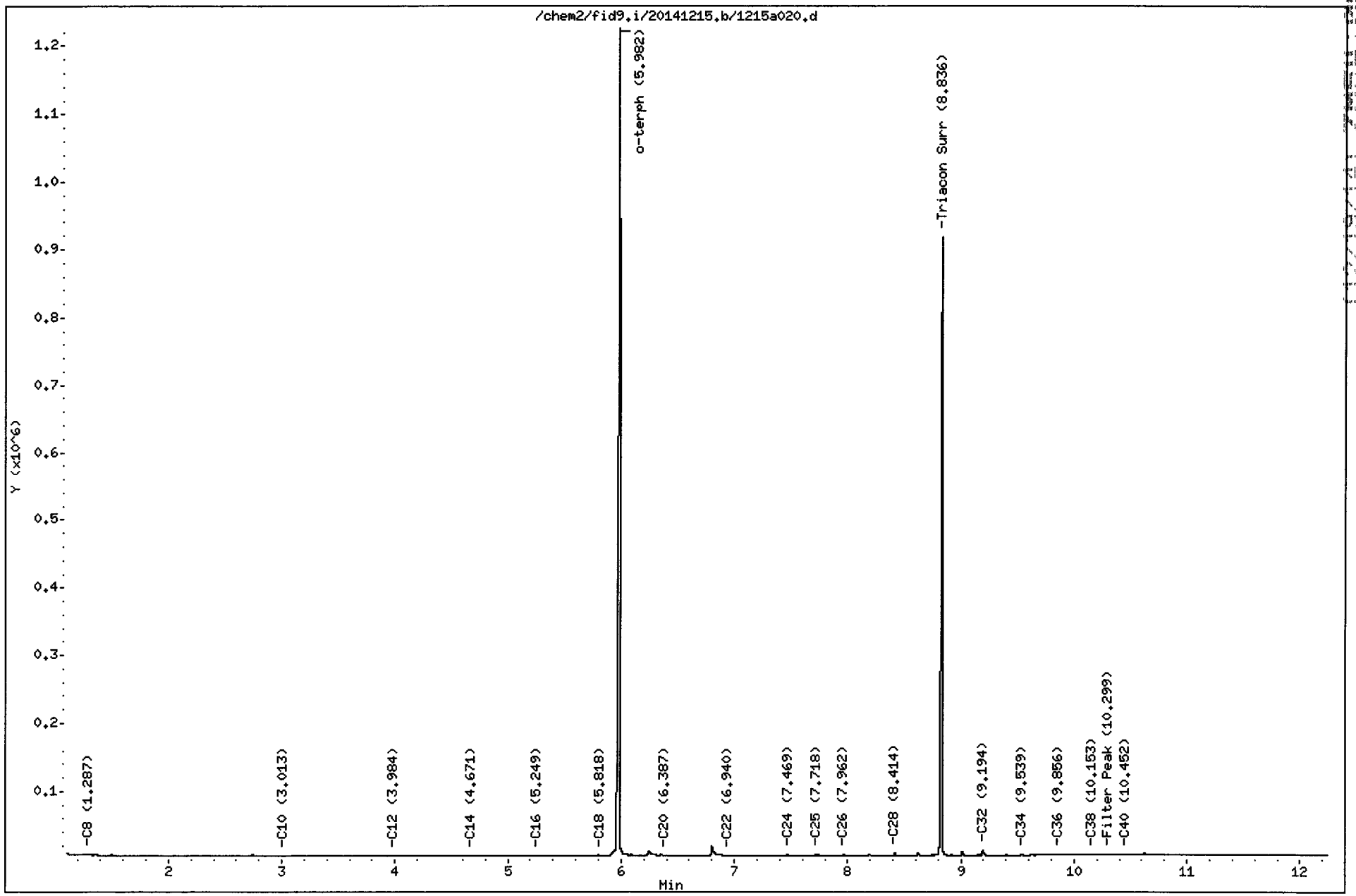


Data File: /chem2/fid9.i/20141215.b/1215a020.d
Date : 15-DEC-2014 20:27
Client ID: MW-10R
Sample Info: ZM54F

Instrument: fid9.i

Operator: JW
Column diameter: 0.25

Column phase: RTX-1

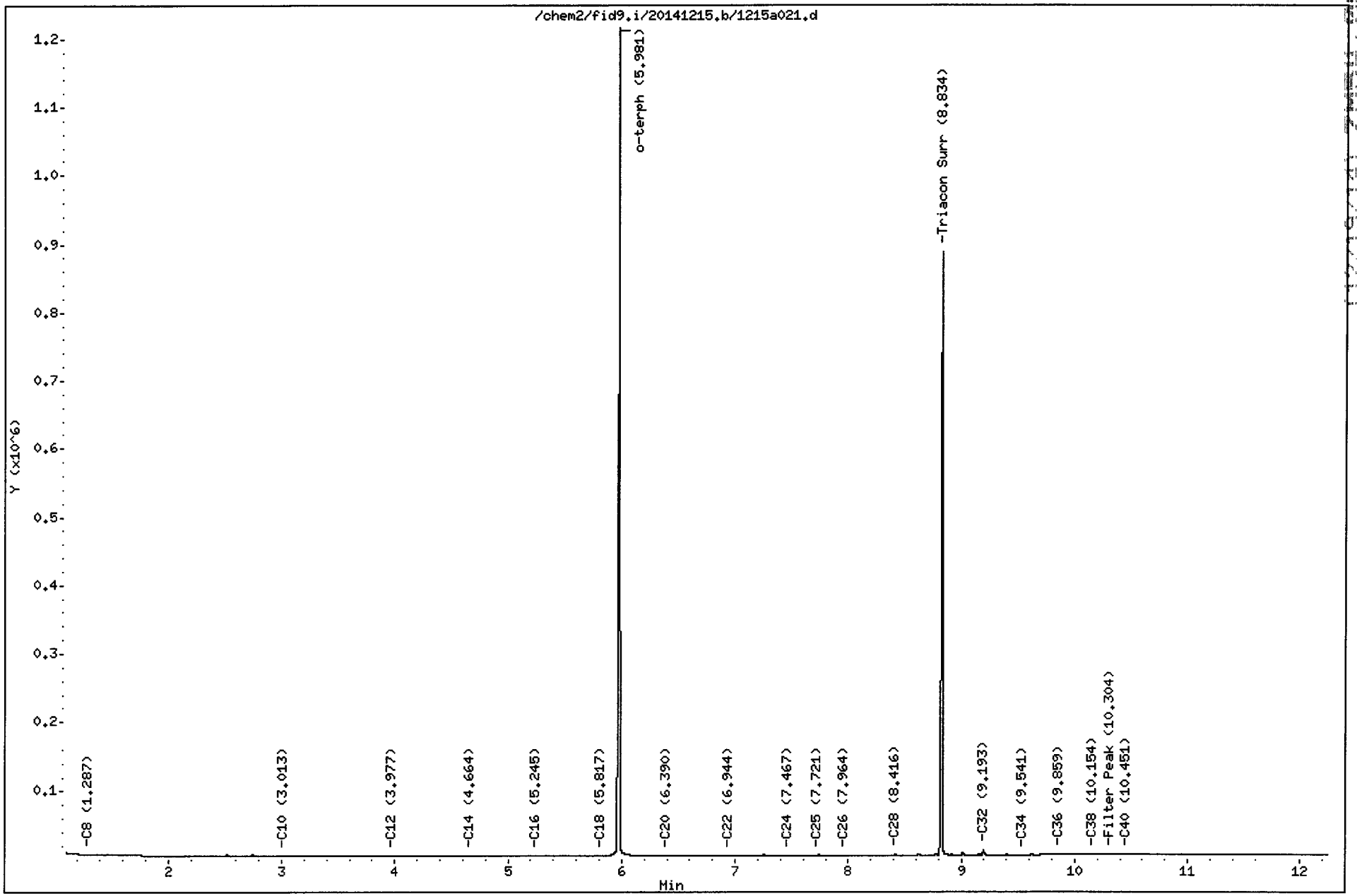


Data File: /chem2/fid9.i/20141215.b/1215a021.d
Date : 15-DEC-2014 20:47
Client ID: MW-2R-1
Sample Info: ZM54G

Instrument: fid9.i

Operator: JW
Column diameter: 0.25

Column phase: RTX-1



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:
Page 1 of 1

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

Matrix: Water
Data Release Authorized:
Reported: 12/18/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-121714	Method Blank	12/17/14	12/18/14	1.00	Diesel Range	0.10	< 0.10 U
14-25955	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		96.6%
ZM54E	MW-9	12/17/14	12/18/14	1.00	Diesel Range	0.10	< 0.10 U
14-25955	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		88.6%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00

Client ID	OTER	TOT OUT
MB-121714	96.6%	0
LCS-121714	84.6%	0
LCSD-121714	91.2%	0
MW-9	88.6%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-25955 to 14-25955

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-121714**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-121714
LIMS ID: 14-25955
Matrix: Water
Data Release Authorized:
Reported: 12/18/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Date Extracted LCS/LCSD: 12/17/14

Date Analyzed LCS: 12/18/14 06:56
LCSD: 12/18/14 07:20
Instrument/Analyst LCS: FID/VTS
LCSD: FID/VTS

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.32	3.00	77.3%	2.51	3.00	83.7%	7.9%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	84.6%	91.2%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 11/26/14

ARI Job: ZM54
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-25955-121714MB1	Method Blank	500 mL	1.00 mL	12/17/14
14-25955-121714LCS1	Lab Control	500 mL	1.00 mL	12/17/14
14-25955-121714LCSD1	Lab Control Dup	500 mL	1.00 mL	12/17/14
14-25955-ZM54E	MW-9	500 mL	1.00 mL	12/17/14

Data File: /chem3/fid3b.i/20141217.b/1217b056.d

Date : 18-DEC-2014 06:32

Client ID:

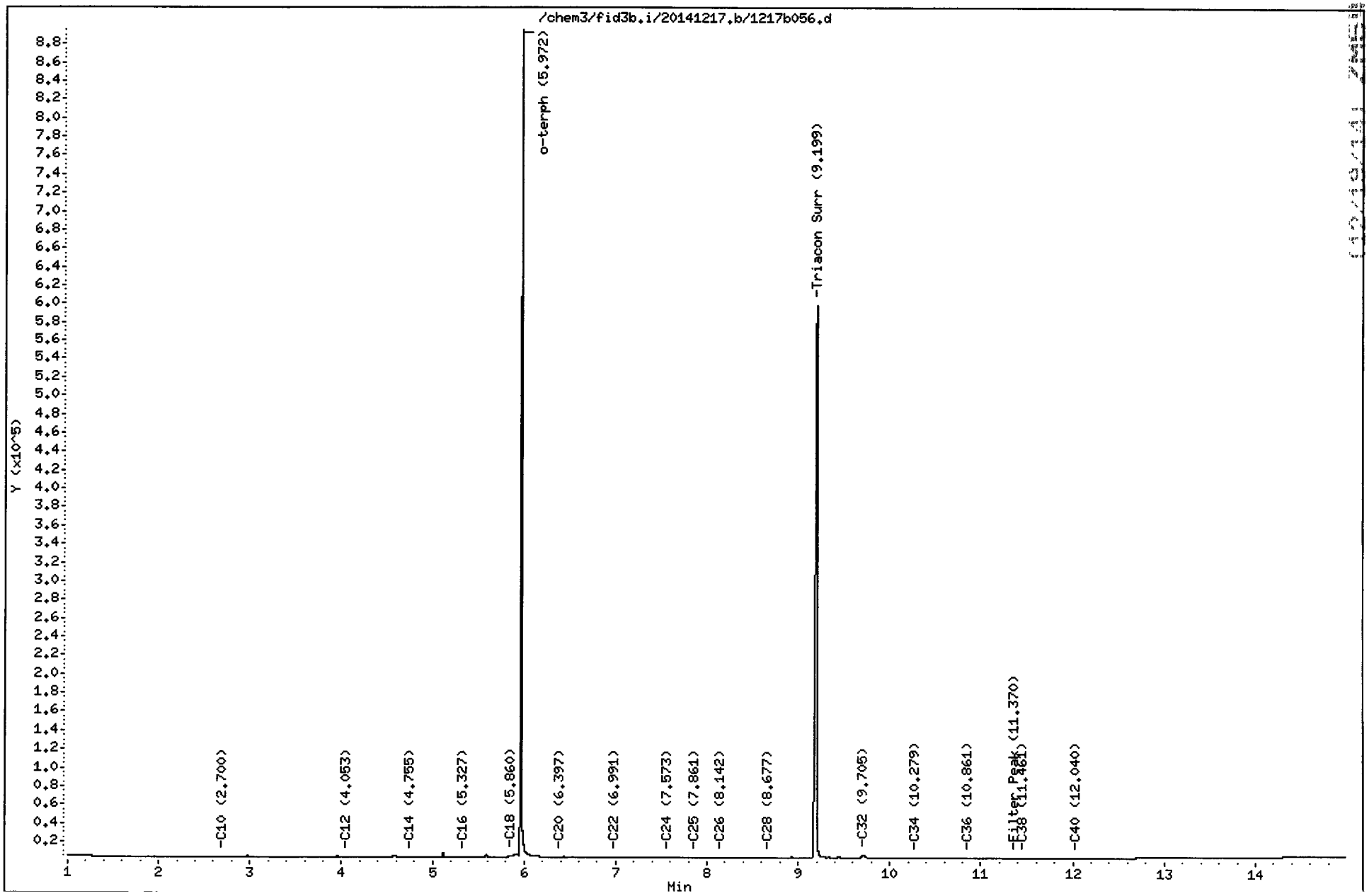
Sample Info: ZM54MBW1

Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

Column diameter: 0.25



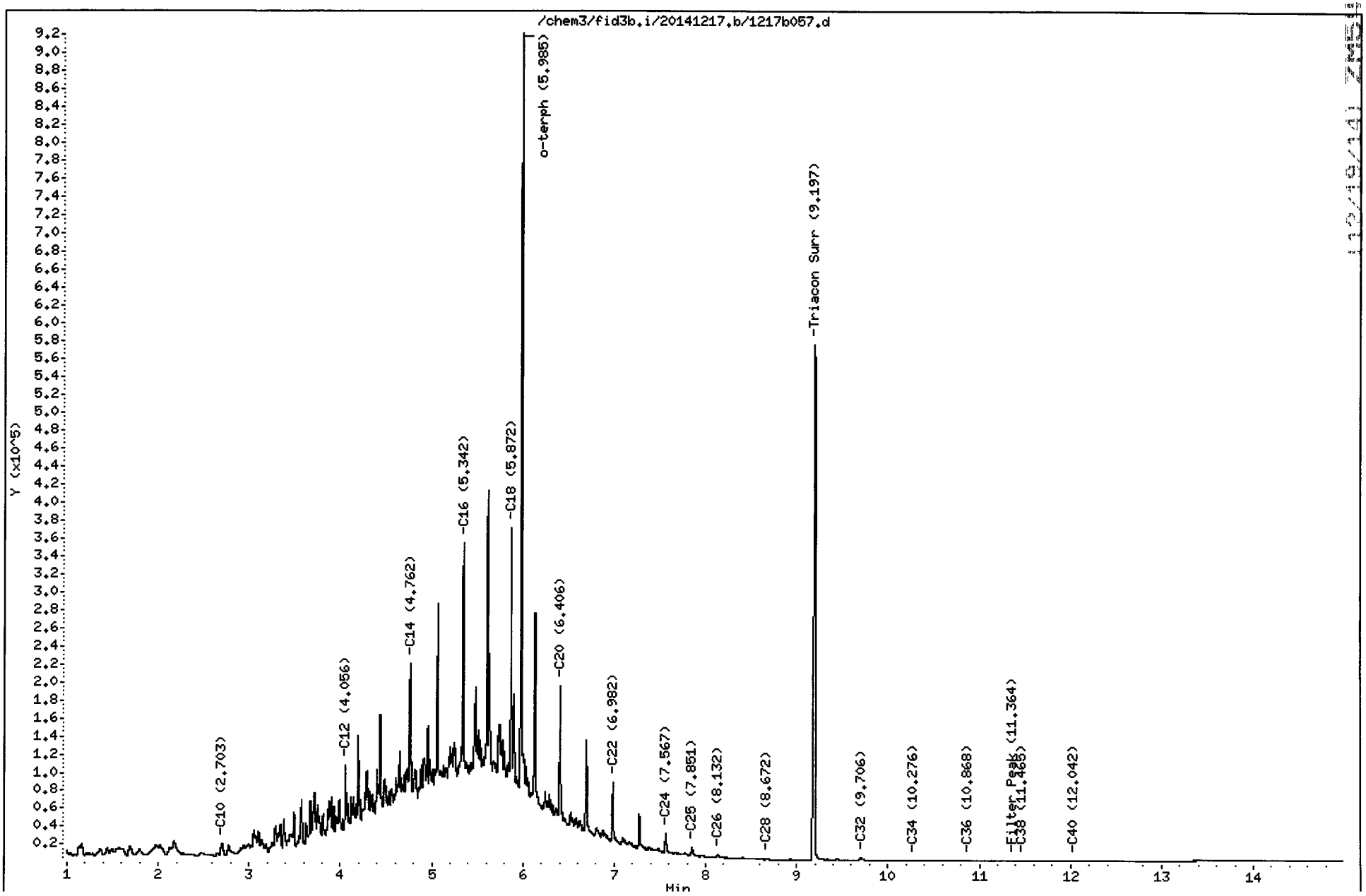
Data File: /chem3/fid3b.i/20141217.b/1217b057.d
Date : 18-DEC-2014 06:56
Client ID:
Sample Info: ZM54LCSW1

Column phase: RTX-1

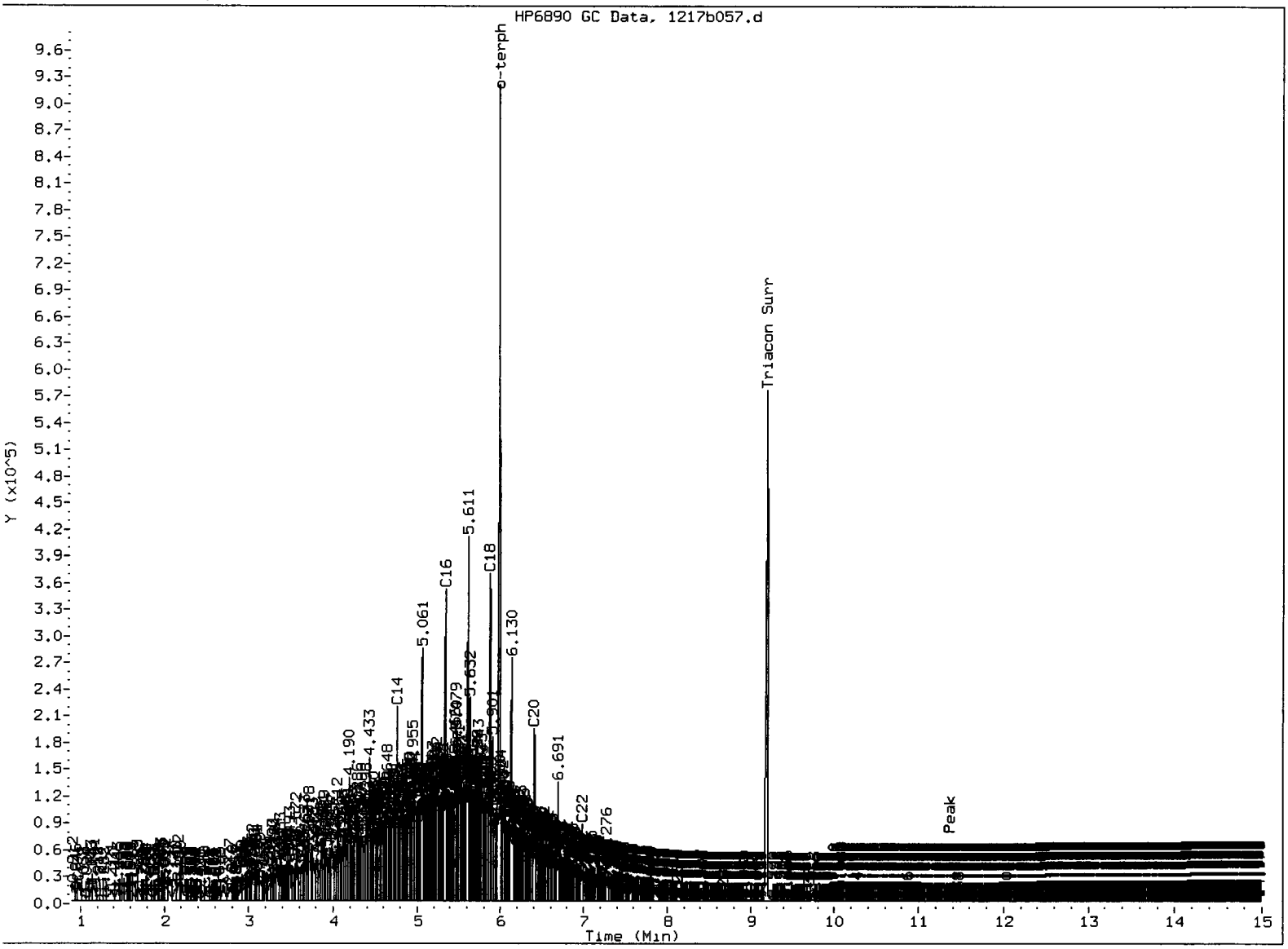
Instrument: fid3b.i

Operator: JW
Column diameter: 0.25

12.17.1



FID:3B-2C/RTX-1 ZM54LCSW1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: LJ Date: 12.18.07

Data File: /chem3/fid3b.i/20141217.b/1217b058.d

Date : 18-DEC-2014 07:20

Client ID:

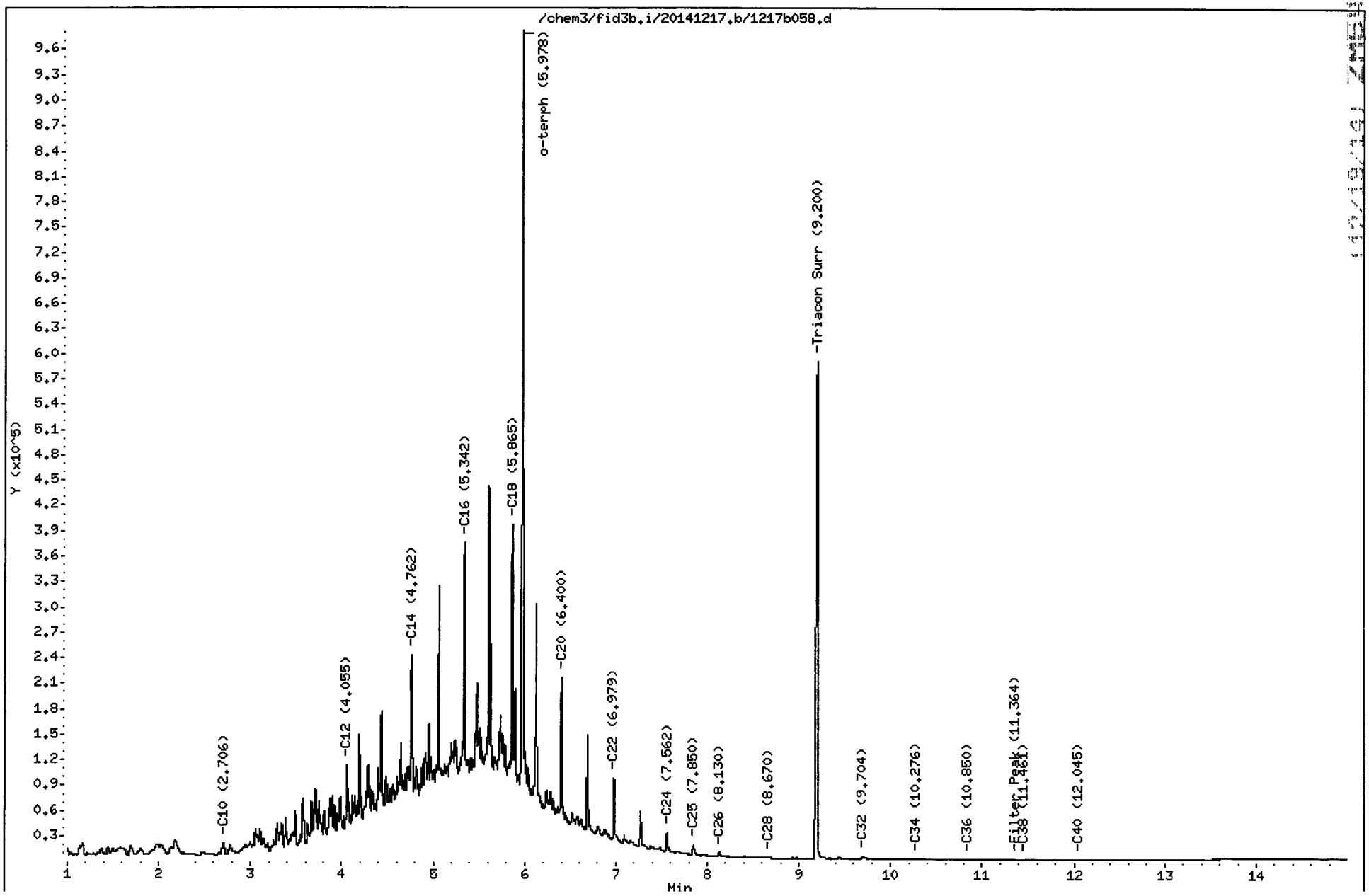
Sample Info: ZM54LCSDW1

Column phase: RTX-1

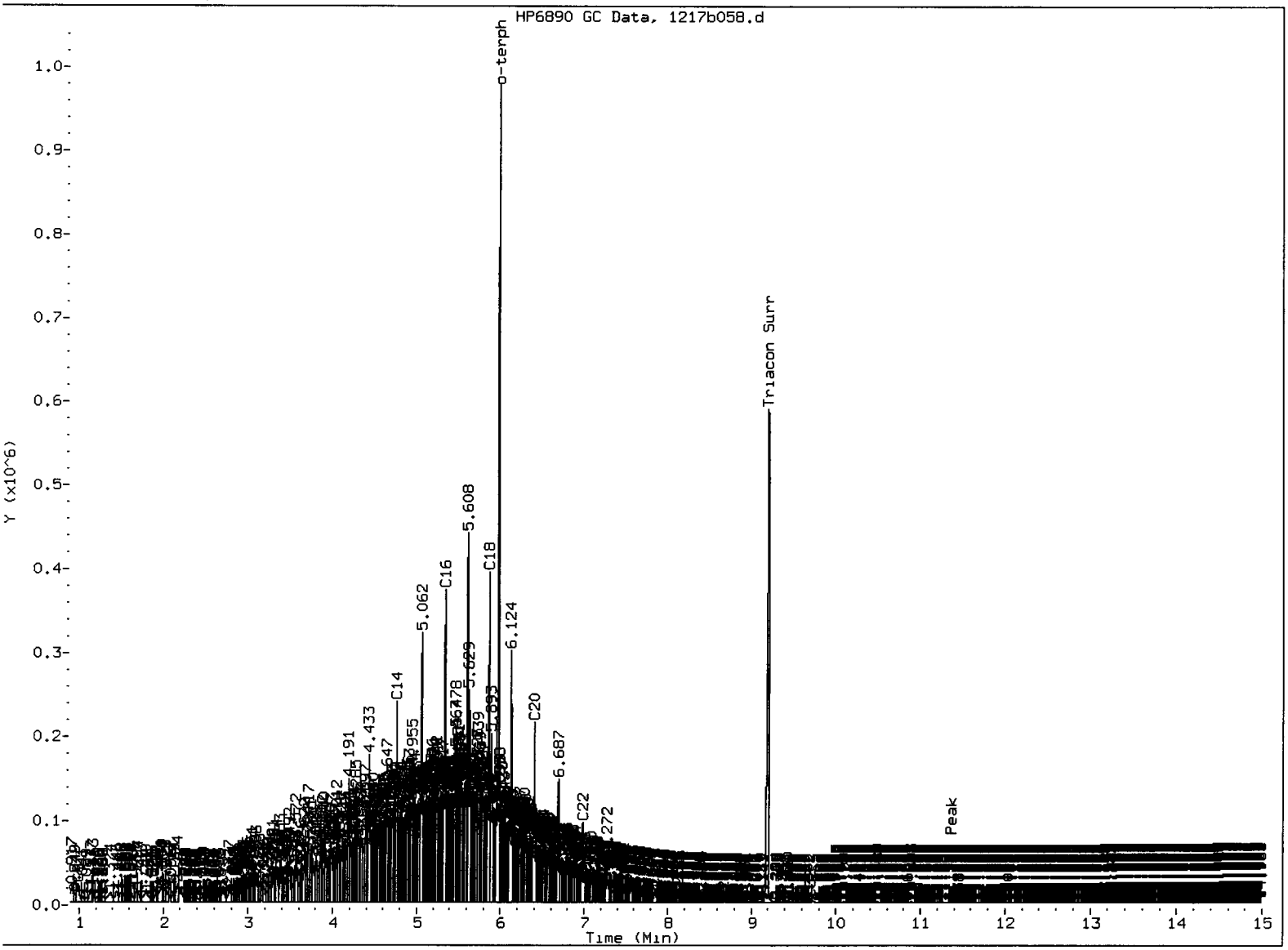
Instrument: fid3b.i

Operator: JW

Column diameter: 0.25



FID:3B-2C/RTX-1 ZM54LCSDW1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: _____ Date: 12.18.14

12/19/14; ZM54; 60058

Data File: /chem3/fid3b.i/20141217.b/1217b059.d

Date : 18-DEC-2014 07:44

Client ID:

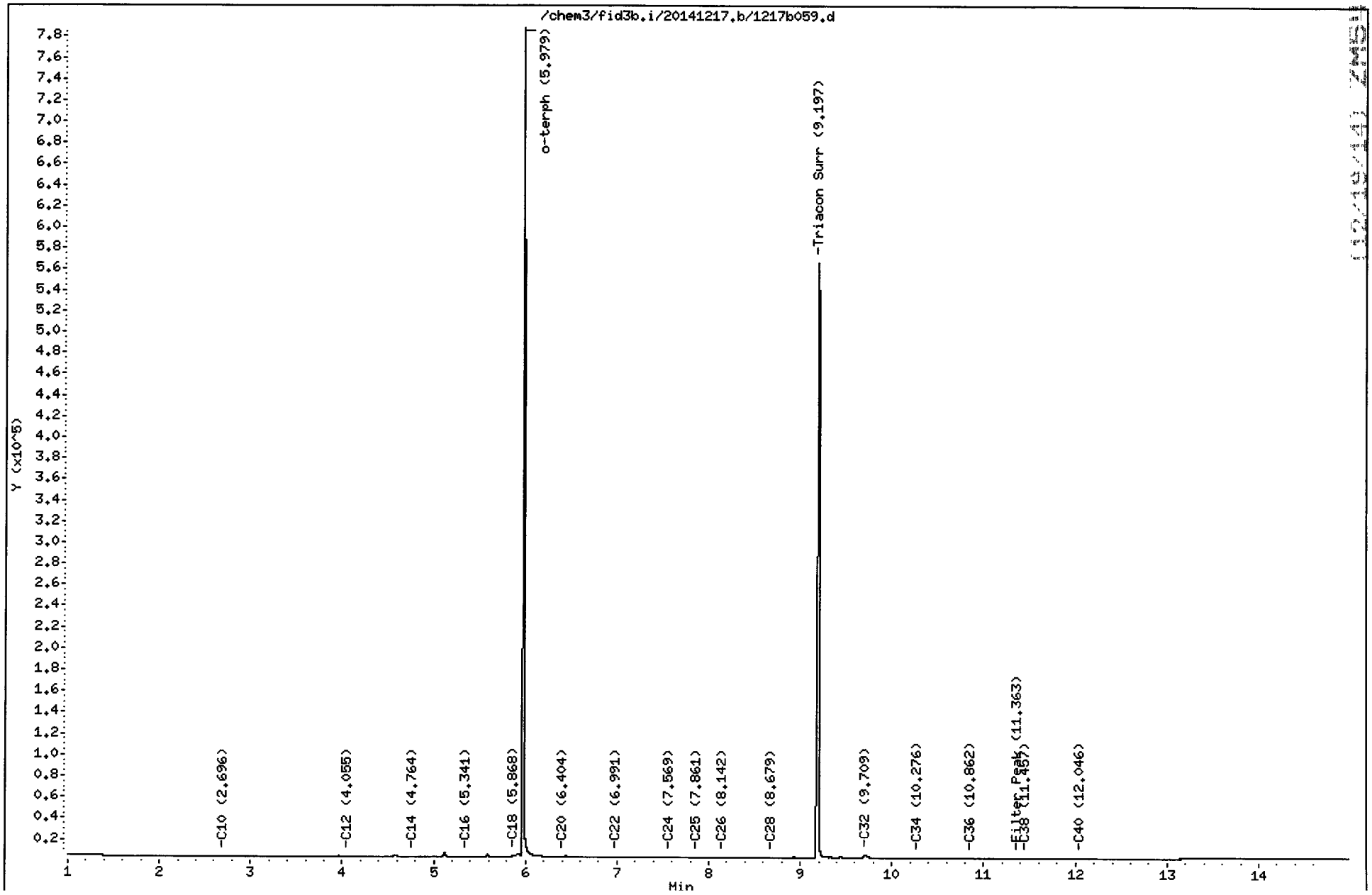
Sample Info: ZM54ERE

Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

Column diameter: 0.25



SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-1R
ARI ID: 14-25951 ZM54A

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.010	0.026
N-Nitrate	11/26/14	Calculated	mg-N/L	0.200	16.3
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	0.020
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.200	16.3
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	20.0	80.0
Sulfide	12/03/14 120314#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-2R
ARI ID: 14-25952 ZM54B

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.010	0.018
N-Nitrate	11/26/14	Calculated	mg-N/L	0.010	0.616
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	0.038
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	0.654
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	2.0	20.4
Sulfide	12/01/14 120114#1	SM4500-S2D	mg/L	0.050	0.098

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-4R
ARI ID: 14-25953 ZM54C

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.010	0.034
N-Nitrate	11/26/14	Calculated	mg-N/L	0.050	2.21
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.050	2.21
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	10.0	42.5
Sulfide	12/01/14 120114#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-7
ARI ID: 14-25954 ZM54D

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.200	10.9
N-Nitrate	11/26/14	Calculated	mg-N/L	0.010	0.012
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	0.012
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	2.0	24.1
Sulfide	12/01/14 120114#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-9
ARI ID: 14-25955 ZM54E

Analyte	**Date Batch**	**Method**	**Units**	**RL**	**Sample**
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.010	0.266
N-Nitrate	11/26/14	Calculated	mg-N/L	0.010	< 0.010 U
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	2.0	12.8
Sulfide	12/01/14 120114#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Client ID: MW-10R
ARI ID: 14-25956 ZM54F

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	12/04/14 120414#1	EPA 350.1M	mg-N/L	0.050	3.10
N-Nitrate	11/26/14	Calculated	mg-N/L	0.010	< 0.010 U
N-Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Nitrate + Nitrite	11/26/14 112614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Sulfate	12/09/14 120914#1	EPA 375.2	mg/L	40.0	211
Sulfide	12/01/14 120114#1	SM4500-S2D	mg/L	0.050	0.059

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	Blank	ID
N-Ammonia	EPA 350.1M	12/04/14	mg-N/L	< 0.010 U	FB
N-Nitrite	EPA 353.2	11/26/14	mg-N/L	< 0.010 U	FB
Nitrate + Nitrite	EPA 353.2	11/26/14	mg-N/L	< 0.010 U	FB
Sulfate	EPA 375.2	12/09/14	mg/L	< 2.0 U	FB
Sulfide	SM4500-S2D	12/01/14	mg/L	< 0.050 U	
		12/03/14		< 0.050 U	
		12/03/14		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: NA
Date Received: NA

Analyte/Method	QC ID	Date	Units	LCS	Spike Added	Recovery
Sulfide	ICVL	12/01/14	mg/L	0.496	0.501	99.0%
SM4500-S2D	ICVL	12/03/14		0.511	0.499	102.4%
	PREP	12/03/14		6.96	6.92	100.6%

STANDARD REFERENCE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: NA
Date Received: NA

Analyte/SRM ID	Method	Date	Units	SRM	True Value	Recovery
N-Ammonia ERA #360114	EPA 350.1M	12/04/14	mg-N/L	0.468	0.500	93.6%
N-Nitrite ERA #141113	EPA 353.2	11/26/14	mg-N/L	0.497	0.500	99.4%
Nitrate + Nitrite ERA #320614	EPA 353.2	11/26/14	mg-N/L	0.502	0.500	100.4%
Sulfate ERA 131013	EPA 375.2	12/09/14	mg/L	14.8	15.0	98.7%

REPLICATE RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: ZM54A Client ID: MW-1R						
N-Nitrite	EPA 353.2	11/26/14	mg-N/L	0.020	0.021	4.9%
Nitrate + Nitrite	EPA 353.2	11/26/14	mg-N/L	16.3	16.2	0.6%
Sulfide	SM4500-S2D	12/03/14	mg/L	< 0.050	< 0.050	NA

MS/MSD RESULTS-CONVENTIONALS
ZM54-Kennedy Jenks Consultants

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 12/10/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: ZM54A Client ID: MW-1R							
N-Nitrite	EPA 353.2	11/26/14	mg-N/L	0.020	0.535	0.500	103.0%
Nitrate + Nitrite	EPA 353.2	11/26/14	mg-N/L	16.3	41.1	25.0	99.2%
Sulfide	SM4500-S2D	12/03/14	mg/L	< 0.050	6.40	6.92	92.5%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-1R
SAMPLE

Lab Sample ID: ZM54A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-2R
SAMPLE

Lab Sample ID: ZM54B
LIMS ID: 14-25952
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	**7439-89-6**	**Iron**	0.05	**0.15**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-4R
SAMPLE

Lab Sample ID: ZM54C
LIMS ID: 14-25953
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: MW-7
SAMPLE

Lab Sample ID: ZM54D
LIMS ID: 14-25954
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	**7439-89-6**	**Iron**	0.05	**12.9**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-9
SAMPLE

Lab Sample ID: ZM54E
LIMS ID: 14-25955
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	**7439-89-6**	**Iron**	0.05	**0.58**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-10R
SAMPLE

Lab Sample ID: ZM54F
LIMS ID: 14-25956
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	**7439-89-6**	**Iron**	0.05	**1.99**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: ZM54MB
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/L	Q
6010C	11/28/14	6010C	12/03/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: ZM54LCS
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 12/04/14

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

BLANK SPIKE/BLANK SPIKE DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Dup Found	Spike Added	Spike Recovery	Spike Dup Recovery	RPD	Q
Iron	6010C	2.01	2.00	2.00	100%	100%	0.5%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

5 January 2015

Ty Schreiner
Kennedy Jenks Consultants
32001 32nd Ave S., Suite 100
Federal Way, WA 98001

RE: Client Project: Ecology Cornet Bay Marina, 1396010.00
ARI Job No: ZM54

Dear Ty:

Please find enclosed the modified reports for the samples from the project referenced above.

The results for 'Total Xylenes' have been added as requested by Matt Wilson.

An electronic copy of these reports will be kept on file at ARI. Should you have any further questions, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file ZM54

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-1R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 16:15

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-2R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54B
LIMS ID: 14-25952
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 16:42

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	102%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-4R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54C
LIMS ID: 14-25953
Matrix: Water
Data Release Authorized: JJ
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 17:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	102%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-7**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54D
LIMS ID: 14-25954
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 17:37

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	112%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-9**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54E
LIMS ID: 14-25955
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 18:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	117%
d8-Toluene	105%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-10R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54F
LIMS ID: 14-25956
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 18:31

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	114%
d8-Toluene	101%
Bromofluorobenzene	99.8%
d4-1,2-Dichlorobenzene	101%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW-2R-1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54G
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina 1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 12/04/14 11:36

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	123%
d8-Toluene	101%
Bromofluorobenzene	99.2%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: Trip Blank**
Page 1 of 1 **SAMPLE**

Lab Sample ID: ZM54H
LIMS ID: 14-25958
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 11/25/14
Date Received: 11/26/14

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 15:47

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-112814A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-112814A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 11/28/14 10:07

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	102%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	102%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-120414A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-120414A
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 12/04/14 11:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
1330-20-7	Total Xylenes	0.60	< 0.60	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	130%
d8-Toluene	102%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	101%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-112814A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-112814A
LIMS ID: 14-25951
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 11/28/14 09:12
LCSD: 11/28/14 09:39

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	10.4	10.0	104%	10.1	10.0	101%	2.9%
Toluene	10.0	10.0	100%	9.69	10.0	96.9%	3.1%
Ethylbenzene	10.4	10.0	104%	9.91	10.0	99.1%	4.8%
Total Xylenes	30.6	30.0	102%	29.2	30.0	97.3%	4.7%
m,p-Xylene	20.4	20.0	102%	19.5	20.0	97.5%	4.5%
o-Xylene	10.2	10.0	102%	9.72	10.0	97.2%	4.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	95.9%	98.4%
d8-Toluene	100%	99.7%
Bromofluorobenzene	103%	102%
d4-1,2-Dichlorobenzene	100%	101%

FORM III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-120414A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-120414A
LIMS ID: 14-25957
Matrix: Water
Data Release Authorized:
Reported: 01/05/15

QC Report No: ZM54-Kennedy Jenks Consultants
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 12/04/14 10:14
LCSD: 12/04/14 10:42

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	10.1	10.0	101%	10.3	10.0	103%	2.0%
Toluene	9.58	10.0	95.8%	10.1	10.0	101%	5.3%
Ethylbenzene	10.8	10.0	108%	10.9	10.0	109%	0.9%
Total Xylenes	31.1	30.0	104%	31.9	30.0	106%	2.5%
m,p-Xylene	20.9	20.0	104%	21.3	20.0	106%	1.9%
o-Xylene	10.2	10.0	102%	10.6	10.0	106%	3.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	117%	123%
d8-Toluene	102%	103%
Bromofluorobenzene	101%	101%
d4-1,2-Dichlorobenzene	100%	99.6%

FORM III