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17 October 2014

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

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

Dear Ms. Liu:

This letter report presents the findings of the first quarterly groundwater monitoring event that has been performed following completion of remediation activities at the Cornet Bay Marina (site) in August 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 installation, development of four shallow groundwater monitoring wells, and initial 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 was installed. The tank was installed in a below-ground reinforced concrete vault near the footprint of the former UST excavation. The location of the tank vault is included on Figure 2.

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.

Scope of Work

Monitoring Well Installation and Development

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 (refer to Figure 3). The well installation activities were conducted on 13 August 2014 by ESN Northwest of Olympia, Washington in accordance with the Compliance Monitoring Plan (CMP) and Sampling and Analysis Plan (SAP) prepared by Kennedy/Jenks Consultants. Boreholes for the monitoring wells were completed using direct-push drilling techniques and the monitoring wells were constructed of 2-inch polyvinyl chloride (PVC) well construction materials with pre-packed well screens at the base of each well. Wells were completed to depths of 10.5 feet below grade with 7.5 feet of well screen (0.01-inch slot size) placed at the base of each well. Monitoring wells were completed at the surface with an 8-inch-diameter steel well monument and a locking well cap.

Because each of the new wells replaced a prior monitoring well that had been abandoned as part of the cleanup activities, soil sampling was performed for logging purposes only (no samples were retained for chemical analysis). Soil boring and well installation logs are included in Attachment A.

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. Well development activities included mechanical surging and over-pumping to remove fine grained sediments that had accumulated in the filter packs. During well development, groundwater quality was monitored for temperature, pH, specific conductance, and relative turbidity. Well development water was contained in 55-gallon steel drums, labeled with the contents, and left onsite pending characterization for disposal. Following development, each of the wells was surveyed by KPG to identify elevation of top of casing (for future water level measurement and gradient calculation). Well development forms are included in Attachment B.

Quarterly Groundwater Monitoring

The first quarterly monitoring event was performed from 14 through 18 August 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.

- Groundwater sampling was performed using low-flow purging and sampling techniques with wells purged at a rate of approximately 0.03 to 0.08 gallon per minute using a peristaltic pump. Field parameter monitoring included temperature, pH, specific conductance, and relative turbidity. Purging continued until the field parameters indicated stable conditions.

- Groundwater samples were collected from the four new monitoring wells and two existing 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) using United State Environmental Protection Agency (EPA) Method 8260B.

- QA/QC Samples were also collected including:
    - One field duplicate sample (MW10R-1) was collected and analyzed for each of the primary chemical of concern (COC) analytes (GRO, DRO, BTEX) from well MW-10R.
    - Trip blanks were included with the initial shipment (15 August 2014) to the analytical laboratory.
- Groundwater samples were also collected for analysis of selected monitored natural attenuation (MNA) parameters, including dissolved oxygen (DO), oxidation/reduction potential (ORP), turbidity, pH, nitrate/nitrite, ammonia, sulfate, sulfide, dissolved iron (field filtered), and methane.

Due to slow water level recovery, well MW-1R could not be sampled during the initial attempt on 15 August 2014. As a result, the water level in the well was allowed to recover over the weekend before sampling was performed on 18 August 2014. Groundwater Purge and Sample forms are included in Attachment C.

Monitoring Results

Groundwater Elevation Results

The results of water level monitoring are summarized in Table 1 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). During high tide, a gradient reversal occurs adjacent to the waterfront areas. The current water level monitoring results obtained in August 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 first quarterly monitoring event (August 2014) are summarized in Table 2. All analyte concentrations (including GRO, DRO, and BTEX) in groundwater samples were below detectable levels for each well with the exception of benzene that was detected in one groundwater in a sample from well MW-2R at 1.5 microgram per liter (µg/L).

Since 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. The detected concentration of benzene is below the applicable Clean Water Act (CWA) value of 51 µg/L. CWA values represent the threshold concentration for potential unacceptable risks to human health resulting from consumption of aquatic organisms that have consumed impacted surface water. The detected benzene concentration is also below the National Oceanic and

Atmospheric Administration's (NOAA) *Screening Quick Reference Tables* (SQUIRT) of 110 µg/L. While the SQUIRT values are not promulgated regulatory values, they were developed as conservative screening levels to assess possible adverse impacts to aquatic organisms. Comparison of site groundwater with these ARARs and screening levels demonstrate that the remedial action was successful in removing contaminated site soils that could impact surface water in Cornet Bay. Groundwater laboratory analytical results are summarized in Table 2 and the laboratory analytical reports are provided in Attachment D.

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 3). In general, biodegradation of petroleum hydrocarbons results in the reduction of electron acceptors such as DO, nitrate, manganese (Mn^{+4}), ferric iron (Fe^{+3}), and sulfate. Although future monitoring will be performed during subsequent monitoring events, the preliminary 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
Project Manager

Enclosures:

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

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

Attachments
Attachment A – Boring/Well Installation Logs
Attachment B – Well Development Forms
Attachment C – Groundwater Purge and Sample Forms
Attachment D – Laboratory Analytical Reports

Tables

Table 1: 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

Notes:

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

(b) amsl = above mean sea level

Table 2: 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
MTCA Method A Cleanup Level		800[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 EPA Method 8021B.

(c) Cleanup level with 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).

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

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

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).

µg/L = micrograms per liter.

Table 3: 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
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
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
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

Notes:

(a) Water quality parameter readings at the completion of purging and prior to sampling.
(b) Well was not sampled for dissolved iron bacause of 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
µg/L = micrograms per liter

Figures

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Washington State Department of Ecology
Cornet Bay Marina

Site Location

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October 2014

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

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0 50 100

Scale: Feet
1 inch = 50 feet

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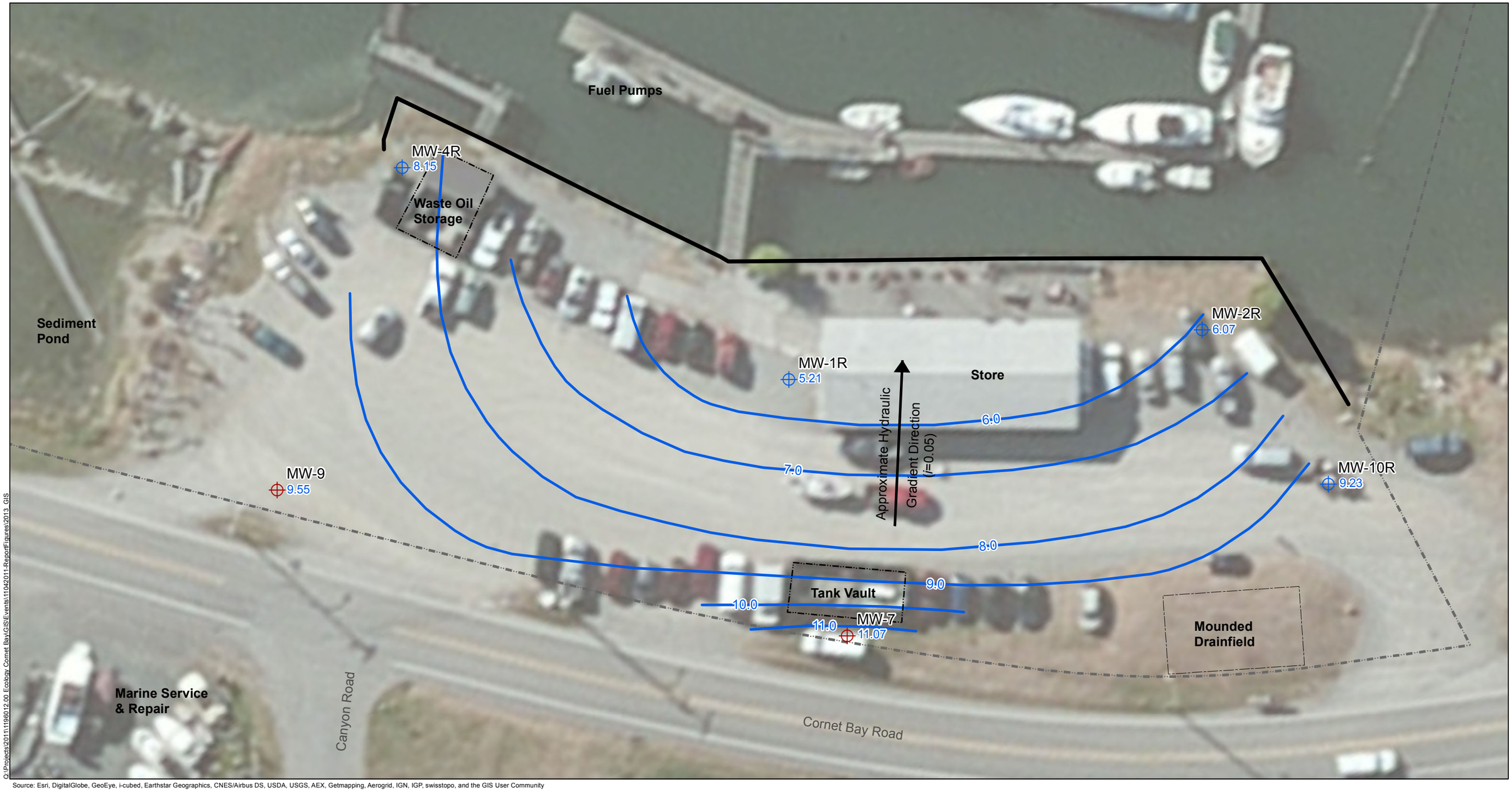
Washington State Department of Ecology
Cornet Bay Marina

Site Plan

1396010*00
October 2014

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

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 30 60

Scale: Feet
1 inch = 30 feet

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Washington State Department of Ecology
Cornet Bay Marina

Groundwater Potentiometric Surface Map August 2014

1396010*00
October 2014

Figure 3

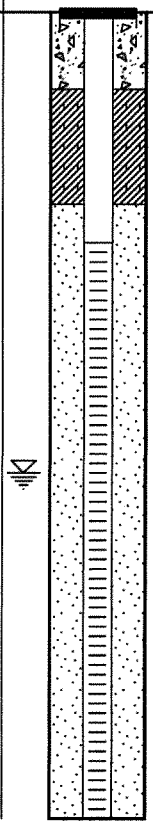
Attachment A

Boring/Well Installation Logs

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: SW of main building		**Well Name**	MW-1(R)
DRILLING COMPANY: ESN	DRILLER:	**Project Name**	Cornet Bay Marina
DRILLING METHOD(S): Direct Push	DRILL BIT(S) SIZE: 2+4-inch	**Project Number**	1396010*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 10.5 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 3 FT.	DATE STARTED: 8/13/14	DATE COMPLETED: 8/13/14
SLOTTED CASING: Pre-Pack 2" PVC Well Screen 0.010" slots	FROM 3 TO 10.5 FT.	INITIAL WATER DEPTH (FT): 6.0	
SIZE AND TYPE OF FILTER PACK: 10/20 sand; pre-pack and added to borehole	FROM 2.5 TO 10.5 FT.	LOGGED BY: DKM	
SEAL: Bentonite Chips	FROM 1 TO 2.5 FT.	SAMPLING METHODS: Macro core w/liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		

SAMPLES TYPE	SAMPLES RECOV (FEET)	SAMPLES PENETR. RESIST. BLOWS/6	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3		1–4			0.0		GW	**Well-graded GRAVEL with sand** Medium tan/brown, gravel fill with 40-50% sand, minor fines, fill installed during 2014 cleanup, moderately dense to dense, moist to wet below ~6 feet, no odor, no sheen.
SS	4		5–8			0.0			
			9–10			0.0			

NOTES

1. Boring was initially advanced using 2-inch sampler for logging and then over-drilled at same location with 4-inch sampler for well installation.

KJ PNW CORNET NEW WELLS AUG 2014.GPJ KJ PNW.GDT 10/6/14

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Near NE corner of site		**Well Name** MW-2(R)	
DRILLING COMPANY: ESN	DRILLER	**Project Name** Cornet Bay Marina	
DRILLING METHOD(S): Direct Push/HSA	DRILL BIT(S) SIZE: 2+4-inch/9-inch	**Project Number** 1396010*00	
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 10.5 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 3 FT.	DATE STARTED: 8/13/14	DATE COMPLETED: 8/13/14
SLOTTED CASING: Pre-Pack 2" PVC Well Screen 0.010" slots	FROM 3 TO 10.5 FT.	INITIAL WATER DEPTH (FT): 8.0	
SIZE AND TYPE OF FILTER PACK: 10/20 sand; pre-pack and added to borehole	FROM 2.5 TO 10.5 FT.	LOGGED BY: DKM	
SEAL: Bentonite Chips	FROM 1 TO 2.5 FT.	SAMPLING METHODS: Macro core w/liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		

SAMPLES TYPE	SAMPLES RECOV (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3		1–5			0.0		GW	**Well-graded GRAVEL with sand** Medium tan/brown, gravel fill with 40-50% sand, minor fines, fill installed during 2014 cleanup, moderately dense to dense, moist to wet below ~8 feet, no odor, no sheen.
SS	4		5–10			0.0			
						0.0			

NOTES

1. Boring was initially advanced using 2-inch sampler for logging and then over-drilled at same location with 4-inch sampler for well installation.
2. Boring was initially advanced to final depth with 2-inch direct push sampler for logging. Refusal conditions at ~7' with 4-inch sampler (for well installation) and with HSA rig (9-inch auger). Moved ~3 feet west and drilled to final depth with HSA rig.

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(6-87) (3-88) (8-90)

Boring & Well Construction Log

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BORING LOCATION: Near SW corner of site		**Well Name**	MW-4(R)
DRILLING COMPANY: ESN	DRILLER:	**Project Name**	Cornet Bay Marina
DRILLING METHOD(S): Direct Push	DRILL BIT(S) SIZE: 2+4-inch	**Project Number**	1396010*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 10.5 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 3 FT.	DATE STARTED: 8/13/14	DATE COMPLETED: 8/13/14
SLOTTED CASING: Pre-Pack 2" PVC Well Screen 0.010" slots	FROM 3 TO 10.5 FT.	INITIAL WATER DEPTH (FT): 6.5	
SIZE AND TYPE OF FILTER PACK: 10/20 sand; pre-pack and added to borehole	FROM 2.5 TO 10.5 FT.	LOGGED BY: DKM	
SEAL: Bentonite Chips	FROM 1 TO 2.5 FT.	SAMPLING METHODS: Macro core w/liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		

SAMPLES TYPE	SAMPLES RECOV (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3		1–4			0.0		GW	**Well-graded GRAVEL with sand** Medium tan/brown, gravel fill with 40-50% sand, minor fines, fill installed during 2014 cleanup, moderately dense to dense, moist to wet below ~6 feet, no odor, no sheen.
SS	4		5–8			0.0			
			9–10			0.0			

NOTES

1. Boring was initially advanced using 2-inch sampler for logging and then over-drilled at same location with 4-inch sampler for well installation.

KJ PNW CORNET NEW WELLS AUG 2014.GPJ KJ PNW.GDT 10/6/14

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Boring & Well Construction Log

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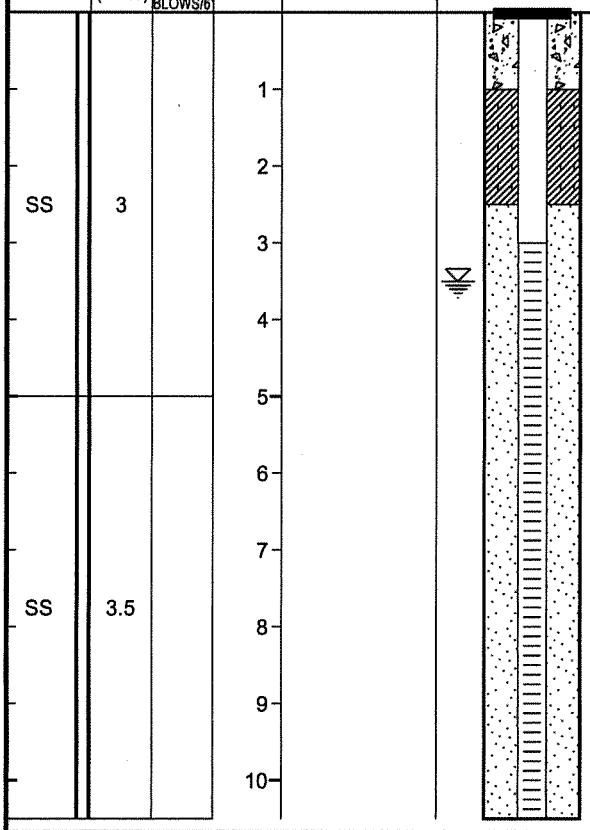
BORING LOCATION: Near N property margin		**Well Name**	MW-10(R)
DRILLING COMPANY: ESN	DRILLER	**Project Name**	Cornet Bay Marina
DRILLING METHOD(S): Direct Push	DRILL BIT(S) SIZE: 2+4-inch	**Project Number**	1396010*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 10.5 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 3 FT.	DATE STARTED: 8/13/14	DATE COMPLETED: 8/13/14
SLOTTED CASING: Pre-Pack 2" PVC Well Screen 0.010" slots	FROM 3 TO 10.5 FT.	INITIAL WATER DEPTH (FT): 3.5	
SIZE AND TYPE OF FILTER PACK: 10/20 sand; pre-pack and added to borehole	FROM 2.5 TO 10.5 FT.	LOGGED BY: DKM	
SEAL: Bentonite Chips	FROM 1 TO 2.5 FT.	SAMPLING METHODS: Macro core w/liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		



SAMPLES TYPE	SAMPLES RECOV (FEET)	SAMPLES PENETR. RESIST. BLOWS/6	DEPTH (FEET)	SAMPLE NUMBER	PID	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			1				**Well-graded GRAVEL with sand** Medium tan/brown, gravel fill with 40-50% sand, minor fines, fill installed during 2014 cleanup, moderately dense to dense, moist to wet below ~3.5 feet, no odor, no sheen.
			2				
SS	3		3				
			4		0.0	GW	
			5				
			6				
			7				
SS	3.5		8		0.0	Wood	**WOOD DEBRIS** Brown/orange, woody material, moderately soft, moist to wet, no odor, no sheen.
			9		0.0	CL/ ML	**Silty CLAY** Medium to dark gray, silty clay, moderately stiff, moist, no odor, no sheen.
			10		0.0	SM	**Silty SAND** Medium gray, medium to fine sand with over 20% silt, 5-10% gravel, moderately dense, wet, no odor, no sheen.

NOTES

1. Boring was initially advanced using 2-inch sampler for logging and then over-drilled at same location with 4-inch sampler for well installation.

KJ PNW CORNET NEW WELLS AUG 2014.GPJ KJ PNW.GDT 10/6/14

F-40.1
(6-87) (3-88) (8-90)

Attachment B

Well Development Forms

Groundwater Purge and Sample Form Date: 5/13/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay Marina **Well Number:** MW-7

Project Number: 139601.00 **Personnel:** DKM

STATIC WATER LEVEL (FT.): 2.2' TOC	MEASURING POINT DESCRIPTION: TOC N side
WATER LEVEL MEASUREMENT METHOD: Electronic wl Meter	PURGE METHOD: Purge Pump / Peristaltic
TIME START PURGE: 1301 (Purge pump) / 1445 (Peristaltic)	PURGE DEPTH (FT.): Screen Interval (~4-14')
TIME END PURGE: 1515	
TIME SAMPLED:	

COMMENTS: Well Re-Development (Existing well)

WELL VOLUME CALCULATION (Fill in before purging)	TOTAL DEPTH (FT.)		DEPTH TO WATER (FT.)		WATER COLUMN (FT.)		MULTIPLIER FOR CASING DIAMETER (IN)				CASING VOLUME (GAL)
							2	4	6		
	13.8 TOC	-	2.2 TOC	=	11.6	X	0.16	0.64	1.44	=	1.86

TIME	1301	1330	1410	1445 / 1455	1455	1505	1515
VOLUME PURGED (GAL)	2.5 gal dewatered	1.5 gal dewatered	2 gal dewatered	start peristaltic ~5 min per gallon	+2 gal	+2 gal	+2 gal (=12 total)
PURGE RATE (GPM)	(purge pump) <1 l/min	(purge pump) <1 l/min	(purge pump) <1 l/min		peristaltic →	→	
TEMPERATURE (°C)				(Not dewatered w/peristaltic)			
pH							
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)							
DISSOLVED OXYGEN (mg/L)							
Eh(mv)Pt-AgCl ref.							
TURBIDITY / COLOR	Cloudy; gray	slt cldy; v. lt. gray	v. slt. cldy → v. lt. gray →		Clear 15.32	clear 12.44	clear 9.09
ODOR							
DEPTH OF PURGE INTAKE (FT)					~8' (middle sat scrn)	→	
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Groundwater Purge and Sample Form Date: 8/13/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay	**Well Number:** MW-9
Project Number: 139601D . 00	**Personnel:** DKM
STATIC WATER LEVEL (FT.): 2.8 TOC	MEASURING POINT DESCRIPTION: TOC N. Side
WATER LEVEL MEASUREMENT METHOD: Electronic wl Meter	PURGE METHOD: Purge Pump / Peristaltic
TIME START PURGE: Purge Pump 1254 / Peristaltic 1515	PURGE DEPTH (FT.): Screen Interval ≈ 3.2-13.2'
TIME END PURGE: 1545	
TIME SAMPLED:	
COMMENTS: Well Re-Development (Existing Well)	

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)
	13.2 TOC	-	2.8 TOC	=	10.4	X	0.16	0.64	1.44	=	1.66

TIME	1254	1334	1405	1450	1525	1535	1545
VOLUME PURGED (GAL)	2	1.5	1	1.5	≈1+	+2	+2
PURGE RATE (GPM)	dewatered (P-rse Pump)	dewatered (P-rse pump)	dewatered (P-rse pump)	dewatered (P-rse Pump)	peristaltic ≈5 min per gallon		
TEMPERATURE (°C)					(dewaters @ faster speeds w/ peristaltic -- need slow purge)		
pH							
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)							
DISSOLVED OXYGEN (mg/L)							
Eh(mv)Pt-AgCl ref.							
TURBIDITY / COLOR	Cloudy; gray	Slt cloudy; gray	V.Slt. cldy lt. gray	Mostly clear v.lt-gray	Clear 32.5	Clear 19.6	Clear 11.2
ODOR	N	→	→	→	→	→	→
DEPTH OF PURGE INTAKE (FT)					≈8' (mid sat scrn)		
DEPTH TO WATER DURING PURGE (FT)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?					N -- very slow purge		

F-43.1 (3-06)

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name:	Cornet Bay	**Well Number:**	MW-1R
Project Number:	1396010 .00	**Personnel:**	DKM/RL

STATIC WATER LEVEL (FT.): ≈6.4	MEASURING POINT DESCRIPTION: TOC North Side
WATER LEVEL MEASUREMENT METHOD: Electronic WL Meter	PURGE METHOD: Purge Pump / Peristaltic
TIME START PURGE: purge pump / peristaltic 0705 / 1200	PURGE DEPTH (FT.): ≈7-10.5' (Saturated part of screen)
TIME END PURGE: 1330	
TIME SAMPLED:	

COMMENTS: Initial Well Development
– slower recovery than other wells; dewaters quickly w/purge pump.
– Can dewater w/peristaltic -- need to use Low purge rates (1 gal/20 min)

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)
	10.5		6.4		4.1		0.16	0.64	1.44		0.66

TIME	706	940	837	925	start 1200 1210	1230	1330		
VOLUME PURGED (GAL)	0.5	<0.5	<0.5	<0.5	+0.5	+0.5	+0.5		
PURGE RATE (GPM)	dewatered → purge pump →				Peristaltic →				
TEMPERATURE (°C)					16.67				
pH					7.54				
SPECIFIC CONDUCTIVITY (uncorrected) (micromhos/cm)					908				
DISSOLVED OXYGEN (mg/L)									
Eh(mv)Pt-AgCl ref.									
TURBIDITY / COLOR	Mod Turbid; gray		Slt/med turbid; lt. grey		Slt turb, v. pale grey	clear	clear		
ODOR									
DEPTH OF PURGE INTAKE (FT)	Bottom →				≈9'				
DEPTH TO WATER DURING PURGE (FT)					@1200 ≈8.5				
NUMBER OF CASING VOLUMES REMOVED									
DEWATERED?						dewatered →			

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay	**Well Number:** MW-2R
Project Number: 139601D .00	**Personnel:** DKM
STATIC WATER LEVEL (FT.): 8.2	MEASURING POINT DESCRIPTION: TOC N.S.JC
WATER LEVEL MEASUREMENT METHOD: Electronic Lt meter	PURGE METHOD: Purge Pump / Peristaltic
TIME START PURGE: Purge pump 6.57 / Peristaltic 1045	PURGE DEPTH (FT.): Saturated screen interval ≈8-10.5'
TIME END PURGE: 1105	
TIME SAMPLED:	

COMMENTS: Initial Well Development
- Dewaters using purge pump
- Slow purge w/Peristaltic is good (does not dewater)

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)
	10.5	-	8.2	=	2.3	X	0.16	0.64	1.44	=	0.37

TIME	658 / 739	833 / 920	start 1045 / 1055	1105				
VOLUME PURGED (GAL)	0.5 gal / 1 gal	1+1 gal = 1.5 gal	+1 gal	+1 gal			≈6 gal Total	
PURGE RATE (GPM)	dewatered (Purge pump) →		peristaltic →					
TEMPERATURE (°C)			17.10	17.21				
pH			6.95	6.93				
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)			1329	1322				
DISSOLVED OXYGEN (mg/L)								
Eh(mv)Pt-AgCl ref.								
TURBIDITY / COLOR	Mod turbid; gray	Slt turbid; lt. gray	Slt turb.; v. lt. green; 15.31	clear; 12.71				
ODOR								
DEPTH OF PURGE INTAKE (FT)	Bottom		≈9					
DEPTH TO WATER DURING PURGE (FT)			start = 9.41					
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?			N	N				

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Comet Bay Marina **Well Number:** MW-4R

Project Number: 1396010 . 00 **Personnel:** DKM

STATIC WATER LEVEL (FT.): ~5.7'	MEASURING POINT DESCRIPTION: TOC N. Side
WATER LEVEL MEASUREMENT METHOD: electronic WL Meter	PURGE METHOD: Purge Pump / Peristaltic
TIME START PURGE: 0717 / 1135 (Purge pump / Peristaltic)	PURGE DEPTH (FT.): Saturated Screen interval ≈ 6-10.5'
TIME END PURGE: 1155	
TIME SAMPLED:	

COMMENTS: Initial Well Development

- dewaters quickly using purge pump.
- Peristaltic low-speed purge -- need slowest speed to not dewater (~1/2 gal in 10 min)

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)
	10.5	-	5.7	=	4.8	X	0.16	0.64	1.44	=	0.77

TIME	713	751	845	930	start 1135 / 1145	1155			
VOLUME PURGED (GAL)	713 ≈1	=0.5	=.75	=0.5	+0.5	+0.5		≈4.5 Total	
PURGE RATE (GPM)	Undetect → (Purge pump)				Peristaltic →				
TEMPERATURE (°C)					17.51	17.58			
pH					7.40	7.40			
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)					1358	1362			
DISSOLVED OXYGEN (mg/L)									
Eh(mv)Pt-AgCl ref.									
TURBIDITY / COLOR	mod turbid; gray		slt turb; lt. gray		clear → 28.14	16.21			
ODOR									
DEPTH OF PURGE INTAKE (FT)	Bottom →				~8'				
DEPTH TO WATER DURING PURGE (FT)					@1135 = 6.4				
NUMBER OF CASING VOLUMES REMOVED									
DEWATERED?					N	N			

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Comet Bay	**Well Number:** MW-10R
Project Number: 139601O .00	**Personnel:** DKM

STATIC WATER LEVEL (FT.): =4.2'	MEASURING POINT DESCRIPTION: TOC North Side
WATER LEVEL MEASUREMENT METHOD: Electronic WL Meter	PURGE METHOD: Purge pump / Peristaltic
TIME START PURGE: Purge pump / Peristaltic 645 / 1000	PURGE DEPTH (FT.): Saturated Screen
TIME END PURGE: 1130	interval = 6'-10.5'
TIME SAMPLED:	

COMMENTS: Well Development Initial
- dewaters quickly w/purge pump.
-- Well recovers very slowly; can dewater w/peristaltic -- needs very slow purge rate

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)
	10.5		4.2		6.3		0.16	0.64	1.44		1.01

TIME	646	730	830	915	Start 1000 1020	1040	Let recover Start: 1110 1120	1130	
VOLUME PURGED (GAL)	1 gal	0.75 gal	0.5 gal	0.5 gal	+1.5	+1.5 dewatered	+0.5	+0.5	≈6.5 gal Total
PURGE RATE (GPM)	dewatered (Purge pump) →				Peristaltic →		Slow -- ½ gal / 10 min →		
TEMPERATURE (°C)					16.12	16.52	17.22	17.21	
pH					7.12	7.20	6.96	7.02	
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)					1891	1837	1781	1720	
DISSOLVED OXYGEN (mg/L)									
Eh(mv)Pt-AgCl ref.									
TURBIDITY / COLOR	mod silty med grey	→	SH. Turb lt. grey		sl/mod turb. med grey 98.9	SH. turb med grey 43.2	slt turbi lt. grey 51.3	clear 25.4	
ODOR									
DEPTH OF PURGE INTAKE (FT)	Bottom →				≈8.5'		≈9.5		
DEPTH TO WATER DURING PURGE (FT)					@ Start 6.9'		@1110 :8.5'		
NUMBER OF CASING VOLUMES REMOVED									
DEWATERED?							Y	N	

Attachment C

Groundwater Purge and Sample Forms

FIELD REPORT **Kennedy/Jenks Consultants**

Project Name: Ecology Cornet Bay
Location: Oak Harbor, WA
Client: WA Dept. of Ecology
Prepared By: R Lopez
Site Task: Groundwater Sampling

Page: 1 of 3
Date: 8/15/14
K/J Job No.: 1396010.00
Weather: ~70°F partly cloudy some drizzle

MW1R - dewatered during sampling
MW2R - Samples: BTEX 3 VOAs
8/15/14 1225 TPH-G 2 VOAs
TPH-D 2 300ml glass amber
Methane 2 VOAs
Sulfide 1 small poly
SO4, NO1, NO3 1 small poly
Metals HNO3 (filtered) 1 300ml poly (dissolved iron)
NH3 1 small poly

MW4R - Samples: BTEX 3 VOAs
8/15/14 1110 TPH-G 2 VOAs
TPH-D 2 300ml glass amber
Methane 2 VOAs
Sulfide 1 small poly
SO4, NO1, NO3 1 small poly
Metals HNO3 (filtered) 1 300ml poly (dissolved iron)
NH3 1 small poly

MW7 - Samples: BTEX 3 VOAs
8/14/1740 TPH-G 2 VOAs
TPH-D 2 300ml glass amber
Methane 2 VOAs
Sulfide 1 small poly

Signed: _____

Cont. on next page →

32001 32nd Ave. South, Suite 100, Federal Way, WA 98001
253-835-6400/FAX 253-952-3435

FIELD REPORT **Kennedy/Jenks Consultants**

Project Name: Ecology Cornet Bay
Location: Oak Harbor, WA
Client: WA Dept. of Ecology
Prepared By: R Lopez
Site Task: Groundwater Sampling

Page: 2 of 3
Date: 8/15/14
K/J Job No.: 1396010.00
Weather: ~70°F partly cloudy some drizzle

MW7 cont.

SO4, NO2, NO3 1 small poly
Metals HNO3 (filtered) 1 300ml poly (dissolved iron)
NH3 1 small poly

MW9 Samples: BTEX 3 vocs
8/15/14 TPH-G 2 vocs
TPH-D 2 300 ml glass amber
Methane 2 vocs
Sulfide 1 small poly
SO4, NO2, NO3 1 small poly
Metals HNO3 (filtered) 1 300ml poly (dissolved iron)
NH3 1 small poly

MW10R Samples: BTEX 3 vocs
8/15/14 1345 TPH-G 2 vocs
TPH-D 2 300ml glass amber
Methan 2 vocs
Sulfide 1 small poly
SO4, NO2, NO3 1 small poly
Metals HNO3 (filtered) 1 300ml poly (dissolved iron)
NH3 1 small poly

MW10R-1 duplicate samples from MW10R: BTEX 3 vocs
8/15/14 1450 TPH-G 2 vocs
TPH-D 2 300ml glass amber

Signed:

cont. on next page →

32001 32nd Ave. South, Suite 100, Federal Way, WA 98001
253-835-6400/FAX 253-952-3435

FIELD REPORT **Kennedy/Jenks Consultants**

Project Name: Ecology Cornet Bay
Page: 3 of 3
Location: Oak Harbor, WA
Date: 8/15/14
Client: WA Dept. of Ecology
K/J Job No.: 1391605.10.00
Prepared By: R Lopez
Weather: ~70° F partly cloudy some drizzle
Site Task: Groundwater Sampling

MW 1R- no samples taken due to well being dewatered and not producing enough yield during recharge. Sample scheduled for Monday 8/18/14.

Signed:

32001 32nd Ave. South, Suite 100, Federal Way, WA 98001
253-835-6400/FAX 253-952-3435

Groundwater Purge and Sample Form Date: 8/15/15 **Kennedy/Jenks Consultants**

Project Name: Ecology Cornet Bay	Well Number: MW1R
Project Number: 1396010.00	Personnel: R. Lopez
STATIC WATER LEVEL (FT.): 8.98	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD: peristaltic pump
TIME START PURGE: 1000 / 1425	PURGE DEPTH (FT.): 9.5
TIME END PURGE: ~1012	
TIME SAMPLED:	

COMMENTS: Horiba U-22XD calibrated 8/15/14 0930 / dewatered, allowed to recharge ~ 3 hrs,

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)
	10.5		8.98		1.52		0.16	0.64	1.44		0.24

TIME	1000	1005	1010					
VOLUME PURGED (GAL)		.70	1					
PURGE RATE (GPM)								
TEMPERATURE (°C)		16.62	16.47					
pH		6.26	6.66					
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)		2.00	2.06					
DISSOLVED OXYGEN (mg/L)		5.51	4.56					
~~Eh(mv) Pt-AgCl ref.~~ ORP		87	21					
TURBIDITY / COLOR		667.0	375.0					
ODOR		no	—					
DEPTH OF PURGE INTAKE (FT)								
DEPTH TO WATER DURING PURGE (FT)		9.84	10.23	9.46				
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?			yes					

Groundwater Purge and Sample Form Date 8/15/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay Well Number MW R

Project Number: 1896010.00 Personnel Lgp 2

STATIC WATER LEVEL (FT.): 7.80	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD: peristaltic pump
TIME START PURGE: 1205	PURGE DEPTH (FT.): 8.5
TIME END PURGE: 1230	
TIME SAMPLED: 1225	

COMMENTS: 1.2 gal total discharge

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)
	10.5	-	7.80	=	2.7	X	(0.16)	0.64	1.44	=	0.43

TIME	1205	1210	1215	1220	1225			
VOLUME PURGED (GAL)		.15	.40	.65	.9			
PURGE RATE (GPM)								
TEMPERATURE (°C)		17.91	17.65	17.54	17.42			
pH		6.93	6.82	6.79	6.77			
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)		1.23	1.25	1.26	1.26			
DISSOLVED OXYGEN (mg/L)		6.95	6.48	6.36	6.15			
~~Eh(mv)Pt-AgCl ref.~~ ORP		73	76	78	79			
TURBIDITY / COLOR		34.4	25.1	20.8	28.8			
ODOR								
DEPTH OF PURGE INTAKE (FT)								
DEPTH TO WATER DURING PURGE (FT)		8.14	8 33	8.51	8.61			
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?								

Groundwater Purge and Sample Form Date 8/15/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay Well Number: MW4R

Project Number: 1396010 00 Personnel: R Lopez

STATIC WATER LEVEL (FT.) 5.61 MEASURING POINT DESCRIPTION

WATER LEVEL MEASUREMENT METHOD PURGE METHOD stelte pump

TIME START PUR PURGE RATE 5

TIME END PURGE 1115

TIME SAMPLED: 1110

COMMENTS: 1.25 4

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)
	10.5		5.61		4.89		(0.16)	0.64	1.44		0.78

TIME 1015	1050	1055	1100	1105			
VOLUME PURGED (GAL)	.2	.4	.7	.9			
PURGE RATE (GPM)							
TEMPERATURE (°C)	16.78	16.76	16.81	16.74			
pH	7.35	7.28	7.25	7.25			
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)	1.35	1.36	1.39	1.410			
DISSOLVED OXYGEN (mg/L)	4.42	3.38	3.42	3.51			
~~Eh(mv) Pt-AgCl ref.~~ ORP	26	-2	-11	-18			
TURBIDITY / COLOR	60.5	44.1	34.9	32.7			
ODOR	NO						
DEPTH OF PURGE INTAKE (FT)							
DEPTH TO WATER DURING PURGE (FT)	6.31	6.91	7.10	7.90			
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Groundwater Purge and Sample Form Date 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Ecology Cornet Bay	**Well Number:** MW7
Project Number: 1396010.00	**Personnel:** R Lopez
STATIC WATER LEVEL (FT.): 2.59	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD: peristaltic pump
TIME START PURGE: 1700	PURGE DEPTH (FT.): 8
TIME END PURGE: 1745	
TIME SAMPLED: 1740	
COMMENTS:	
2.5 gal total	

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)
	13.8		2.59		11.21		0.16	0.64	1.44		1.79

TIME	1700	1705	1710	1715	1720	1725	1730	1735
VOLUME PURGED (GAL)		.20	.5	.75	1.0	1.2	1.7	2.1
PURGE RATE (GPM)								
TEMPERATURE (°C)		17.30	17.18	17.32	17.47	17.52	17.52	17.47
pH		6.86	6.70	6.66	6.63	6.63	6.66	6.67
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)		0.575	0.568	0.568	0.574	0.579	0.586	0.673
DISSOLVED OXYGEN (mg/L)		4.25	2.86	2.53	2.35	2.27	2.20	2.16
~~Eh(mv)Pt.AgCl ref.~~ ORP		~~-77~~ -77	-82	-97	-145	-164	-171	-175
TURBIDITY / COLOR		37.2	~~33.0~~ 37.1	32.7	24.4	19.4	17.0	16.3
ODOR		no						
DEPTH OF PURGE INTAKE (FT)								
DEPTH TO WATER DURING PURGE (FT)		3.31	3.35	3.38	3.59	3.67	3.71	3.74
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?								

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay	**Well Number:** MW9
Project Number: 1396010.00	**Personnel:** R. Lopez
STATIC WATER LEVEL (FT.): 3.28	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD: Peristaltic pump Geotech
TIME START PURGE: 1538 R	PURGE DEPTH (FT.): 8ft
TIME END PURGE: 1625	
TIME SAMPLED: 1615	

COMMENTS: Calibrated Horiba W-22XD 1500 8/14/14 pH 4.01, cond 4.50 mS/cm, DO 8.33 mg/l, ORP 252 mV, check turb 0.0 NTU

2.0 gal total removed

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)
	13.2		3.28		9.92		0.16	0.64	1.44		1.58

TIME	1530	1535	1540	1545	1550	1555	1600	1605
VOLUME PURGED (GAL)		.25	.40	.60	.75	.90	1.2	1.35
PURGE RATE (GPM)								
TEMPERATURE (°C)		19.94	19.80	19.72	19.41	19.11	18.57	18.31
pH		6.15	6.53	6.61	6.70	6.72	6.73	6.80
SPECIFIC CONDUCTIVITY (micromhos) (uncorrected) ~~micromhos~~ mS/cm		0.752	0.702	0.690	0.666	0.657	0.664	0.684
DISSOLVED OXYGEN (mg/L)		4.55	3.38	3.19	2.94	2.80	2.84	4.43
~~Eh(mv) Pt-AgCl ref.~~ ORP mV		128	106	99	83	64	48	28
TURBIDITY / COLOR		27.8	46.0	61.4	49.3	54.7	64.1	41.7
ODOR		no						
DEPTH OF PURGE INTAKE (FT)								
DEPTH TO WATER DURING PURGE (FT)		3.94	~~4.21~~ 4.10	4.30	4.82	5.29	5.64	5.71
NUMBER OF CASING VOLUMES REMOVED								
DEWATERED?								

Groundwater Purge and Sample Form Date: 8/14/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay **Well Number:** MW-? container

Project Number: B96010.00 **Personnel:** R Lopez

STATIC WATER LEVEL (FT.):	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD:
TIME START PURGE:	PURGE DEPTH (FT.):
TIME END PURGE:	
TIME SAMPLED:	
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)
							0.16	0.64	1.44		

TIME	1610	1615					
VOLUME PURGED (GAL)	1.5	1.7					
PURGE RATE (GPM)							
TEMPERATURE (°C)	17.85	17.82					
pH	6.88	6.91					
SPECIFIC CONDUCTIVITY (uncorrected) (micromhos/cm)	0.691	0.693					
DISSOLVED OXYGEN (mg/L)	4.50	2.95					
~~Eh(mv)Pt-AgCl ref.~~ ORP	16	10					
TURBIDITY / COLOR	18.6	17.0					
ODOR	no	⟷					
DEPTH OF PURGE INTAKE (FT)							
DEPTH TO WATER DURING PURGE (FT)	6.01	6.19					
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Groundwater Purge and Sample Form Date: 8/15/14 **Kennedy/Jenks Consultants**

Project Name: Cornet Bay	Well Number: MW10R
Project Number: 1396010.00	Personnel: R Lopez
STATIC WATER LEVEL (FT.): 4.19	MEASURING POINT DESCRIPTION:
WATER LEVEL MEASUREMENT METHOD:	PURGE METHOD: peristaltic pump
TIME START PURGE: 1310	PURGE DEPTH (FT.): 7
TIME END PURGE: 1350	
TIME SAMPLED: 1345	

COMMENTS:

1.2 gal total discharge / dewatered during sampling, allowed to recharge for ~30 min then completed sampling

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)
	10.5		4.19		6.31		0.16	0.64	1.44		1.0

TIME	1310	1315	1320	1325	1330	1335	1340
VOLUME PURGED (GAL)		.1	.4	.6	.75	.90	1.0
PURGE RATE (GPM)							
TEMPERATURE (°C)		18.97	19.65	19.72	18.01	17.79	18.23
pH		6.97	6.86	6.89	6.93	6.90	7.03
SPECIFIC CONDUCTIVITY (micromhos/cm) (uncorrected)		1.95	1.86	1.89	2.08	2.15	2.16
DISSOLVED OXYGEN (mg/L)		6.01	5.19	5.81	5.53	6.02	7.73
~~Eh(mv)Pt-AgCl ref.~~ ORP		68	57	54	44	1	-30
TURBIDITY / COLOR		101.0	96.6	222.0	149.0	147.0	165.0
ODOR		no					
DEPTH OF PURGE INTAKE (FT)							
DEPTH TO WATER DURING PURGE (FT)		5.36	6.39	6.93	7.60	7.85	7.93
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Groundwater Purge and Sample Form Date: 8/18/14 **Kennedy/Jenks Consultants**

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

PROJECT NUMBER: 1396010.00 PERSONNEL: MJW

STATIC WATER LEVEL (FT): 6.22 @ 1415 MEASURING POINT DESCRIPTION: N Side of TOC

WATER LEVEL MEASUREMENT METHOD: Geotech Interface Probe PURGE METHOD: Geopump Peristaltic w/ new PE & Silicon Tubing

TIME START PURGE: 1424 PURGE DEPTH (FT) 9.5 (Interface Probe used as guide)

TIME END PURGE: 1647

TIME SAMPLED: 1505

COMMENTS: WQ parameters did not stabilize prior to sample collection. Well dewatered several times during sampling of MNA parameters (excluding Methane, NWTPH-Dx & NWTPH-Gx/BTEX). Refer to Field Report 081814 for details.

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)
	10.5		6.22		4.28		~~0.16~~	0.64	1.44		0.68

TIME	1426	1431	1435	1438	1441	1443	
VOLUME PURGED ~~(GAL)~~ L	~0.5	~1.0	~1.65	~2.1	~2.5	~2.9	
PURGE RATE ~~(GPM)~~ L/min	0.15	→	→	→	→	→	
TEMPERATURE (°C)	20.73	20.69	20.67	20.55	20.44	20.44	
pH	6.04	6.47	6.62	6.69	6.73	6.79	
SPECIFIC CONDUCTIVITY (~~micromhos~~ mS/cm) (uncorrected)	2.23	2.17	2.16	2.06	2.02	1.92	
DISSOLVED OXYGEN (mg/L)	6.44	4.95	4.75	4.75	4.78	4.37	
~~eh(MV) Pt-AgCl ref.~~ ORP(mV)	144	125	118	115	113	111	
TURBIDITY/COLOR (NTU)	55.9	25.1	18.5	19.8	19.1	22.2	
ODOR	No	→	→	→	→	→	
DEPTH OF PURGE INTAKE (FT)	9.5	→	→	→	→	→	
DEPTH TO WATER DURING PURGE (FT)	6.68	6.95	7.60	7.84	8.01	8.56	
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED? Yes							

F-43.1 (5-89) Sal ‰ 0.1 → (ISGO.I) Page 1 of 2

Groundwater Purge and Sample Form Date: 8/18/14 **Kennedy/Jenks Consultants**

PROJECT NAME: Refer to pg 1 WELL NUMBER:

PROJECT NUMBER: PERSONNEL:

SAMPLE DATA:
TIME SAMPLED: 1505 COMMENTS: Refer to Field Report 081814 for dewatering information.
DEPTH SAMPLED (FT): 9.5
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-1R	5	Voas	HCL	No	40mL	Clear →		Yes	NWTPH-Gx/BTEX	
	2	Amber	No	No	500mL	Clear →		Yes	NWTPH-Dx w/sgc	
	2	Voa	No	No	40mL	Clear →		Yes	Methane	
	1	Poly	No	No	500mL	Turbid	brown	Yes	SO_4,	NO_2, NO_3
	1	Poly	Zn Acetate	No	500mL	Clear →		Yes	Sulfide	
	1	Poly	H_2SO_4	No	500mL	Clear →		Yes	Ammonia	

PURGE WATER DISPOSAL NOTES:
TOTAL DISCHARGE (~~GAL~~ L): ~3.25 COMMENTS:
DISPOSAL METHOD: Onsite 55-gal purge drum
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 (Installed new locks (Master Lock 0356) on all wells including MW-1R)

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

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL:
WEATHER CONDITIONS: Sunny
TEMPERATURE (SPECIFY °C OR °F): ~80°F
PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? Dewatered well (Refer to Field Report 081814)

cc: Project Manager:
Job File:
Other:

Attachment D

Laboratory Analytical Reports

Analytical Resources, Incorporated
Analytical Chemists and Consultants

2 September 2014

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

RE: Client Project: EcologyCornet Bay Marina, 1396010.00
ARI Job No: YW72

Dear Dean:

Please find enclosed the original Chain-of-Custody (COC) record and the final results for the samples from the project referenced above. Six water samples and one trip blank were received on August 16, 2014. The samples were analyzed for BETX, NWTPH-G, methane, NWTPH-Dx, dissolved iron and conventional parameters as instructed.

The percent recovery for the surrogate, o-terphenyl, was low following the initial NWTPH-Dx analysis of sample MW-10R. This sample was re-extracted and re-analyzed. The percent recovery for o-terphenyl was within acceptable QC limits for the re-extraction. The results for both analyses have been submitted.

A matrix spike (MS) was prepared and analyzed for sulfide in conjunction with sample MW-7. The percent recovery for sulfide was low following the analysis of the MS. Since the percent recovery for sulfide was within acceptable QC limits for the corresponding LCS, it was concluded that the sample matrix was the cause of the low MS recovery. No corrective actions were taken.

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 YW72

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: TW72	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Kennedy/Jenks	Phone: 253 835 6400	Date: 8/15/15	Ice Present? Yes
Client Contact:		No. of Coolers: 2	Cooler Temps: 6.8, 5.9
Client Project Name: Ecology Cornet Bay Marina			
Client Project #: 1396010*00	Samplers:		

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

Sample ID	Date	Time	Matrix	No Containers	NWTPH-HCID w/silica gel	NWTPH-Dx	BTEX (by 8260)	Nitrate/nitrite	Ammonia	Sulfate & Sulfide	Methane	Dissolved Iron *	Notes/Comments
MW-7	8/14/14	1740	GW	13	X	X	X	X	X	X	X	X	
MW-9	8/14/14	1605	GW	13	X	X	X	X	X	X	X	X	
~~MW-1R~~					X	X	X	X	X	X	X	X	Did not sample
MW-2R	8/15/14	1025	GW	13	X	X	X	X	X	X	X	X	
MW-4R	8/15/14	1110	GW	13	X	X	X	X	X	X	X	X	
MW-10R	8/15/14	1345	GW	13	X	X	X	X	X	X	X	X	
~~MW-10~~ MW10R-1	8/15/14	1450	GW	7	X	X	X						

Analysis Requested

* Field Filtered

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
After hour deposit	Printed Name: Raymond Lopez	Printed Name: Chris Atwell	Printed Name	Printed Name:
	Company: Kennedy/Jenks	Company: API	Company:	Company
	Date & Time: 8/15/14 1900	Date & Time: 8/16/14 0810	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.

TW72 00002

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: YW72

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) 5.0 5.9

Time: 0810

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

Temp Gun ID#: 90877552

Cooler Accepted by: CA Date: 8/16/14 Time: 0810

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 8/8/14

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

Samples Logged by: CA Date: 8/16/14 Time: 0855

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

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

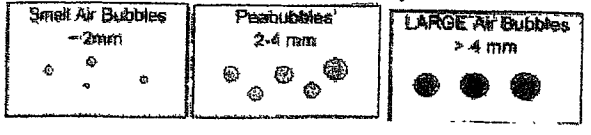
Additional Notes, Discrepancies, & Resolutions:

MW-7 2-4mm 1 Pb

MW-2R -2mm 2 SMB

MW02-1 2-4mm 4 Pb

By: CA Date: 8/16/14



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

PRESERVATION VERIFICATION 08/16/14

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **YW72**

Inquiry Number: NONE
Analysis Requested: 08/18/14
Contact: Faragalli, Jessica
Client: Kennedy Jenks Consultants, Inc.
Logged by: CA
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Mark
VTSR: 08/15/14

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
14-16907 **YW72A**	MW-7			P			DIS P						F			Y						
14-16908 **YW72B**	MW-9			P			DIS P						F			Y						
14-16909 **YW72C**	MW-2R			P			DIS P						F			Y						
14-16910 **YW72D**	MW-4R			P			DIS P						F			Y						
14-16911 **YW72E**	MW-10R			P			DIS P						F			Y						
14-16912 **YW72F**	MW10R-1			P			DIS P						F			Y						

P = pass
F = Fail

Checked By CA Date 8/16/14

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YW72
Client: Kennedy Jenks Consultants, Inc.
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-7	YW72A	14-16907	Water	08/14/14 17:40	08/16/14 19:00
2.	MW-9	YW72B	14-16908	Water	08/14/14 16:15	08/16/14 19:00
3.	MW-2R	YW72C	14-16909	Water	08/15/14 12:25	08/16/14 19:00
4.	MW-4R	YW72D	14-16910	Water	08/15/14 11:10	08/16/14 19:00
5.	MW-10R	YW72E	14-16911	Water	08/15/14 13:45	08/16/14 19:00
6.	MW10R-1	YW72F	14-16912	Water	08/15/14 14:50	08/16/14 19:00
7.	Trip Blanks	YW72G	14-16913	Water	08/14/14	08/16/14 19:00

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: MW-7**
Page 1 of 1 **SAMPLE**

Lab Sample ID: YW72A
LIMS ID: 14-16907
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 16:26

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	103%
Bromofluorobenzene	100%
d4-1,2-Dichlorobenzene	99.6%

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: YW72B
LIMS ID: 14-16908
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 16:52

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	103%
Bromofluorobenzene	97.6%
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: YW72C
LIMS ID: 14-16909
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 17:19

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	**Benzene**	**1.0**	**1.5**	
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	102%
Bromofluorobenzene	98.0%
d4-1,2-Dichlorobenzene	99.4%

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: YW72D
LIMS ID: 14-16910
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 17:45

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	98.9%
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-10R**
Page 1 of 1 **SAMPLE**

Lab Sample ID: YW72E
LIMS ID: 14-16911
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 18:12

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	107%
d8-Toluene	103%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	99.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MW10R-1**
Page 1 of 1 **SAMPLE**

Lab Sample ID: YW72F
LIMS ID: 14-16912
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 18:38

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	103%
Bromofluorobenzene	98.2%
d4-1,2-Dichlorobenzene	99.7%

ANALYTICAL RESOURCES INCORPORATED

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

Lab Sample ID: YW72G
LIMS ID: 14-16913
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 15:32

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	105%
d8-Toluene	96.1%
Bromofluorobenzene	99.0%
d4-1,2-Dichlorobenzene	98.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-081814A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-081814A
LIMS ID: 14-16907
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/PKC
Date Analyzed: 08/18/14 14:29

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	109%
d8-Toluene	98.6%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-081814A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-081814A
LIMS ID: 14-16907
Matrix: Water
Data Release Authorized:
Reported: 08/21/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/PKC
LCSD: NT2/PKC
Date Analyzed LCS: 08/18/14 13:35
LCSD: 08/18/14 14:02

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	10.2	10.0	102%	10.6	10.0	106%	3.8%
Toluene	9.96	10.0	99.6%	10.1	10.0	101%	1.4%
Ethylbenzene	10.0	10.0	100%	10.0	10.0	100%	0.0%
m,p-Xylene	20.8	20.0	104%	20.4	20.0	102%	1.9%
o-Xylene	10.1	10.0	101%	10.2	10.0	102%	1.0%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	103%	101%
d8-Toluene	102%	103%
Bromofluorobenzene	101%	98.7%
d4-1,2-Dichlorobenzene	102%	100%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-081814A	Method Blank	10	109%	98.6%	102%	101%	0
LCS-081814A	Lab Control	10	103%	102%	101%	102%	0
LCSD-081814A	Lab Control Dup	10	101%	103%	98.7%	100%	0
YW72A	MW-7	10	108%	103%	100%	99.6%	0
YW72B	MW-9	10	104%	103%	97.6%	102%	0
YW72C	MW-2R	10	104%	102%	98.0%	99.4%	0
YW72D	MW-4R	10	106%	98.9%	101%	102%	0
YW72E	MW-10R	10	107%	103%	102%	99.2%	0
YW72F	MW10R-1	10	110%	103%	98.2%	99.7%	0
YW72G	Trip Blanks	10	105%	96.1%	99.0%	98.7%	0

	LCS/MB LIMITS	QC LIMITS
SW8260C		
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(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: 14-16907 to 14-16913

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
METHANE ETHANE ETHENE

Modified RSK 175
Page 1 of 1
Matrix: Water

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Received: 08/16/14

Data Release Authorized:
Reported: 08/27/14

ARI ID	Sample ID	Analysis Date	DL	Analyte	RL	Result
YW72A 14-16907	MW-7	08/21/14	1.0	**Methane**	**0.7**	**1,160**
YW72B 14-16908	MW-9	08/21/14	1.0	Methane	0.7	< 0.7 U
YW72C 14-16909	MW-2R	08/21/14	1.0	Methane	0.7	< 0.7 U
YW72D 14-16910	MW-4R	08/21/14	1.0	**Methane**	**0.7**	**13.2**
YW72E 14-16911	MW-10R	08/21/14	1.0	**Methane**	**0.7**	**5,180**
082114MB	Method Blank	08/21/14	1.0	Methane	0.7	< 0.7 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: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Received: 08/16/14

Data Release Authorized:
Reported: 08/27/14

ARI ID	Analysis Date	Analyte	Spike	Result	Recovery	RPD
082114LCS	08/21/14	Methane	654	719	109.9%	4.3%
082114LCSD				689	105.3%	

Reported in ug/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

RSK 175 WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00

ARI ID	Client ID	PRP	TOT OUT
YW72A	MW-7	94.5%	0
YW72B	MW-9	77.2%	0
YW72C	MW-2R	88.4%	0
YW72D	MW-4R	93.4%	0
YW72E	MW-10R	88.4%	0
MB-082114	Method Blank	97.2%	0
LCS-082114	Lab Control	102%	0
LCSD-082114	Lab Control Dup	98.4%	0

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

Log Number Range: 14-16907 to 14-16911

FORM-II RSK 175

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010*00

Data Release Authorized: MW
Reported: 09/01/14

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-082614	Method Blank	08/26/14	1.0	Gasoline	< 0.25 U
14-16907		PID1		HC ID	---
				Trifluorotoluene	97.1%
				Bromobenzene	95.5%
YW72A	MW-7	08/26/14	1.0	Gasoline	< 0.25 U
14-16907		PID1		HC ID	---
				Trifluorotoluene	98.7%
				Bromobenzene	97.4%
YW72B	MW-9	08/26/14	1.0	Gasoline	< 0.25 U
14-16908		PID1		HC ID	---
				Trifluorotoluene	96.2%
				Bromobenzene	94.8%
YW72C	MW-2R	08/26/14	1.0	Gasoline	< 0.25 U
14-16909		PID1		HC ID	---
				Trifluorotoluene	97.7%
				Bromobenzene	96.8%
YW72D	MW-4R	08/26/14	1.0	Gasoline	< 0.25 U
14-16910		PID1		HC ID	---
				Trifluorotoluene	96.7%
				Bromobenzene	95.3%
YW72E	MW-10R	08/26/14	1.0	Gasoline	< 0.25 U
14-16911		PID1		HC ID	---
				Trifluorotoluene	97.4%
				Bromobenzene	95.7%
YW72F	MW10R-1	08/26/14	1.0	Gasoline	< 0.25 U
14-16912		PID1		HC ID	---
				Trifluorotoluene	98.1%
				Bromobenzene	97.1%
YW72G	Trip Blanks	08/26/14	1.0	Gasoline	< 0.25 U
14-16913		PID1		HC ID	---
				Trifluorotoluene	100%
				Bromobenzene	98.3%

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-082614
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082614
LIMS ID: 14-16907
Matrix: Water
Data Release Authorized:
Reported: 09/01/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/26/14 11:18
LCSD: 08/26/14 11:48
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

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	1.05	1.00	105%	0.99	1.00	99.0%	5.9%

Reported in mg/L (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	96.5%	97.5%
Bromobenzene	95.1%	95.9%

ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: YW72
Matrix: Water

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010*00

Client ID	TFT	BBZ	TOT OUT
MB-082614	97.1%	95.5%	0
LCS-082614	96.5%	95.1%	0
LCSD-082614	97.5%	95.9%	0
MW-7	98.7%	97.4%	0
MW-9	96.2%	94.8%	0
MW-2R	97.7%	96.8%	0
MW-4R	96.7%	95.3%	0
MW-10R	97.4%	95.7%	0
MW10R-1	98.1%	97.1%	0
Trip Blanks	100%	98.3%	0

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

Log Number Range: 14-16907 to 14-16913

FORM II TPHG

Data File: /chem3/pid1.i/20140826-1.b/0826a004.d

Date : 26-AUG-2014 11:18

Client ID:

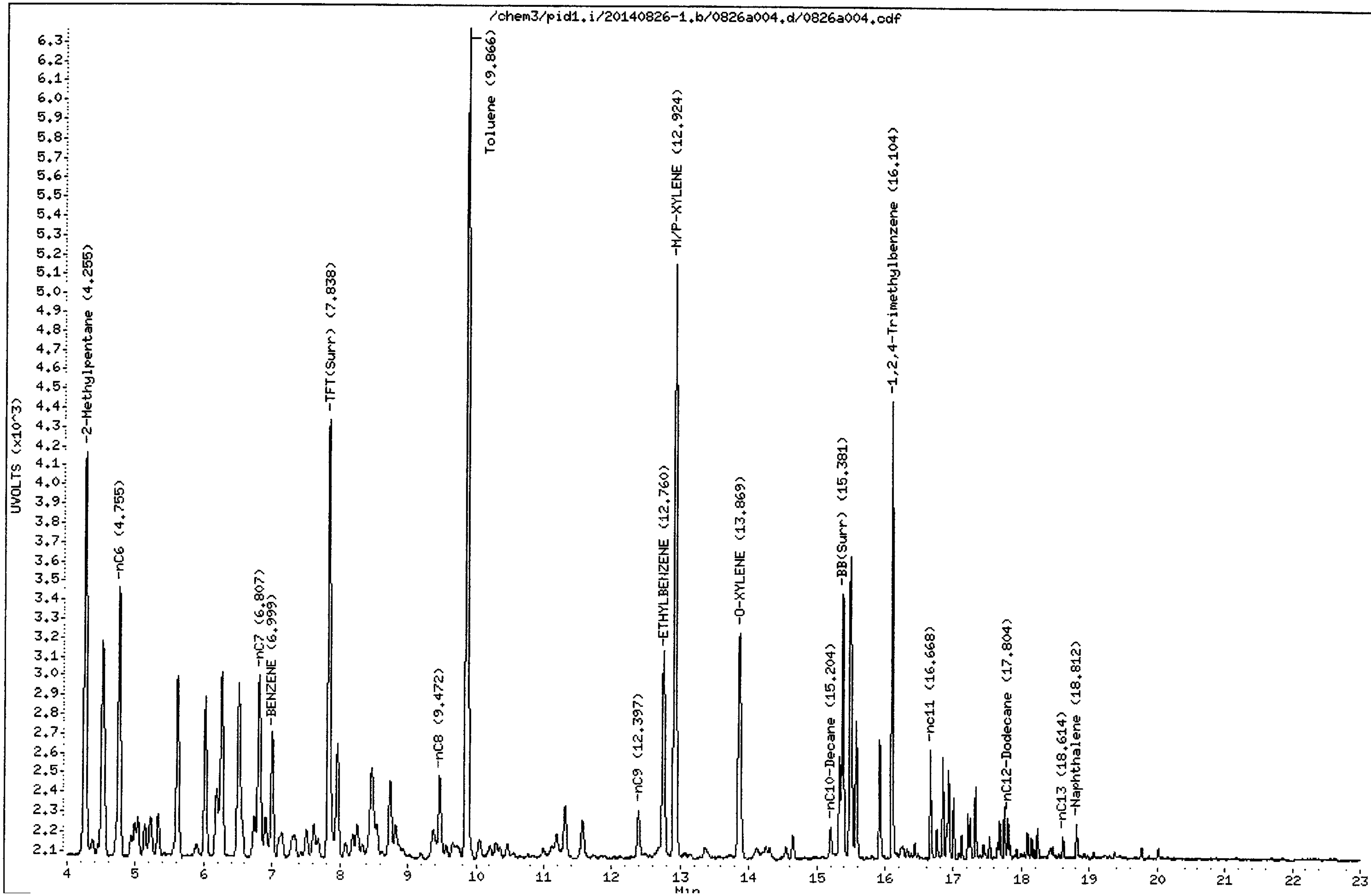
Sample Info: LCS0826

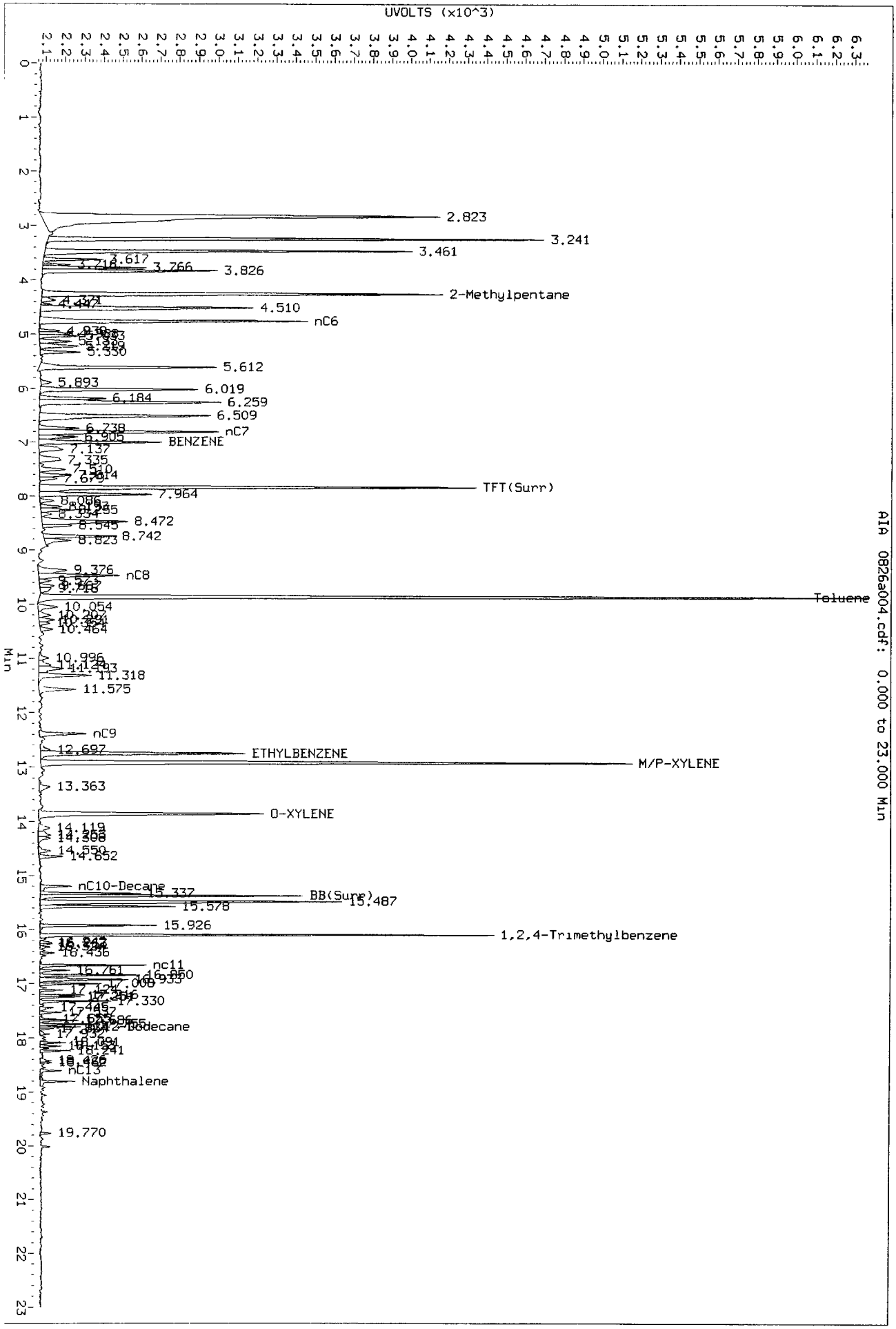
Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

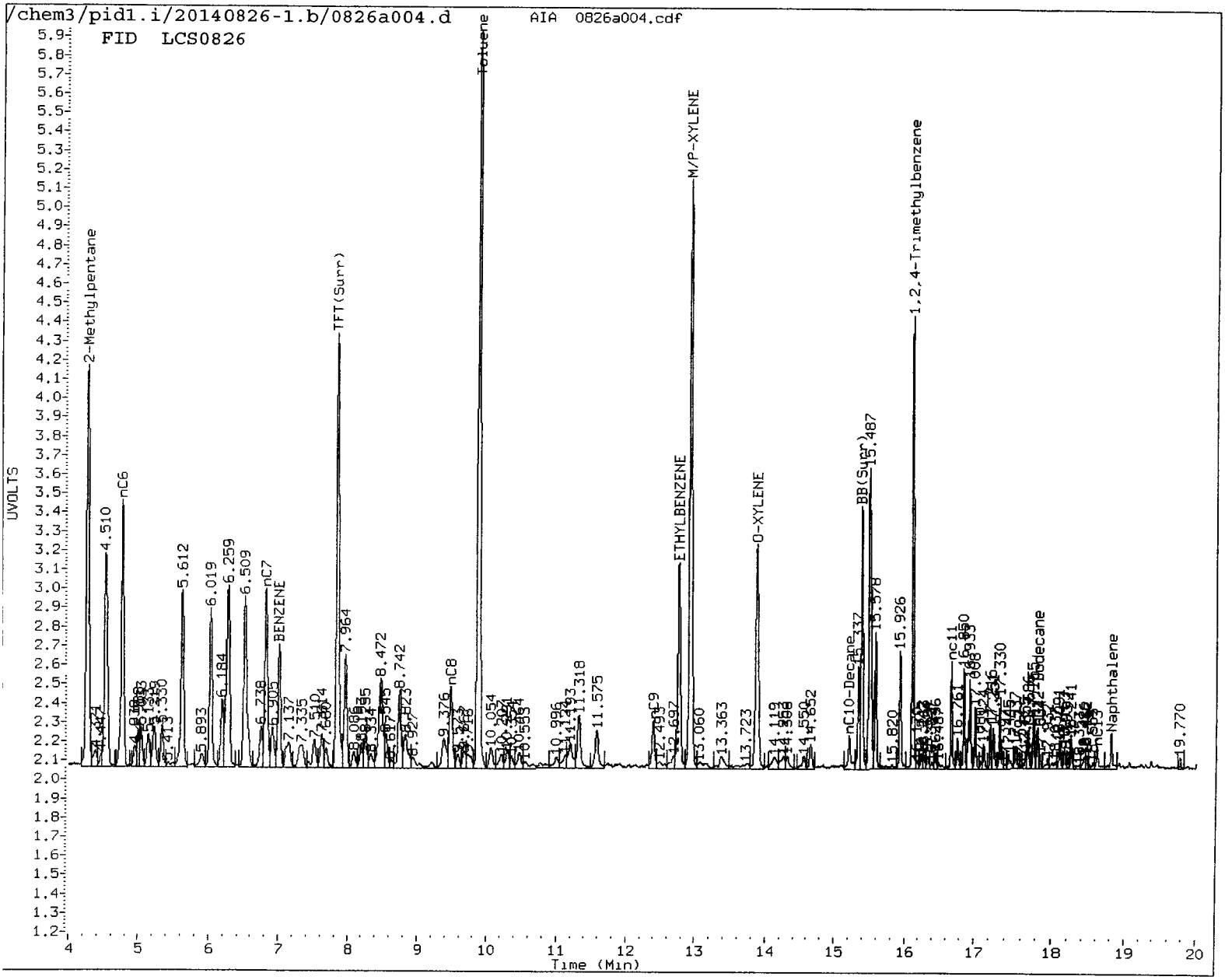
Column diameter: 0.18





Data File: /chem3/pid1.i/20140826-1.b/0826a004.d/0826a004.cdf
Injection Date: 26-AUG-2014 11:18
Instrument: pid1.i
Client Sample ID:

YW72 00026



MANUAL INTEGRATION

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

5. Other _____

Analyst: _____ Date: 8/27/14

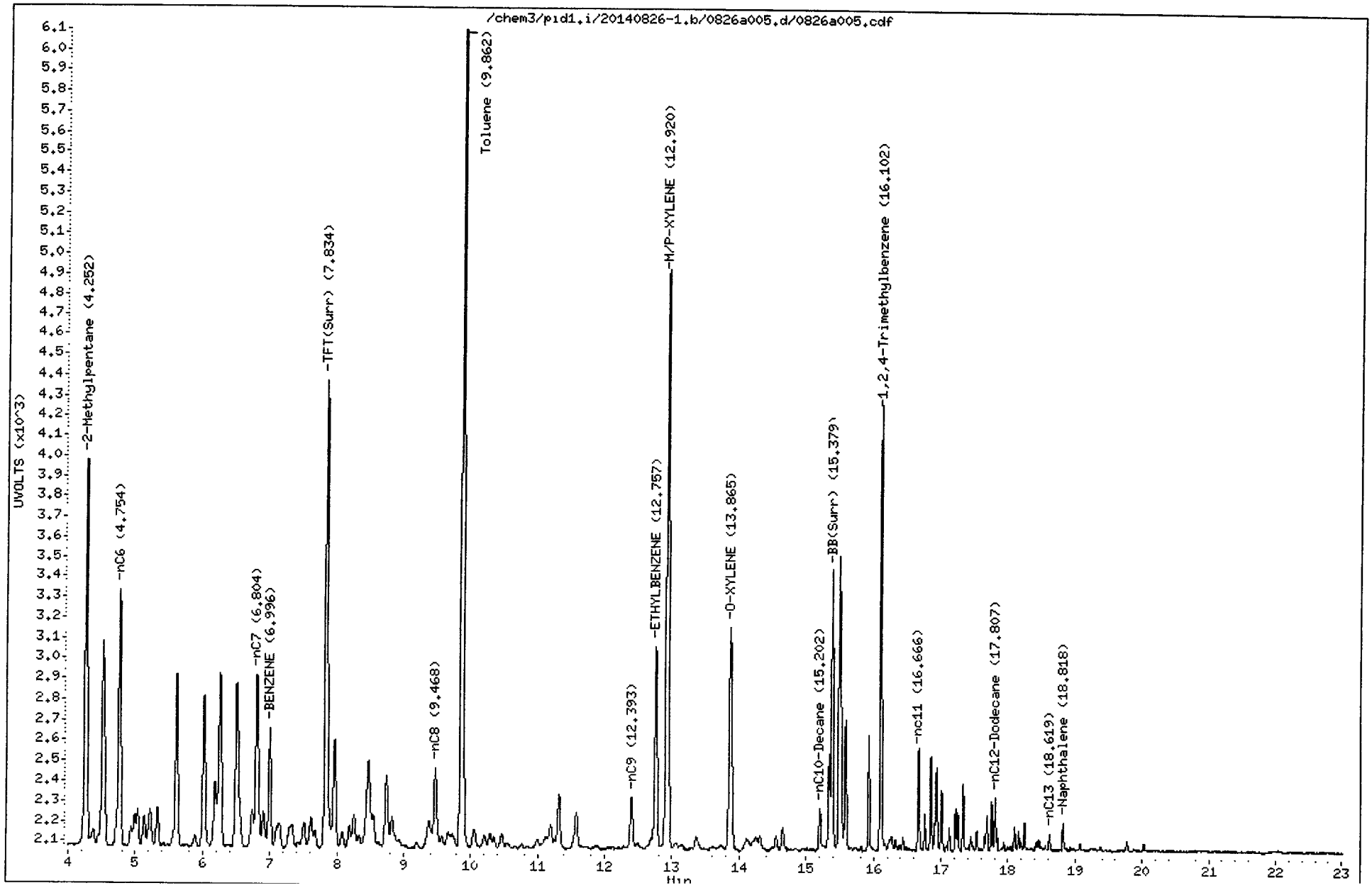
TWTZ : 66627

Data File: /chem3/pid1.i/20140826-1.b/0826a005.d
Date : 26-AUG-2014 11:48
Client ID:
Sample Info: LCSD0826

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC
Column diameter: 0.18



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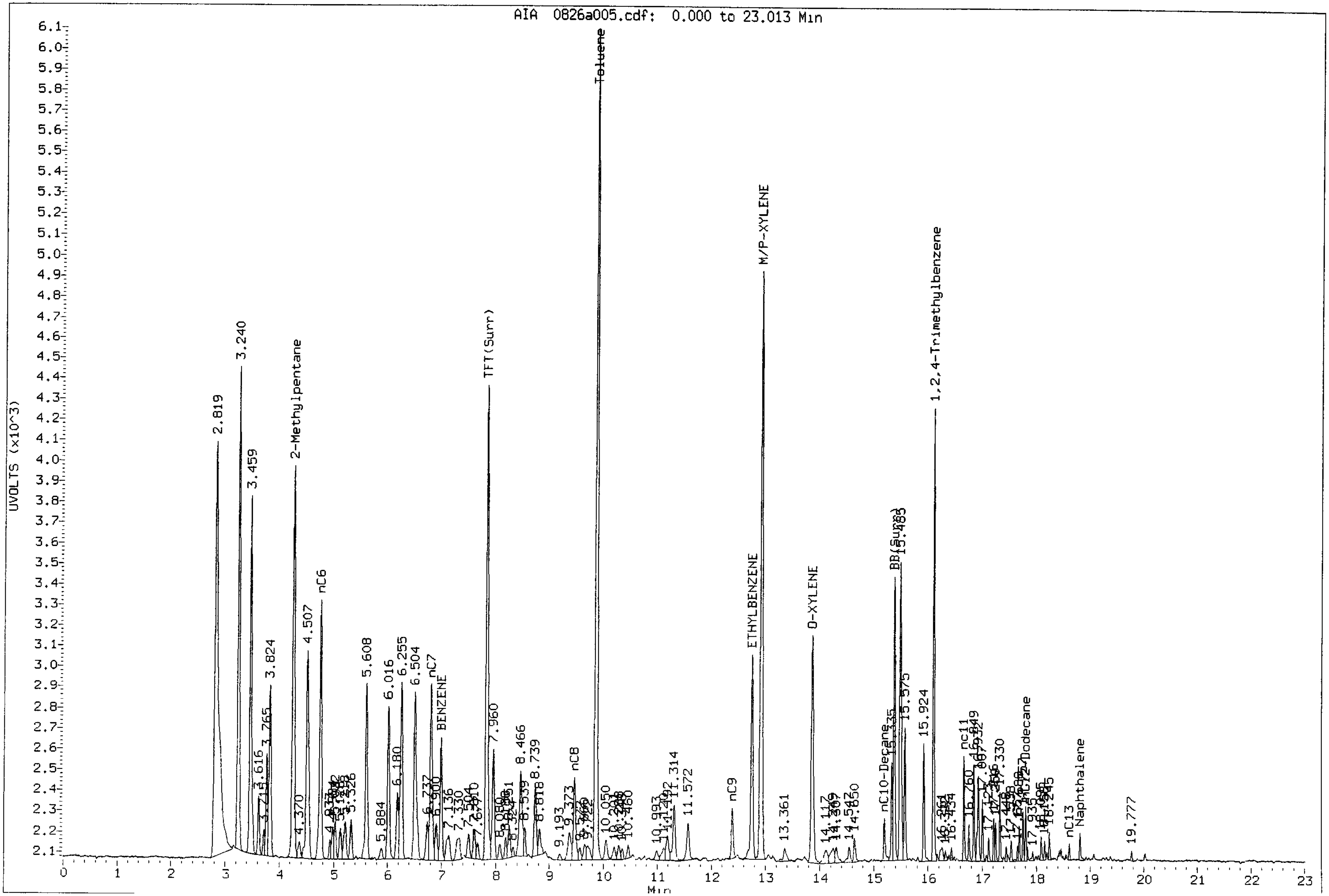
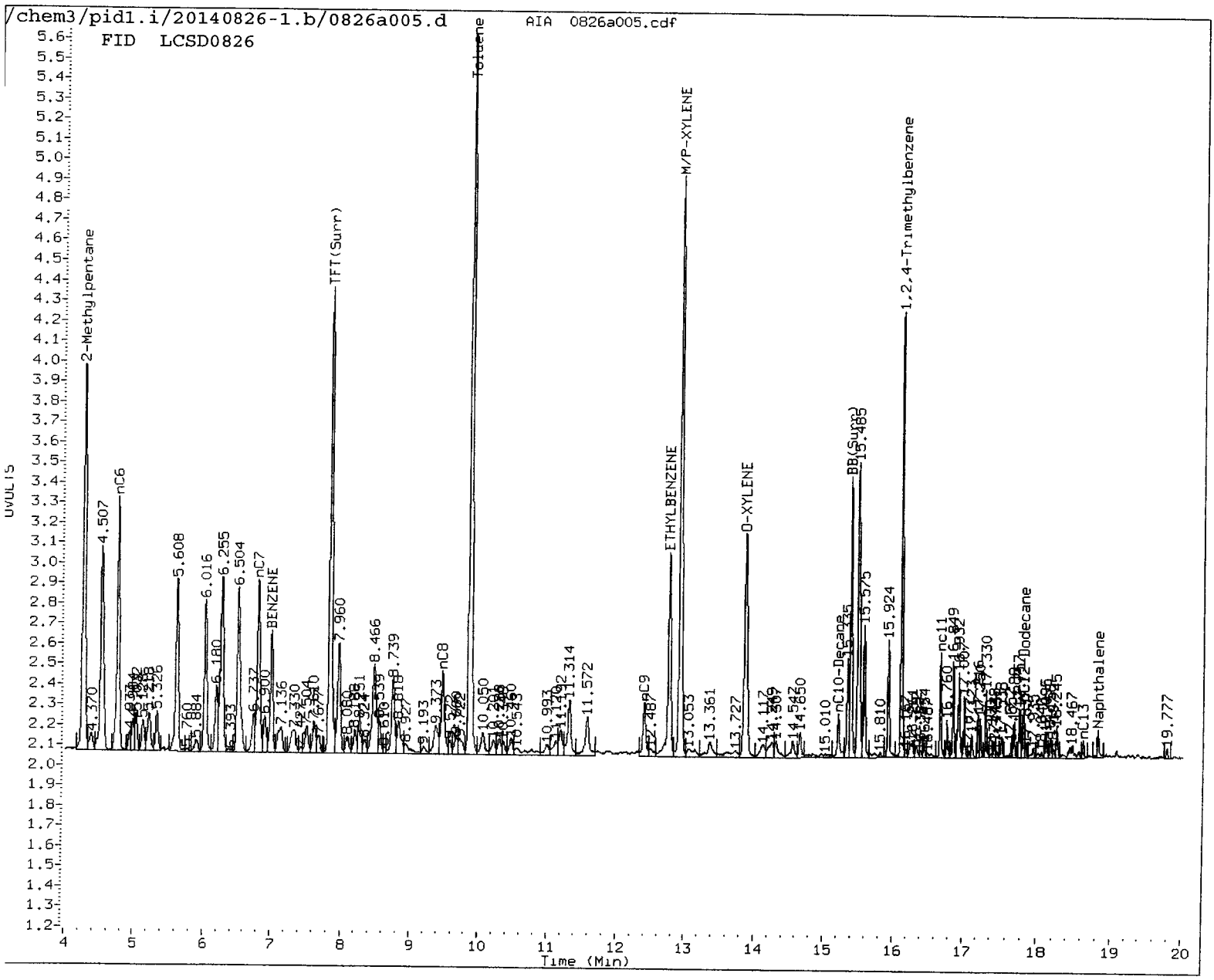
Injection Date: 26-AUG-2014 11:48
Instrument: pid1.i
Client Sample ID:





MANUAL INTEGRATION

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

5. Other _____

Analyst: PC Date: 8/27/14

Data File: /chem3/pid1.i/20140826-1.b/0826a006.d

Date : 26-AUG-2014 12:17

Client ID:

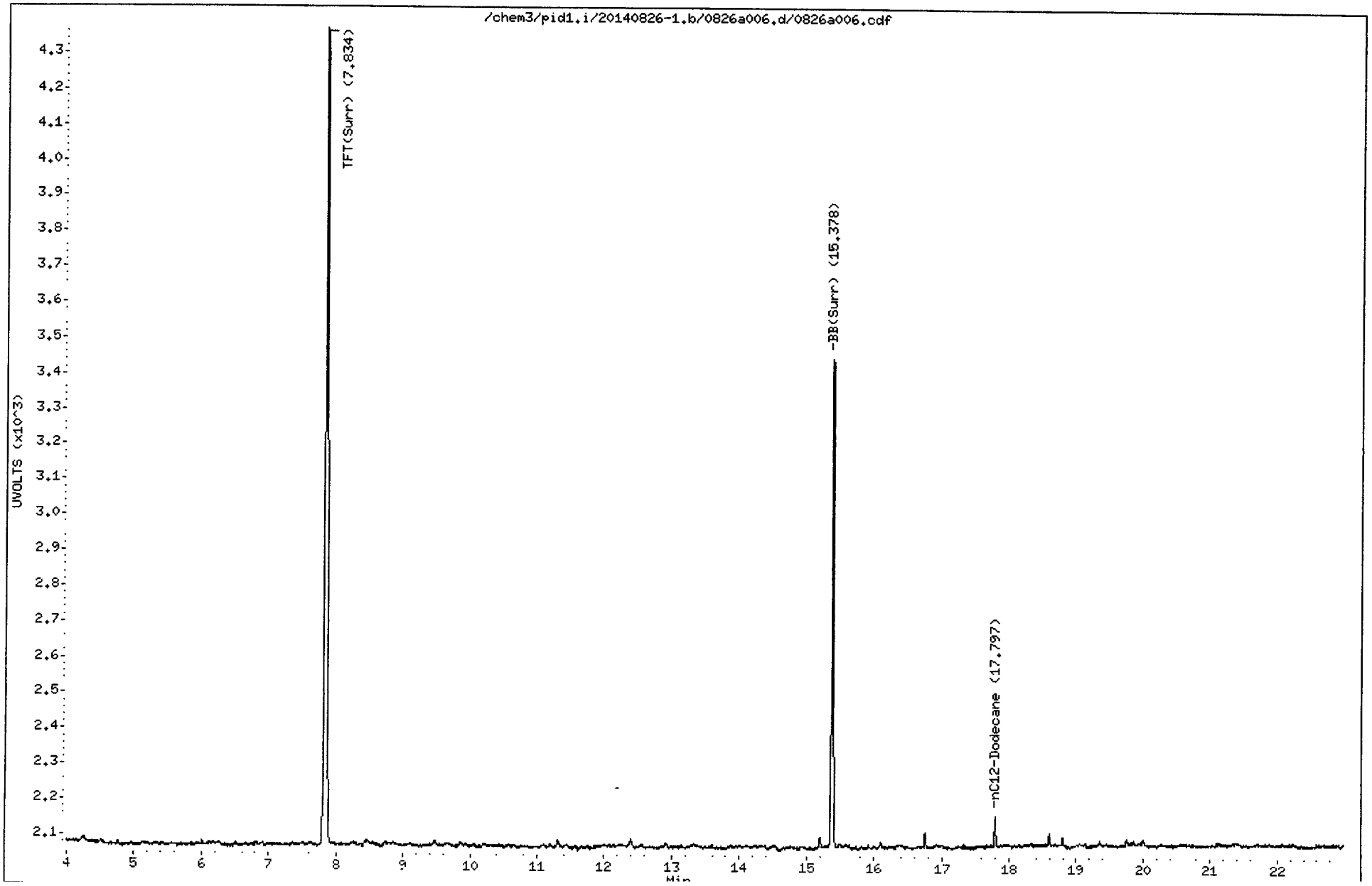
Sample Info: MB0826

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a015.d

Date : 26-AUG-2014 17:49

Client ID: MW-7

Sample Info: YW72A

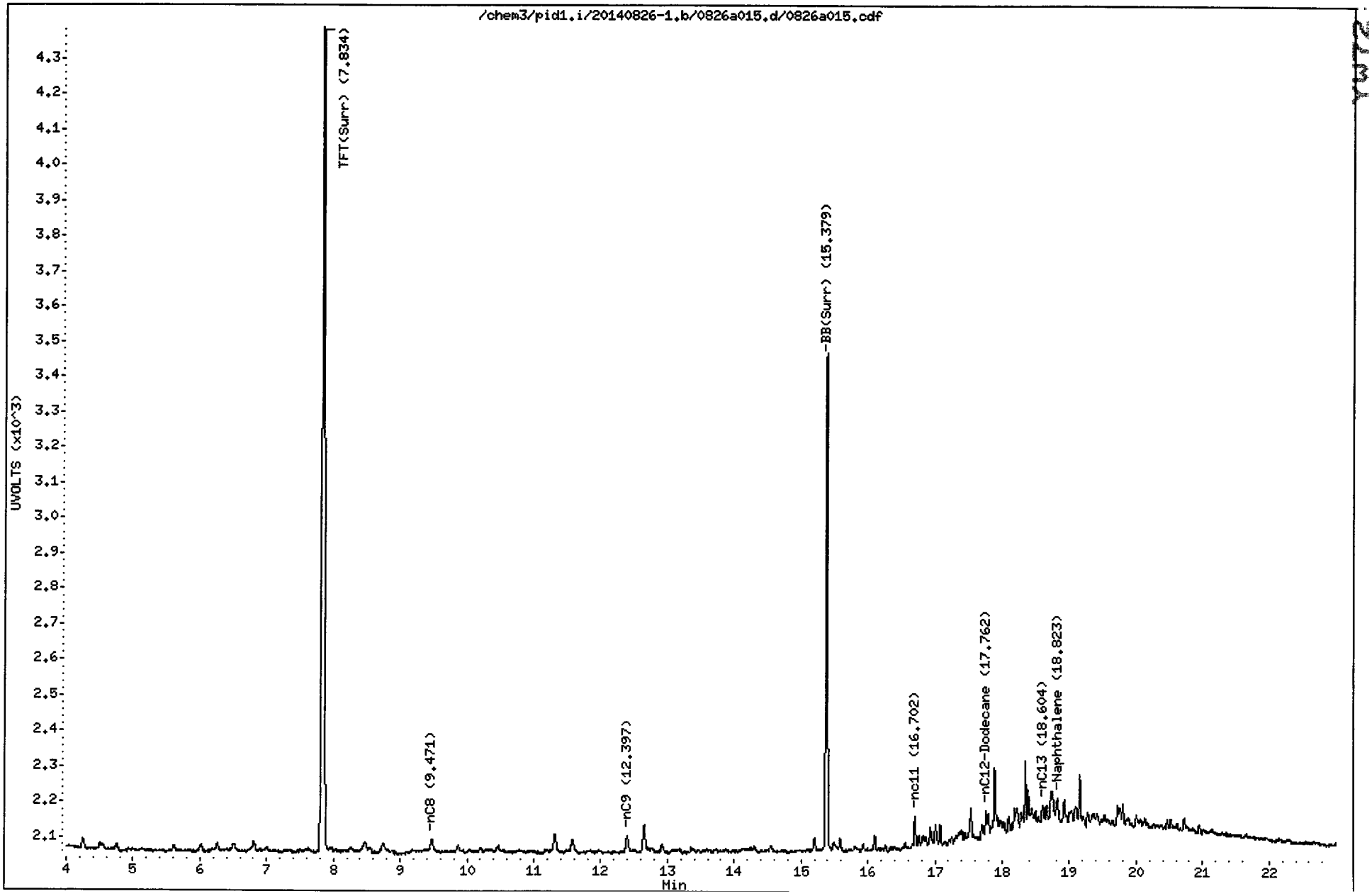
Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

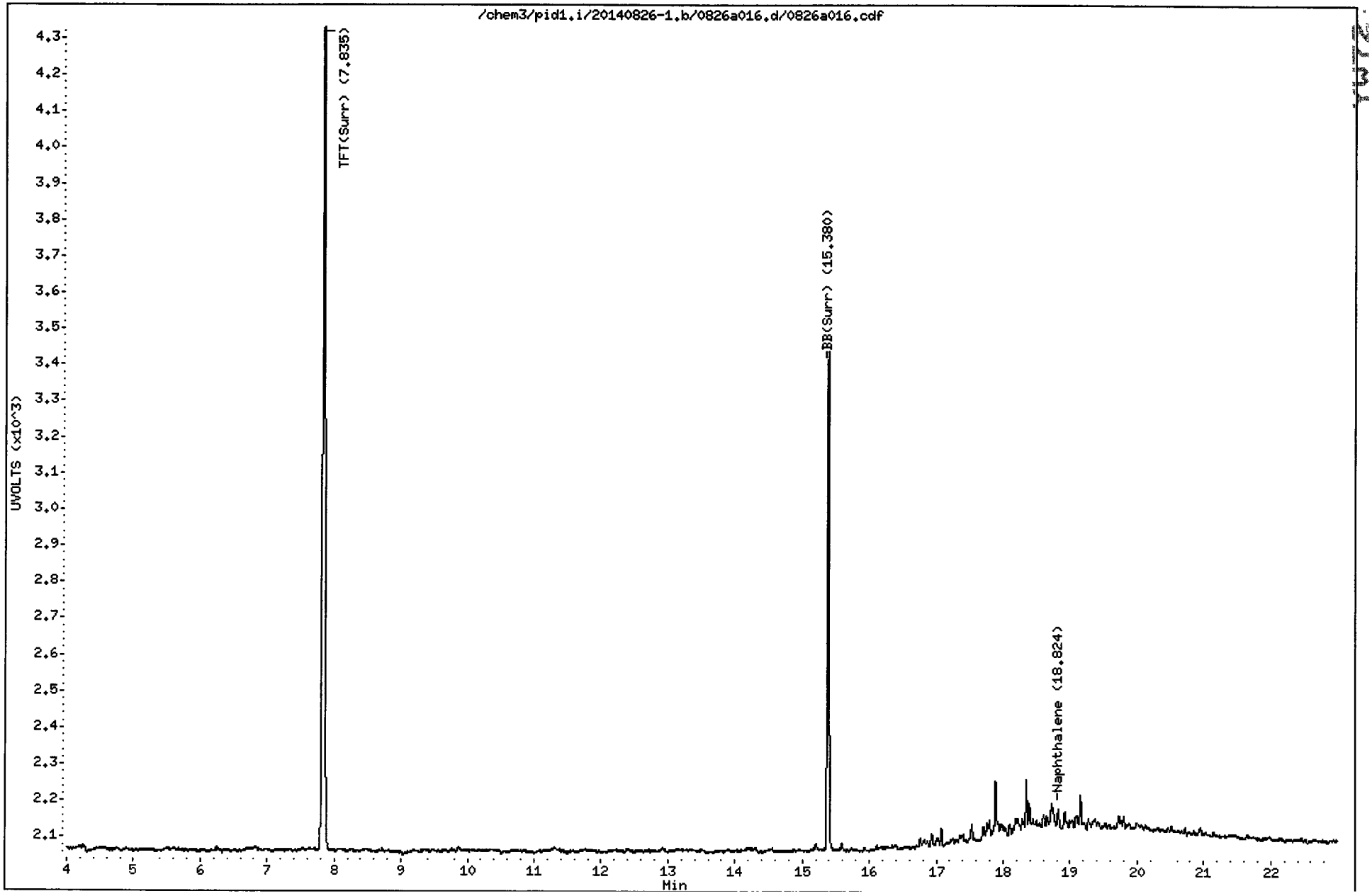
Column diameter: 0.18

YW72 600632



Data File: /chem3/pid1.i/20140826-1.b/0826a016.d
Date : 26-AUG-2014 18:19
Client ID: MW-9
Sample Info: YW72B

Instrument: pid1.i
Operator: PC
Column phase: RTX 502-2 FID
Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a017.d

Date : 26-AUG-2014 18:48

Client ID: MW-2R

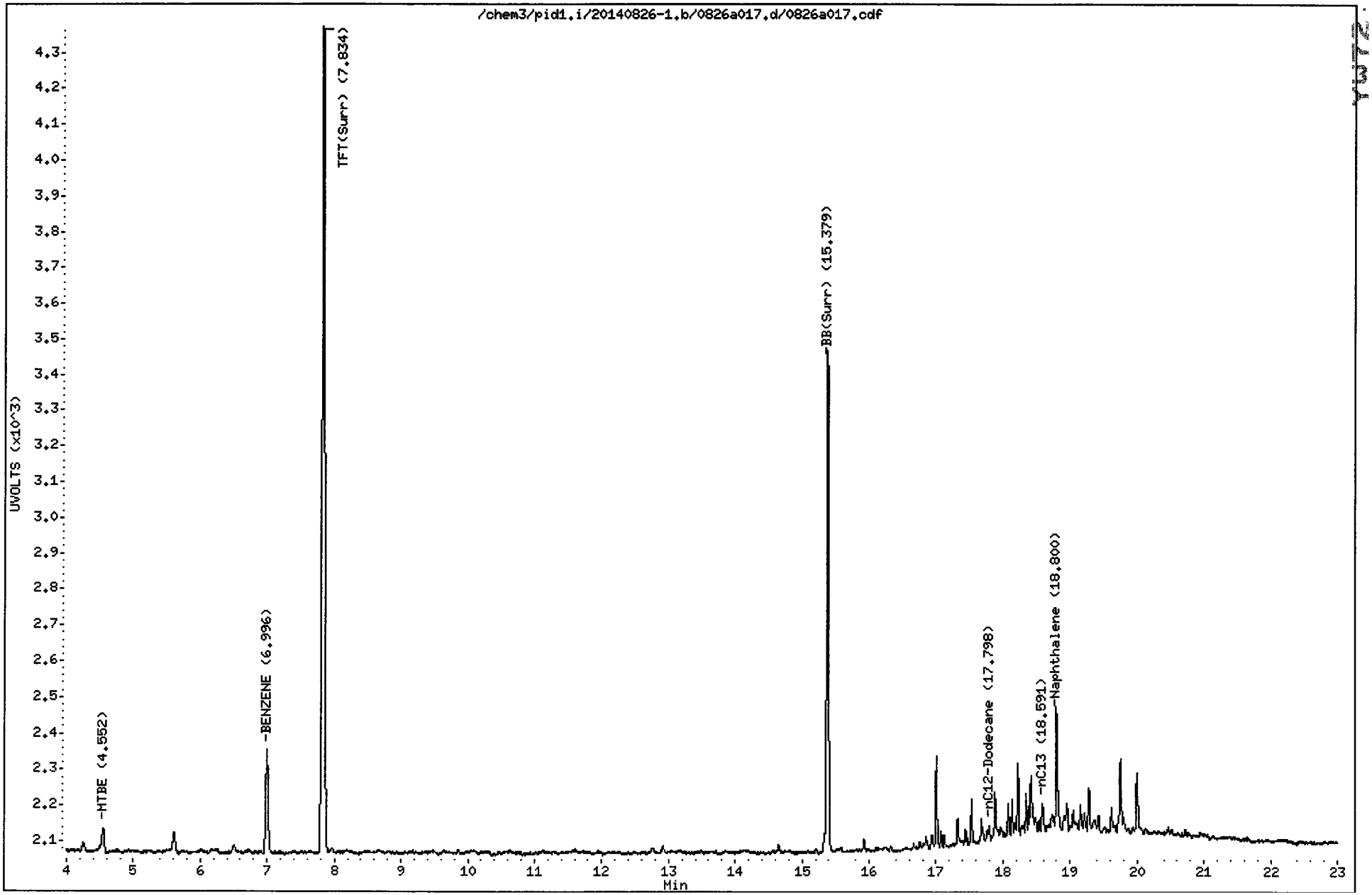
Sample Info: YW72C

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a018.d

Date : 26-AUG-2014 19:17

Client ID: MW-4R

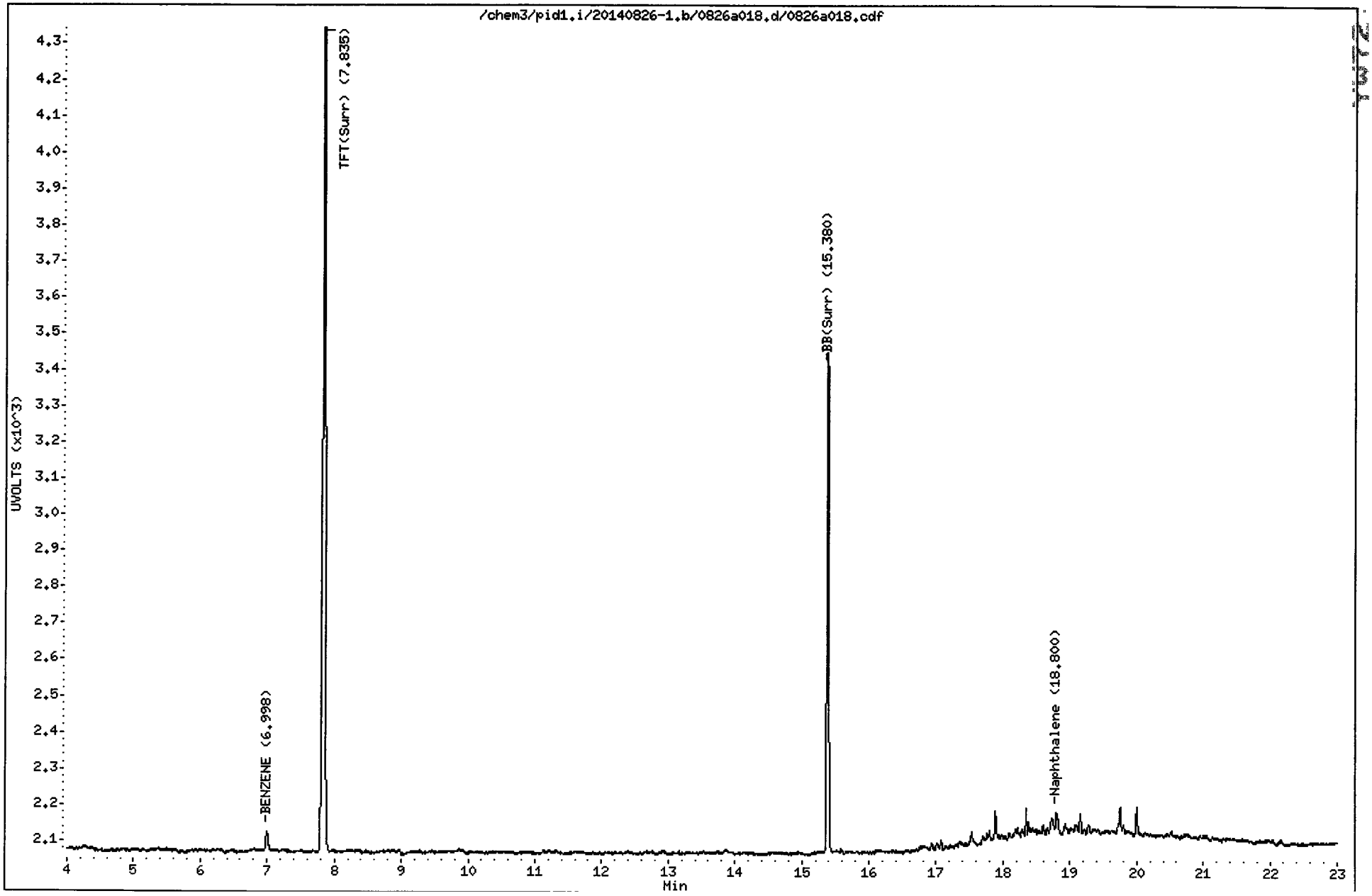
Sample Info: YW72D

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a019.d

Page 1

Date : 26-AUG-2014 19:46

Client ID: MW-10R

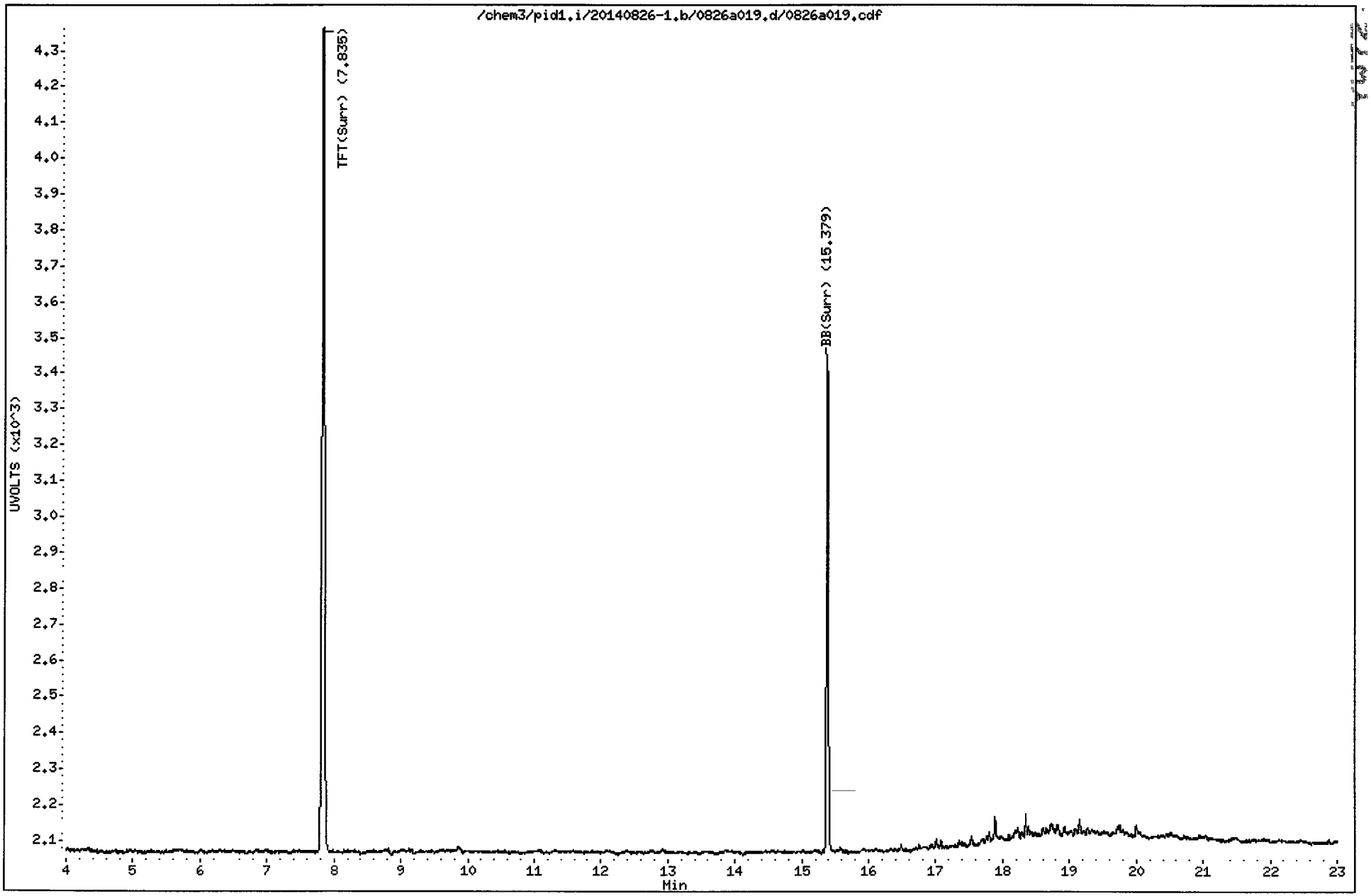
Instrument: pid1.i

Sample Info: YW72E

Operator: PC

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a020.d

Page 1

Date : 26-AUG-2014 20:15

Client ID: MW10R-1

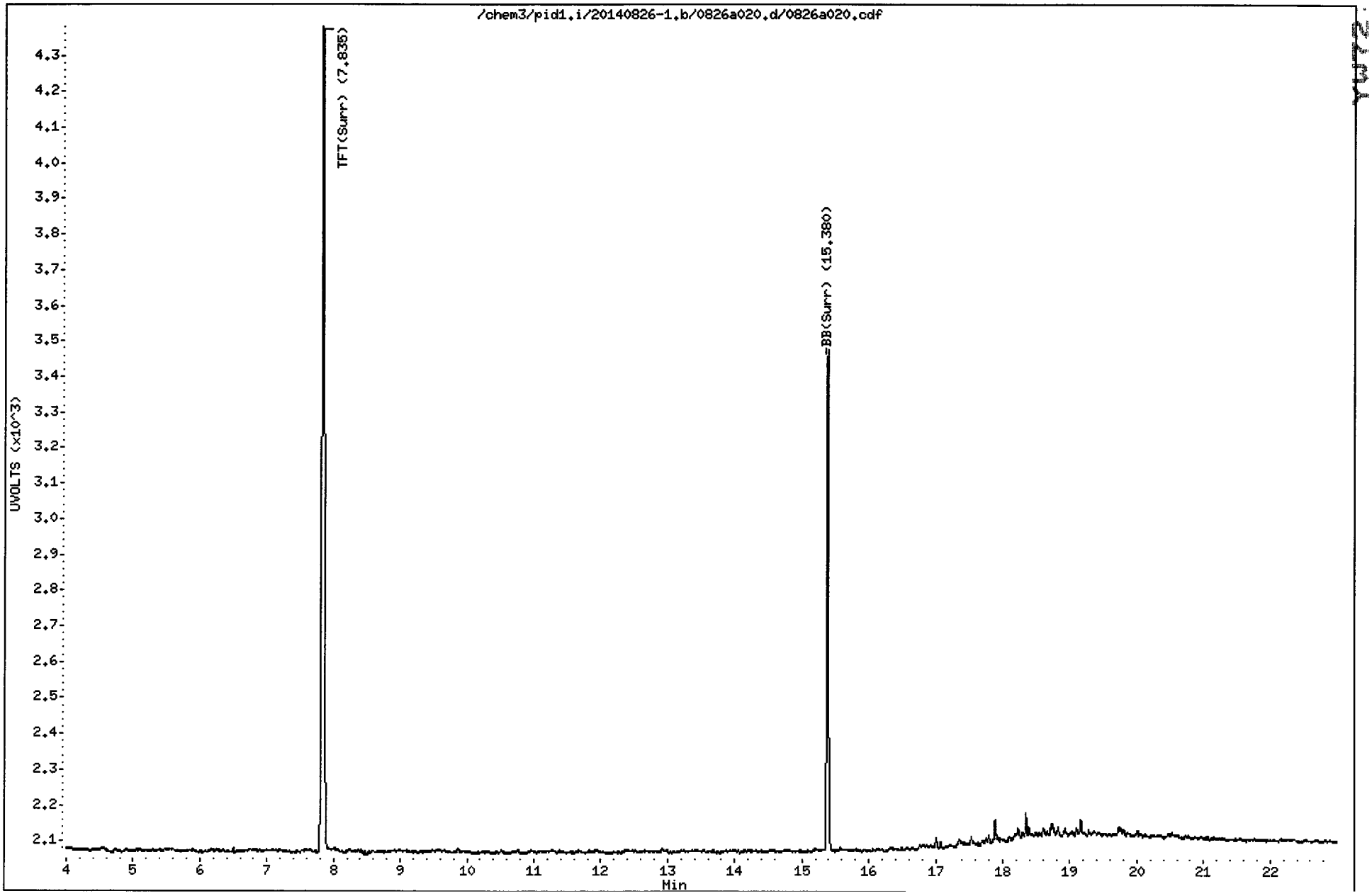
Instrument: pid1.i

Sample Info: YW72F

Operator: PC

Column phase: RTX 502-2 FID

Column diameter: 0.18



Data File: /chem3/pid1.i/20140826-1.b/0826a008.d

Date : 26-AUG-2014 14:01

Client ID: Trip Blanks

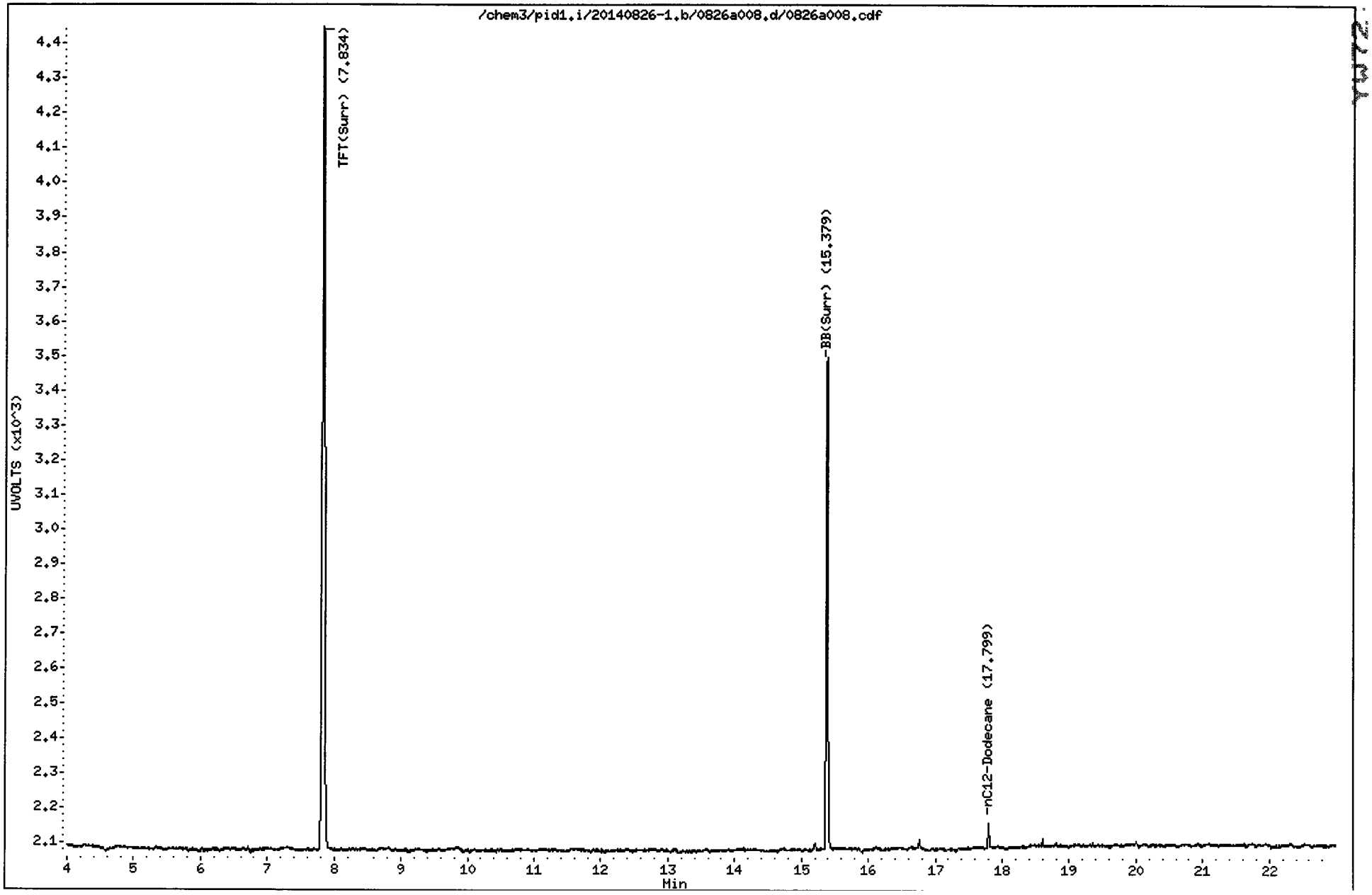
Sample Info: YW72C

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: PC

Column diameter: 0.18



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: YW72-Kennedy Jenks Consultants,
Project: Ecology Cornet Bay Marina
1396010*00

Matrix: Water
Data Release Authorized: MW
Reported: 08/27/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-082114	Method Blank	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16907	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		96.8%
YW72A	MW-7	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16907	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		91.7%
YW72B	MW-9	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16908	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		91.8%
YW72C	MW-2R	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16909	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		92.5%
YW72D	MW-4R	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16910	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		89.2%
YW72E	MW-10R	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16911	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		37.1%
YW72F	MW10R-1	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16912	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		50.4%

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: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00

Client ID	OTER	TOT OUT
MB-082114	96.8%	0
LCS-082114	94.3%	0
LCSD-082114	94.0%	0
MW-7	91.7%	0
MW-9	91.8%	0
MW-2R	92.5%	0
MW-4R	89.2%	0
MW-10R	37.1%*	1
MW10R-1	50.4%	0

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

Prep Method: SW3510C
Log Number Range: 14-16907 to 14-16912

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-082114**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-082114 QC Report No: YW72-Kennedy Jenks Consultants, Inc.
LIMS ID: 14-16907 Project: Ecology Cornet Bay Marina
Matrix: Water 1396010*00
Data Release Authorized: Date Sampled: 08/14/14
Reported: 08/27/14 Date Received: 08/16/14

Date Extracted LCS/LCSD: 08/21/14 Sample Amount LCS: 500 mL
LCSD: 500 mL
Date Analyzed LCS: 08/26/14 19:44 Final Extract Volume LCS: 1.0 mL
LCSD: 08/26/14 20:10 LCSD: 1.0 mL
Instrument/Analyst LCS: FID/VTS Dilution Factor LCS: 1.00
LCSD: FID/VTS LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.76	3.00	92.0%	2.69	3.00	89.7%	2.6%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	94.3%	94.0%

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

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: YW72
Matrix: Water
Project: Ecology Cornet Bay Marina
Date Received: 08/16/14
1396010*00

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-16907-082114MB1	Method Blank	500 mL	1.00 mL	08/21/14
14-16907-082114LCS1	Lab Control	500 mL	1.00 mL	08/21/14
14-16907-082114LCSD1	Lab Control Dup	500 mL	1.00 mL	08/21/14
14-16907-YW72A	MW-7	500 mL	1.00 mL	08/21/14
14-16908-YW72B	MW-9	500 mL	1.00 mL	08/21/14
14-16909-YW72C	MW-2R	500 mL	1.00 mL	08/21/14
14-16910-YW72D	MW-4R	500 mL	1.00 mL	08/21/14
14-16911-YW72E	MW-10R	500 mL	1.00 mL	08/21/14
14-16912-YW72F	MW10R-1	500 mL	1.00 mL	08/21/14

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: YW72-Kennedy Jenks Consultants,
Project: Ecology Cornet Bay Marina
1396010*00

Matrix: Water
Data Release Authorized: MW
Reported: 08/29/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-082814	Method Blank	08/28/14	08/28/14	1.00	Diesel Range	0.10	< 0.10 U
14-16911	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		75.6%
YW72E	MW-10R	08/21/14	08/26/14	1.00	Diesel Range	0.10	< 0.10 U
14-16911	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		37.1%
YW72E RE	MW-10R	08/28/14	08/28/14	1.00	Diesel Range	0.10	< 0.10 U
14-16911	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		55.6%

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: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00

Client ID	OTER	TOT OUT
MB-082814	75.6%	0
LCS-082814	74.2%	0
LCSD-082814	87.1%	0
MW-10R	37.1%*	1
MW-10R RE	55.6%	0

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

Prep Method: SW3510C
Log Number Range: 14-16911 to 14-16911

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-082814**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-082814
LIMS ID: 14-16911
Matrix: Water
Data Release Authorized:
Reported: 08/29/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Date Extracted LCS/LCSD: 08/28/14
Date Analyzed LCS: 08/28/14 12:29
LCSD: 08/28/14 12:54
Instrument/Analyst LCS: FID/JLW
LCSD: FID/JLW

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	2.26	3.00	75.3%	2.54	3.00	84.7%	11.7%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	74.2%	87.1%

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

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: YW72
Matrix: Water
Project: Ecology Cornet Bay Marina
Date Received: 08/16/14
1396010*00

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-16911-082814MB2	Method Blank	500 mL	1.00 mL	08/28/14
14-16911-082814LCS2	Lab Control	500 mL	1.00 mL	08/28/14
14-16911-082814LCSD2	Lab Control Dup	500 mL	1.00 mL	08/28/14
14-16911-YW72E	MW-10R	500 mL	1.00 mL	08/21/14
14-16911-YW72ERE	MW-10R	500 mL	1.00 mL	08/28/14

Data File: /chem3/fid3b.i/20140826.b/08260021.d

Date : 26-AUG-2014 19:19

Client ID: YW72MBW1

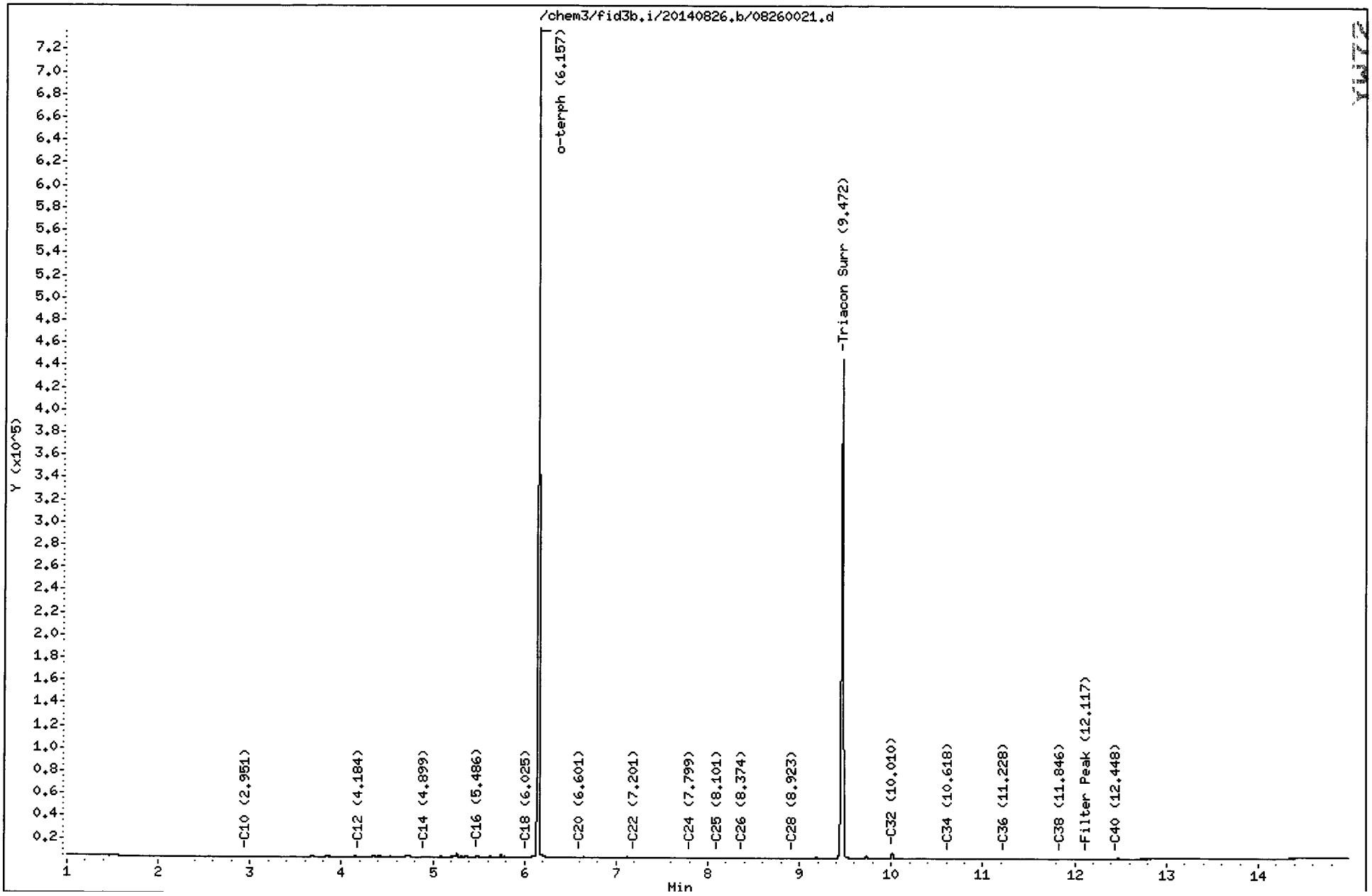
Sample Info: YW72MBW1

Column phase: RTX-1

Instrument: fid3b.i

Operator: JR

Column diameter: 0.25



Data File: /chem3/fid3b.i/20140826.b/08260022.d

Date : 26-AUG-2014 19:44

Client ID: YW72LCSW1

Sample Info: YW72LCSW1

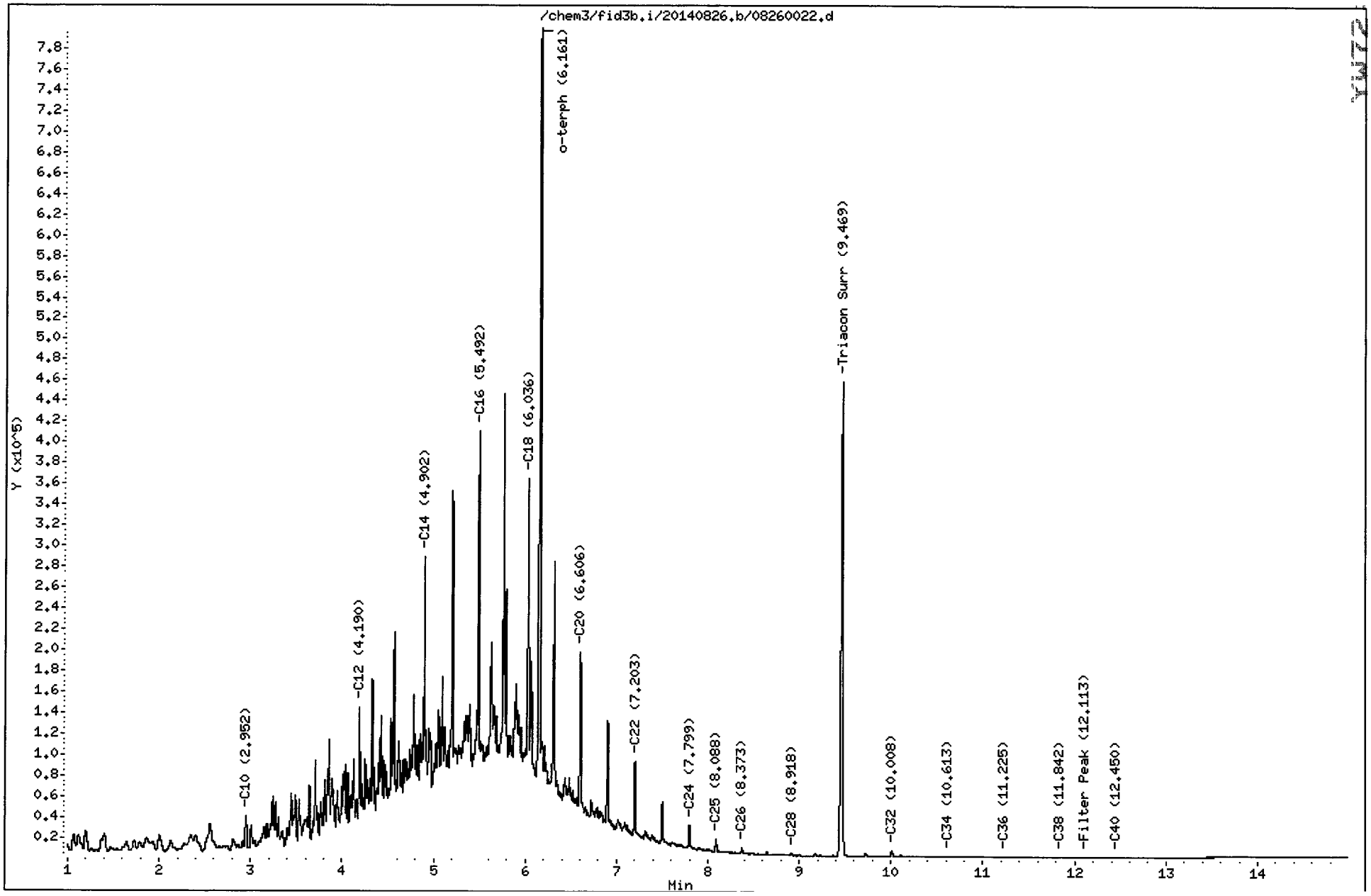
Instrument: fid3b.i

Operator: JR

Column phase: RTX-1

Column diameter: 0.25

8.27.14



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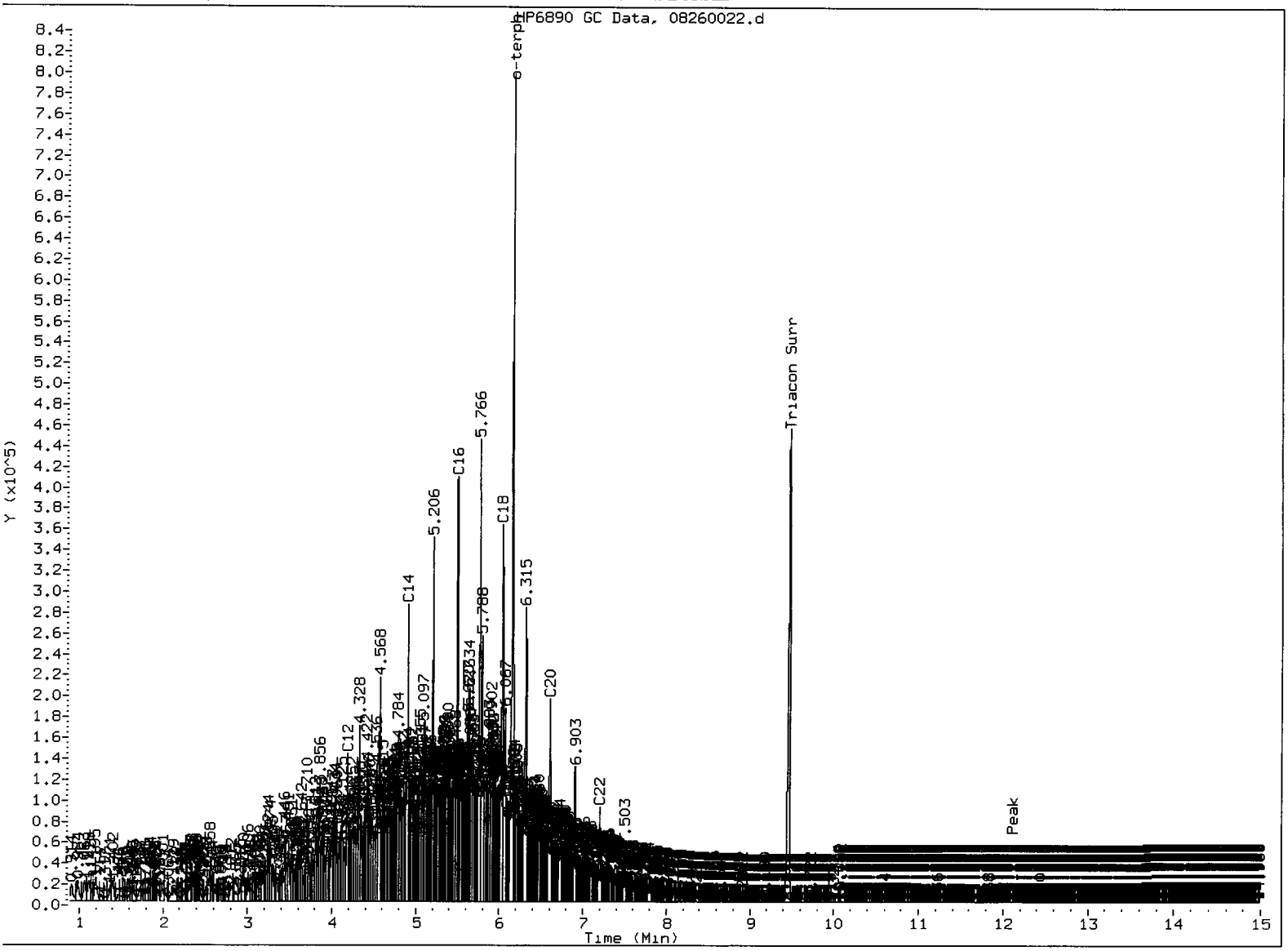


MANUAL INTEGRATION

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

Analyst: VJ Date: 8.27.4

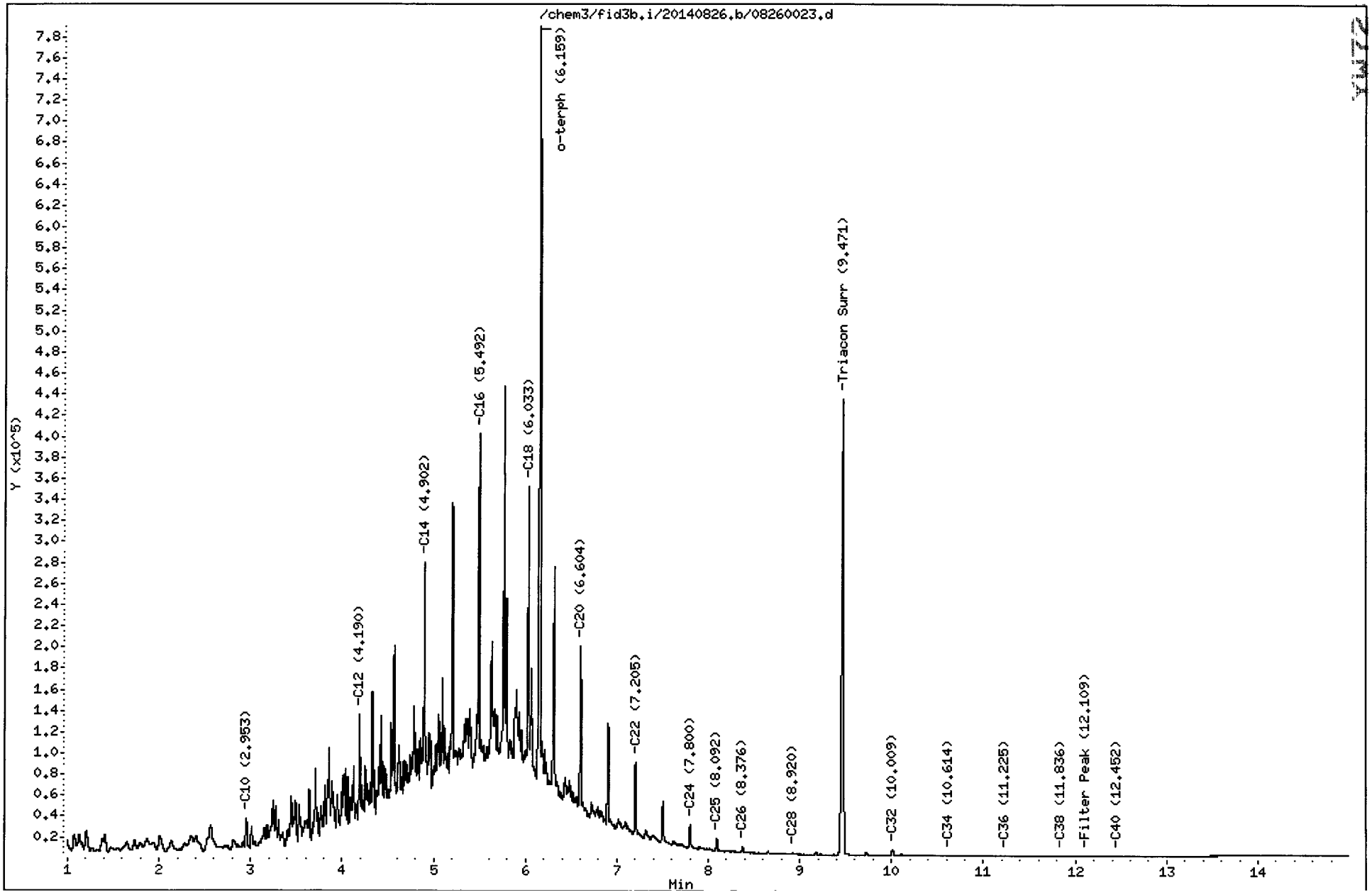
Data File: /chem3/fid3b.i/20140826.b/08260023.d
Date : 26-AUG-2014 20:10
Client ID: YW72LCSDW1
Sample Info: YW72LCSDW1

Instrument: fid3b.i

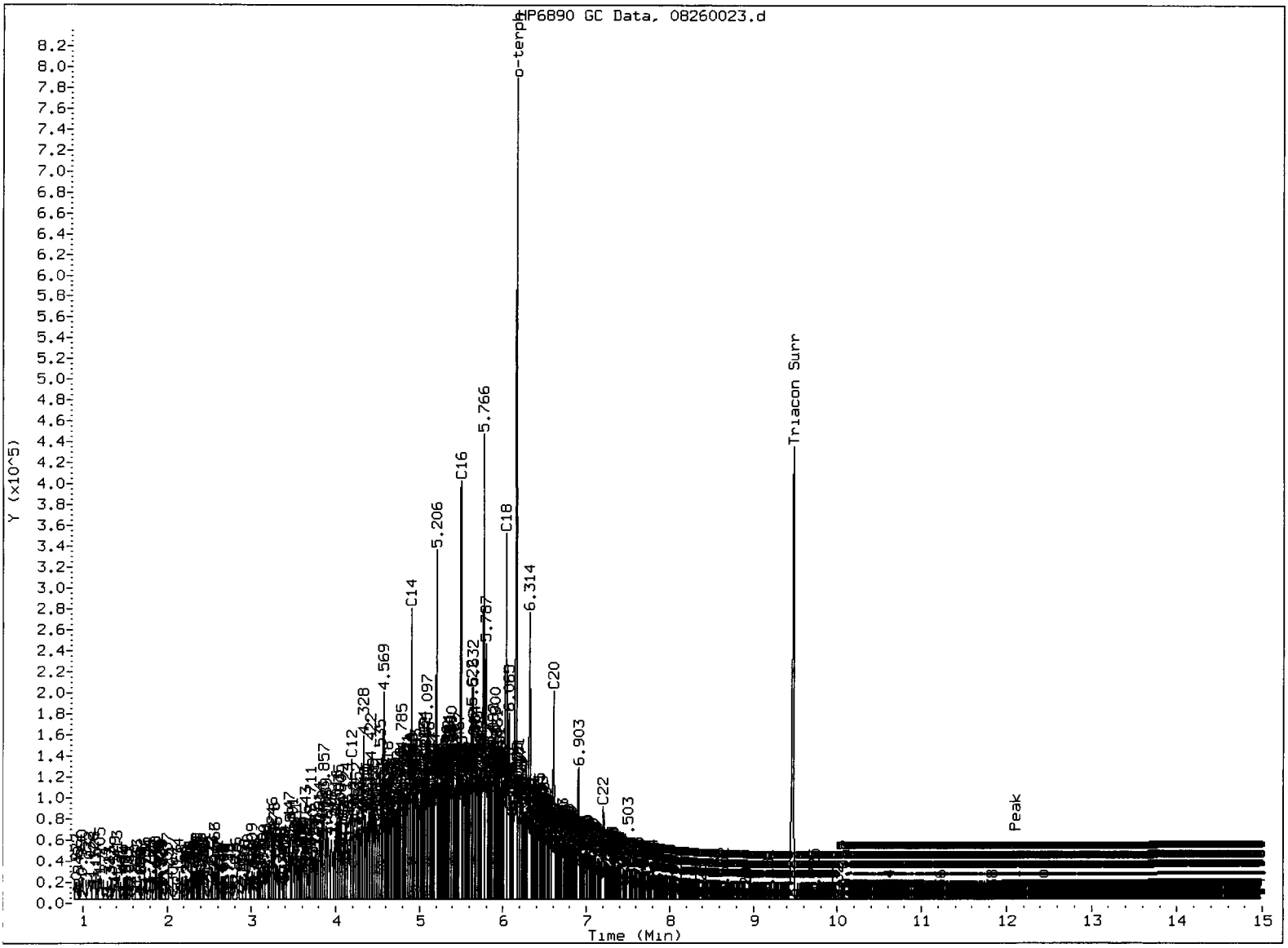
Operator: JR
Column diameter: 0.25

Column phase: RTX-1

8.27.14



FID:3B-2C/RTX-1 YW72LCSDW1 FID:3B SIGNAL



MANUAL INTEGRATION

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

Analyst: VJ Date: 8.27.4

Data File: /chem3/fid3b.i/20140826.b/08260024.d

Date : 26-AUG-2014 20:36

Client ID: MW-7

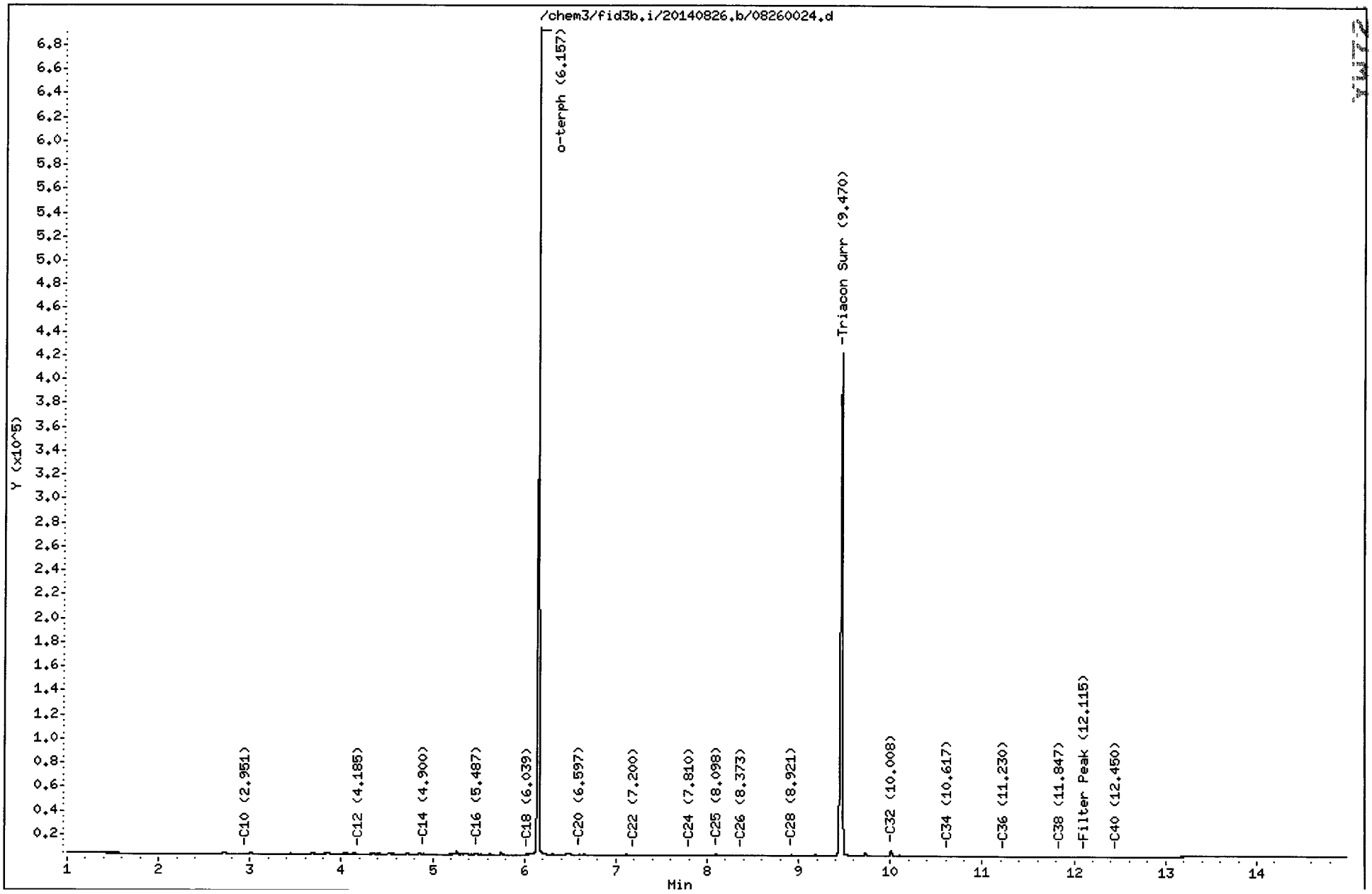
Sample Info: YW72A

Column phase: RTX-1

Instrument: fid3b.i

Operator: JR

Column diameter: 0.25



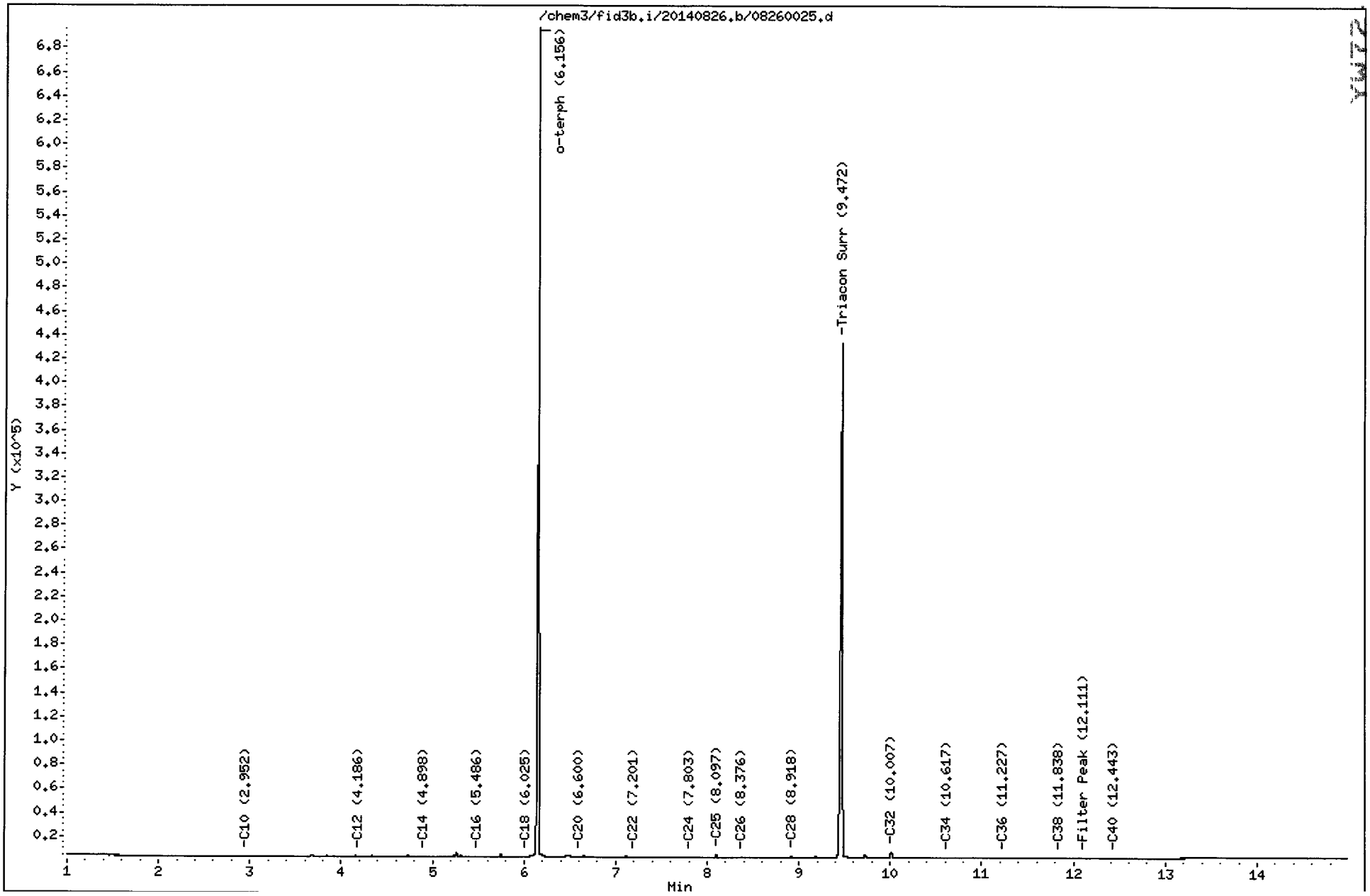
Data File: /chem3/fid3b.i/20140826.b/08260025.d
Date : 26-AUG-2014 21:02
Client ID: MW-9
Sample Info: YW72B

Instrument: fid3b.i

Operator: JR
Column diameter: 0.25

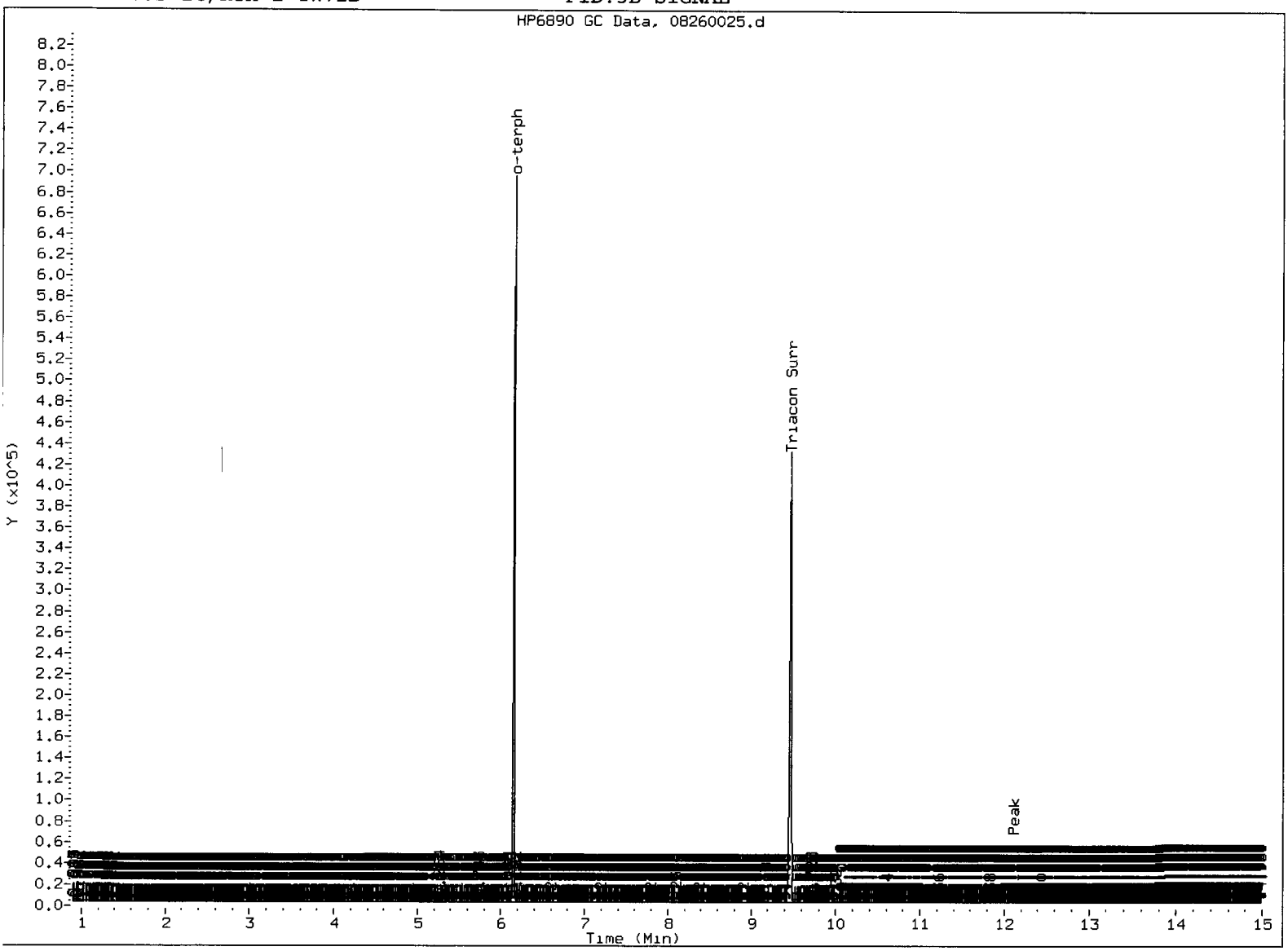
Column phase: RTX-1

8.27.14



FID:3B-2C/RTX-1 YW72B

FID:3B SIGNAL



MANUAL INTEGRATION

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

Analyst: VJ

Date: 8-27-4

Data File: /chem3/fid3b.i/20140826.b/08260026.d

Date : 26-AUG-2014 21:28

Client ID: MW-2R

Sample Info: YW72C

Column phase: RTX-1

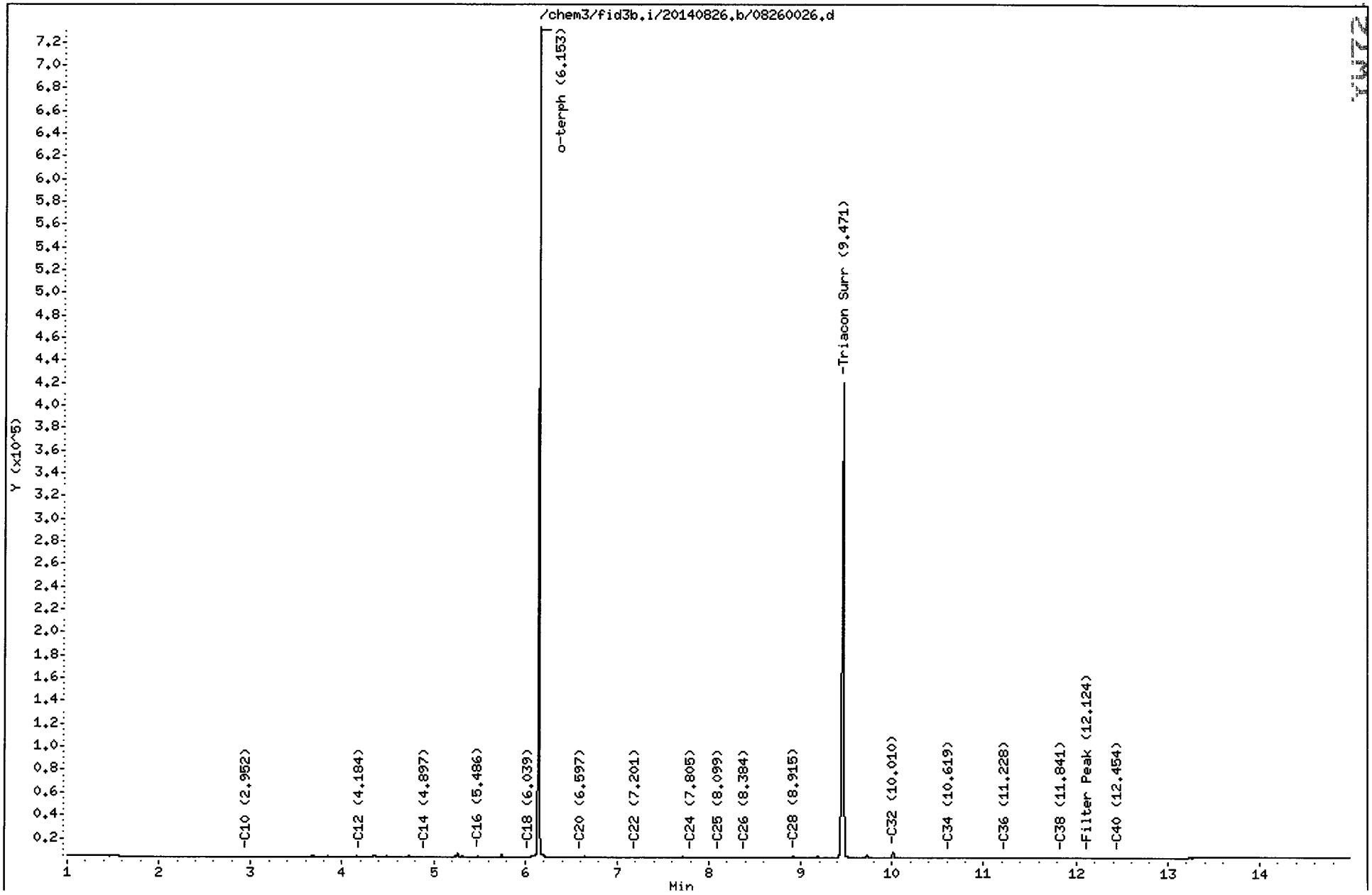
Instrument: fid3b.i

Operator: JR

Column diameter: 0.25

08535

YW72



Data File: /chem3/fid3b.i/20140826.b/08260027.d

Date : 26-AUG-2014 21:53

Client ID: MW-4R

Sample Info: YW72D

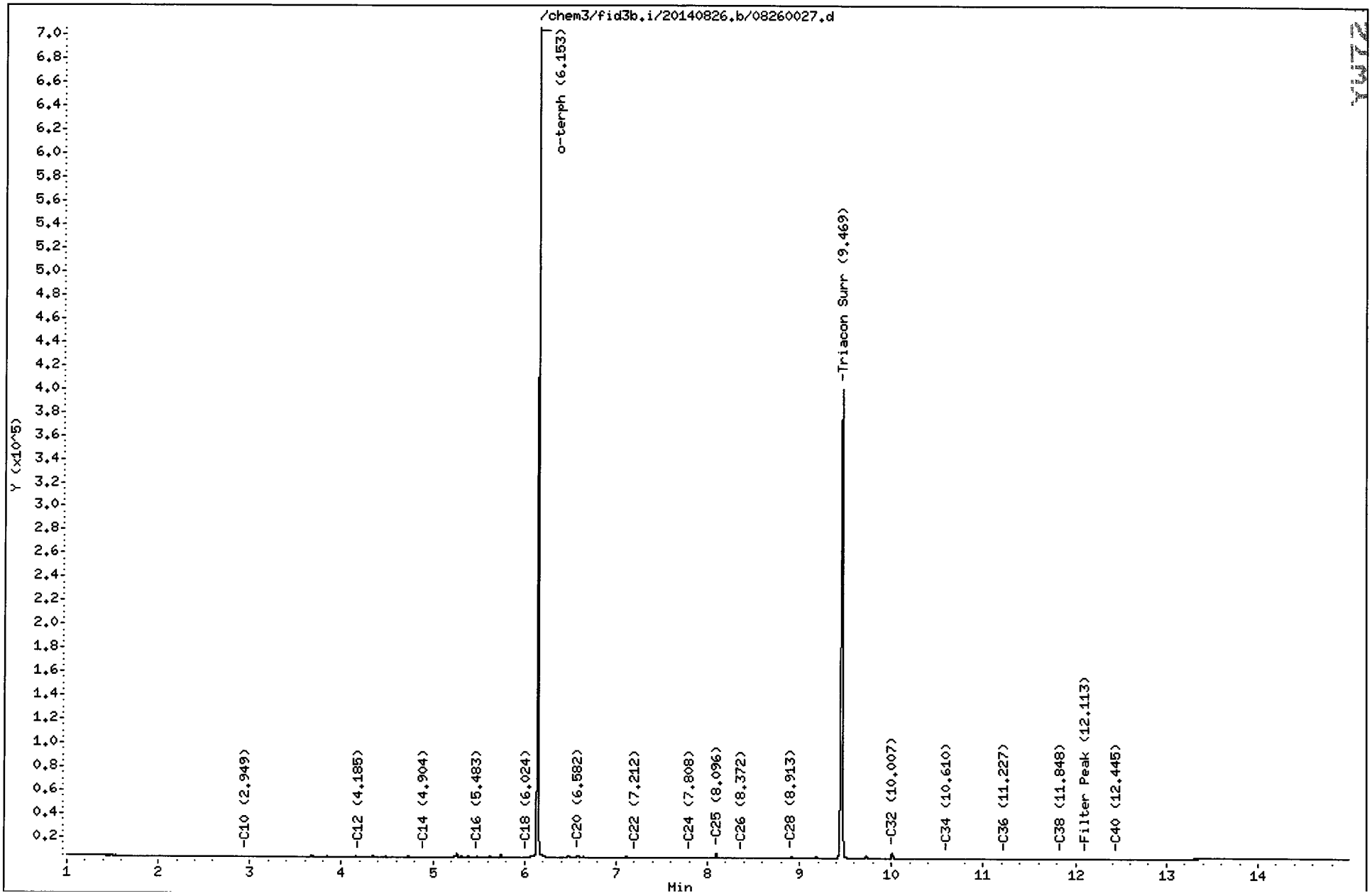
Column phase: RTX-1

Instrument: fid3b.i

Operator: JR

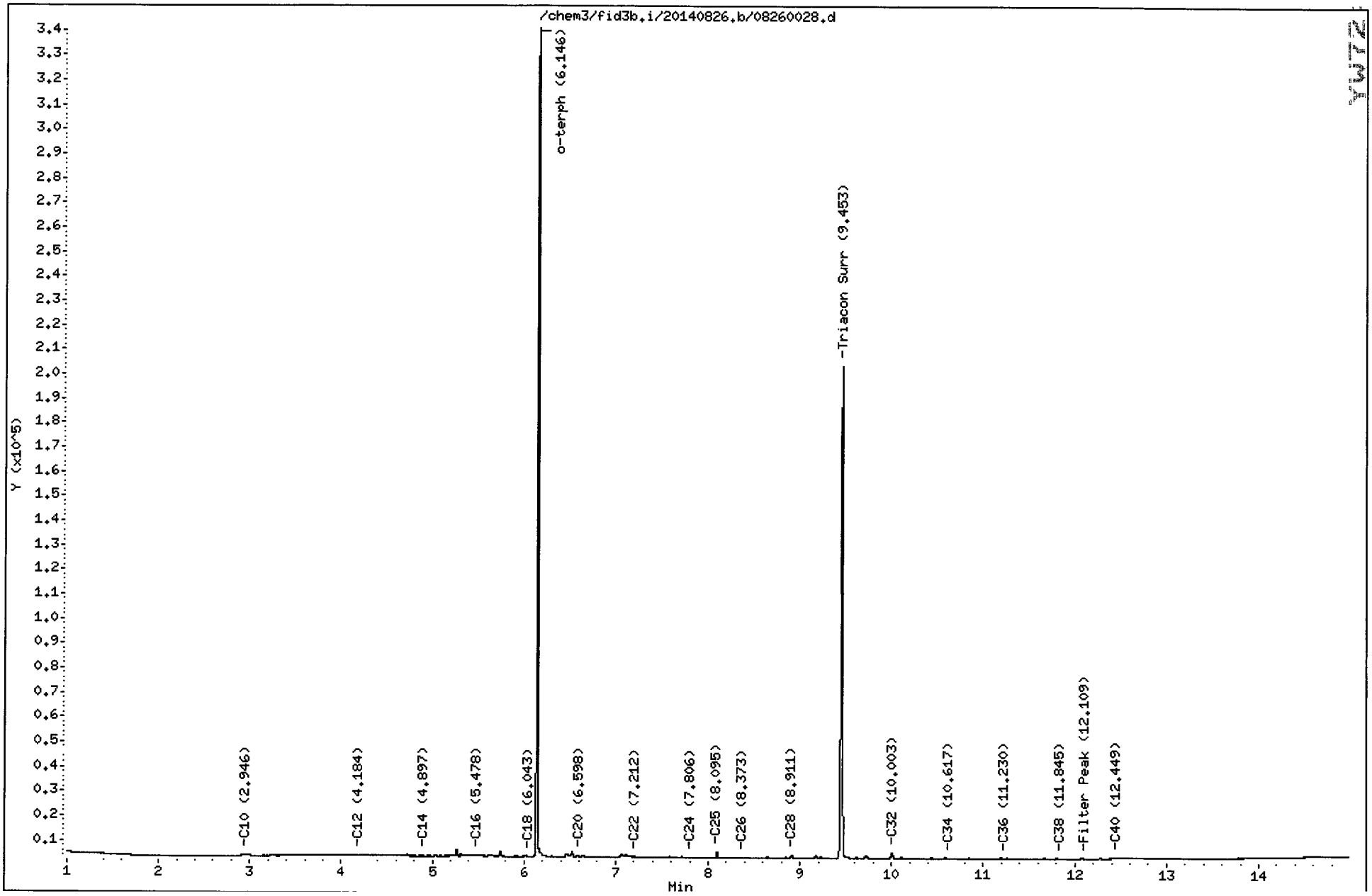
Column diameter: 0.25

YW72 08056



Data File: /chem3/fid3b.i/20140826.b/08260028.d
Date : 26-AUG-2014 22:18
Client ID: MW-10R
Sample Info: YW72E

Instrument: fid3b.i
Operator: JR
Column phase: RTX-1
Column diameter: 0.25



Data File: /chem3/fid3b.i/20140826.b/08260029.d

Date : 26-AUG-2014 22:44

Client ID: MW10R-1

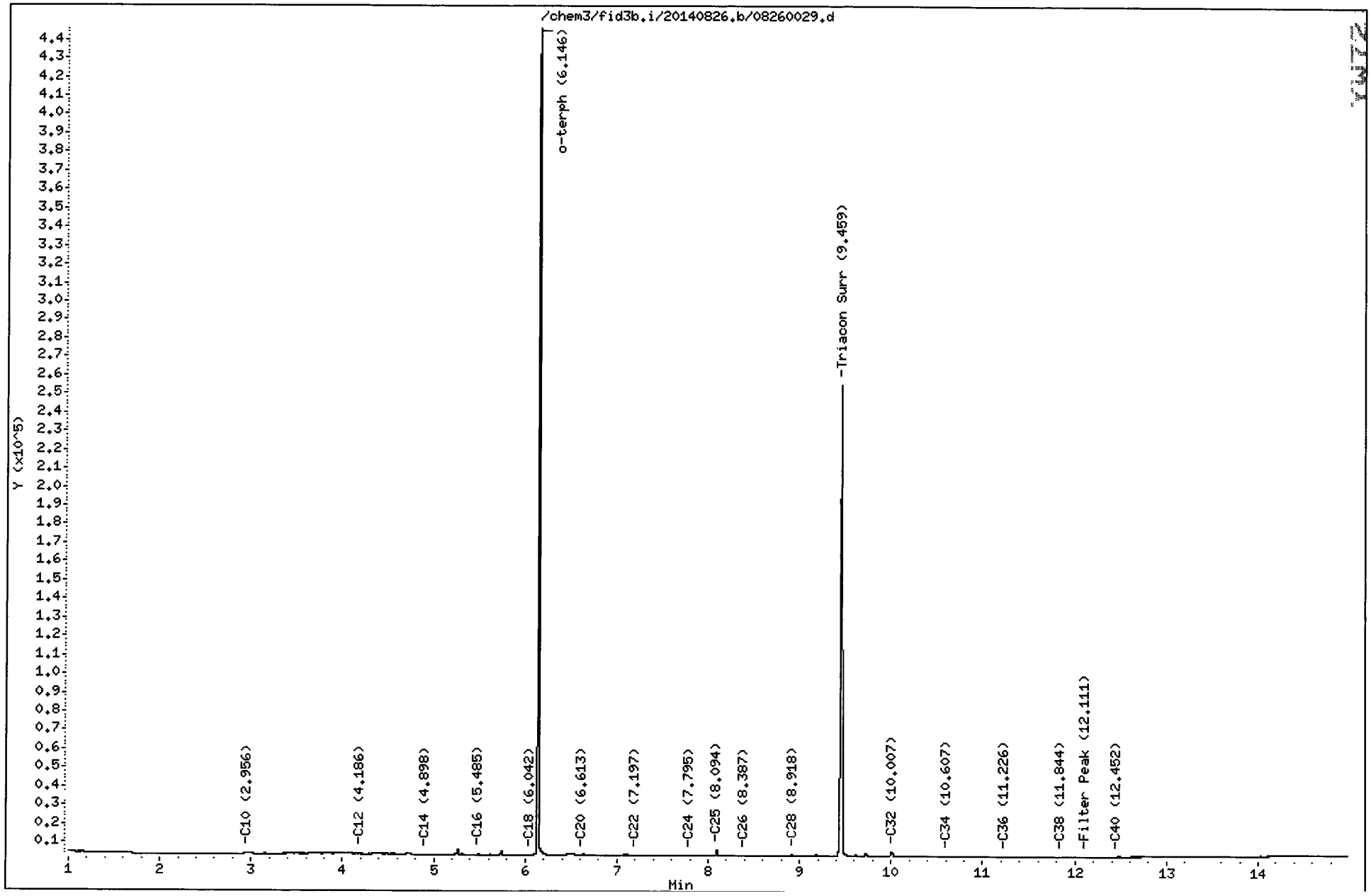
Sample Info: YW72F

Column phase: RTX-1

Instrument: fid3b.i

Operator: JR

Column diameter: 0.25



Data File: /chem3/fid3b.i/20140828.b/08280020.d

Date : 28-AUG-2014 16:19

Client ID: YW72MBW2

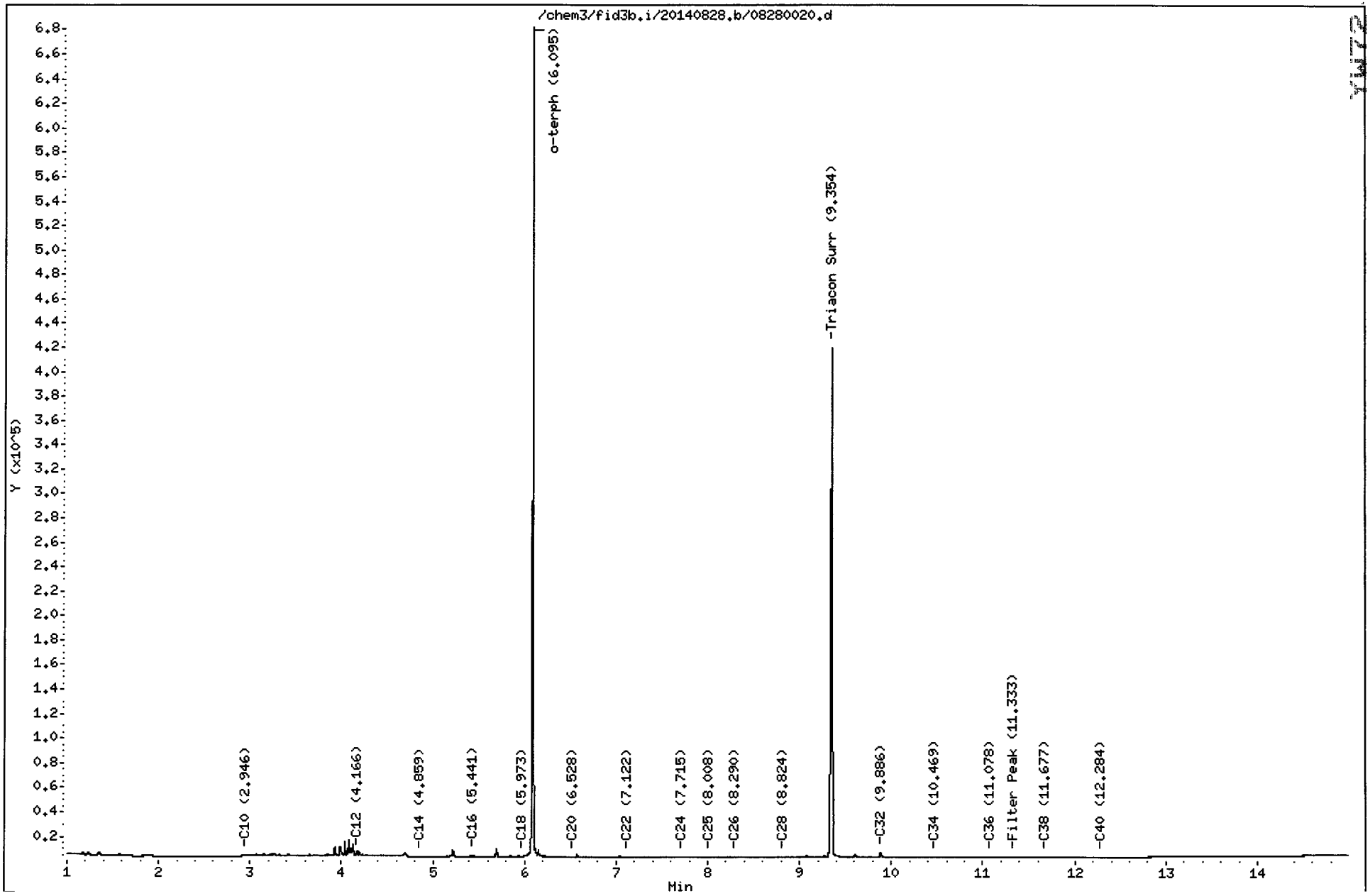
Sample Info: YW72MBW2

Instrument: fid3b.i

Operator: JW

Column phase: RTX-1

Column diameter: 0.25



Data File: /chem3/fid3b.i/20140828.b/08280011.d

Date : 28-AUG-2014 12:29

Client ID: YW72LCSW2

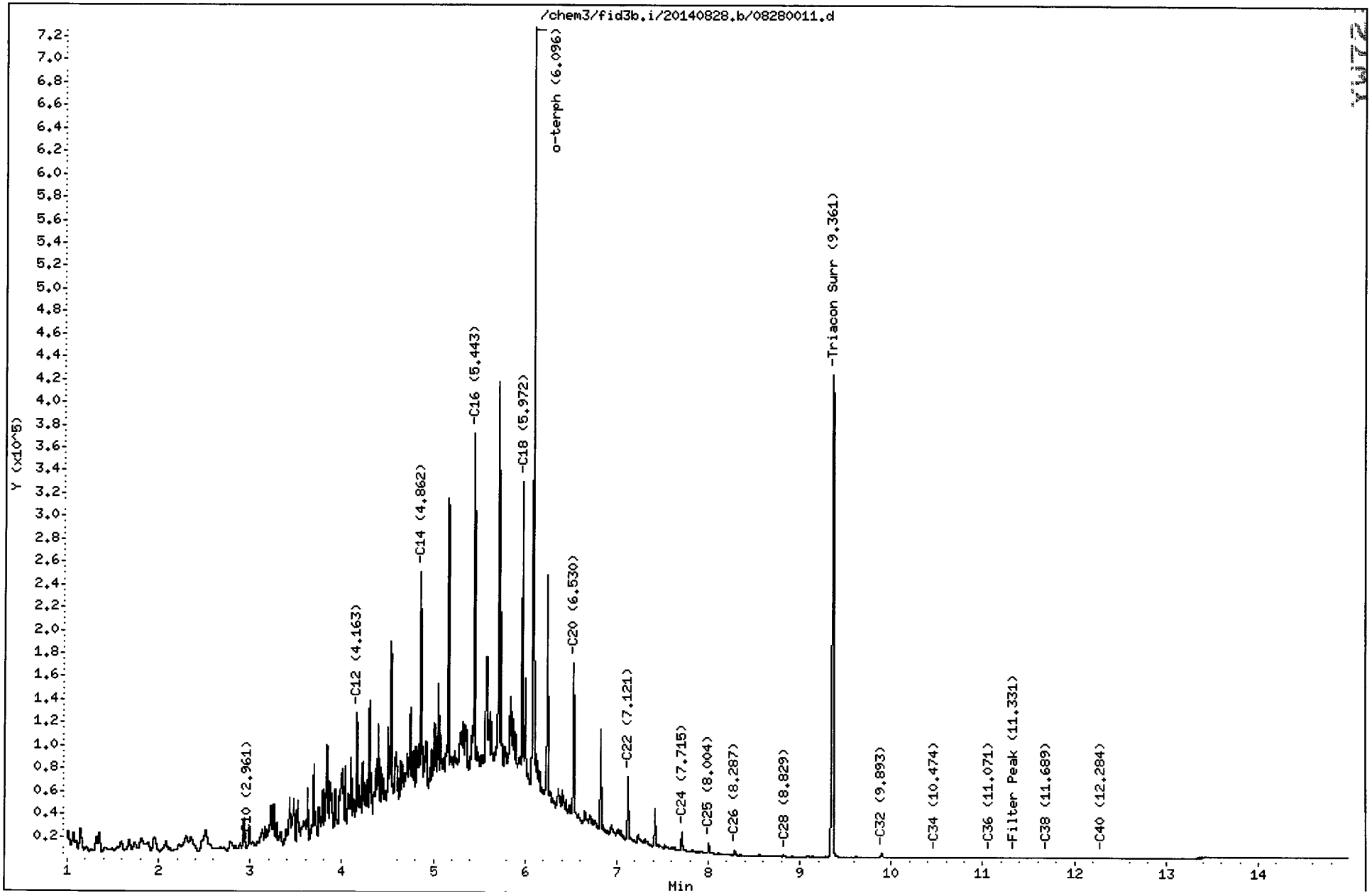
Sample Info: YW72LCSW2

Instrument: fid3b.i

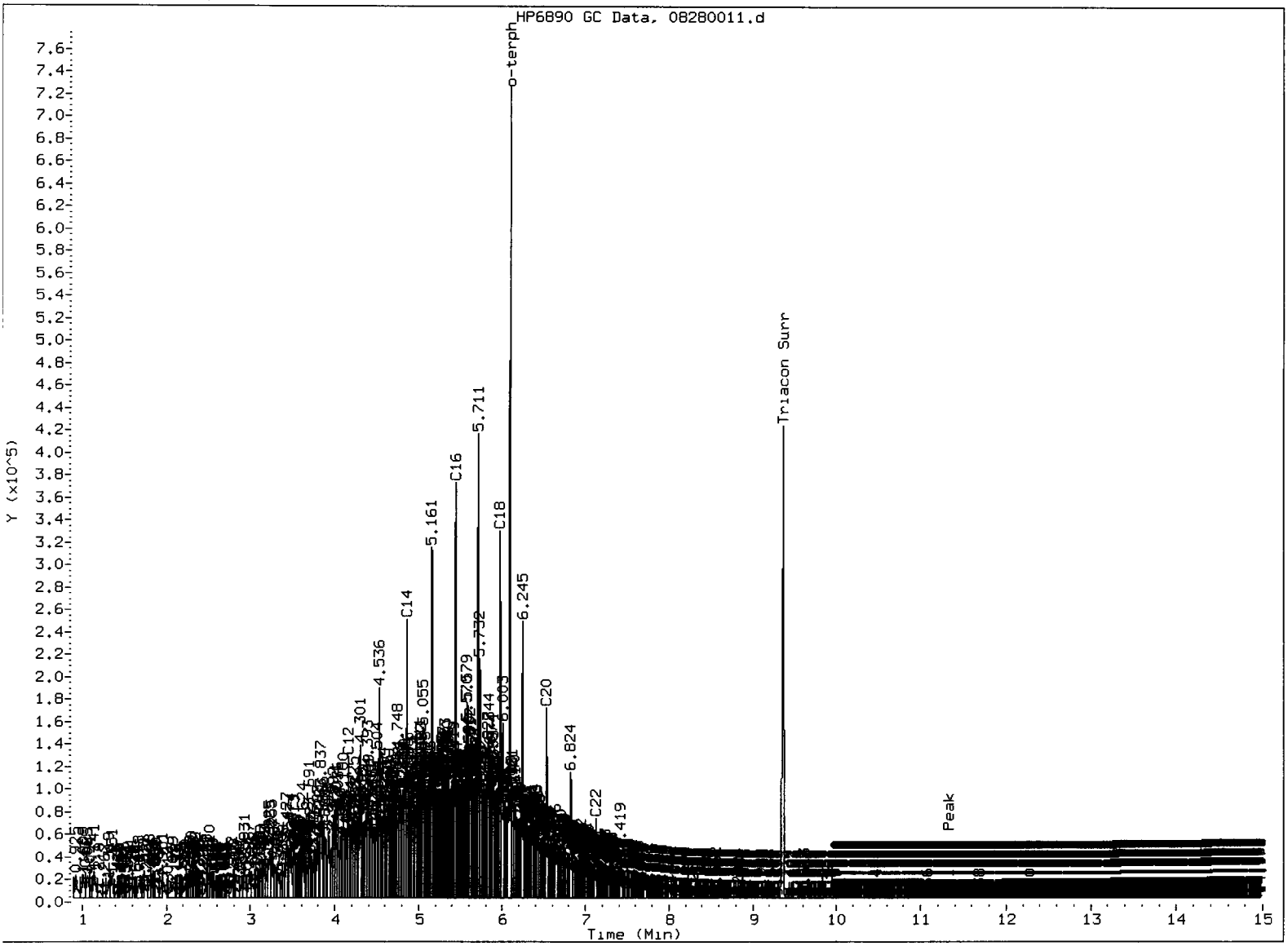
Operator: JW

Column phase: RTX-1

Column diameter: 0.25



FID:3B-2C/RTX-1 YW72LCSW2 FID:3B SIGNAL



MANUAL INTEGRATION

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

Analyst: JU Date: 3/24/14

Data File: /chem3/fid3b.i/20140828.b/08280012.d

Date : 28-AUG-2014 12:54

Client ID: YW72LCSDW2

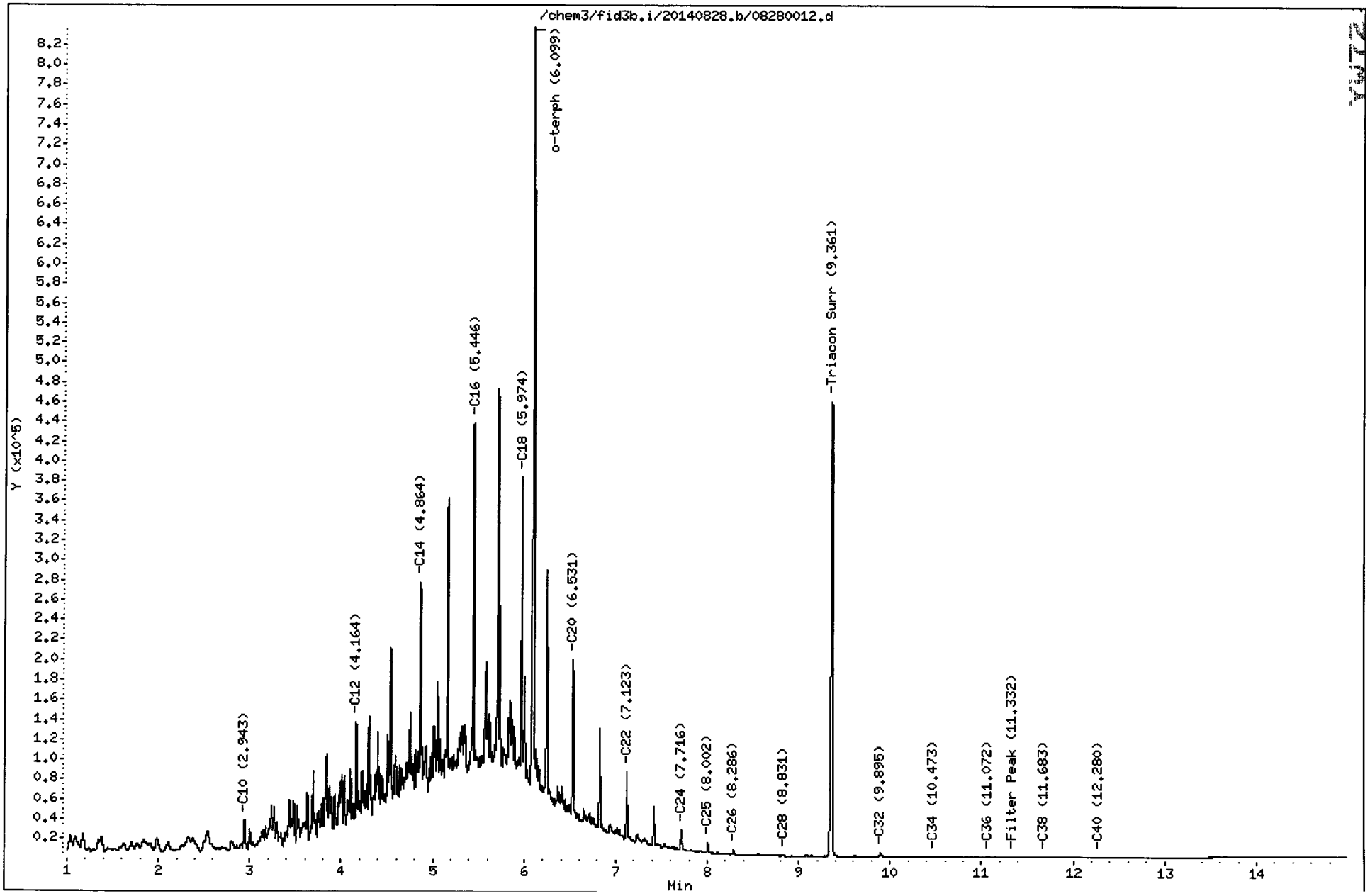
Sample Info: YW72LCSDW2

Instrument: fid3b.i

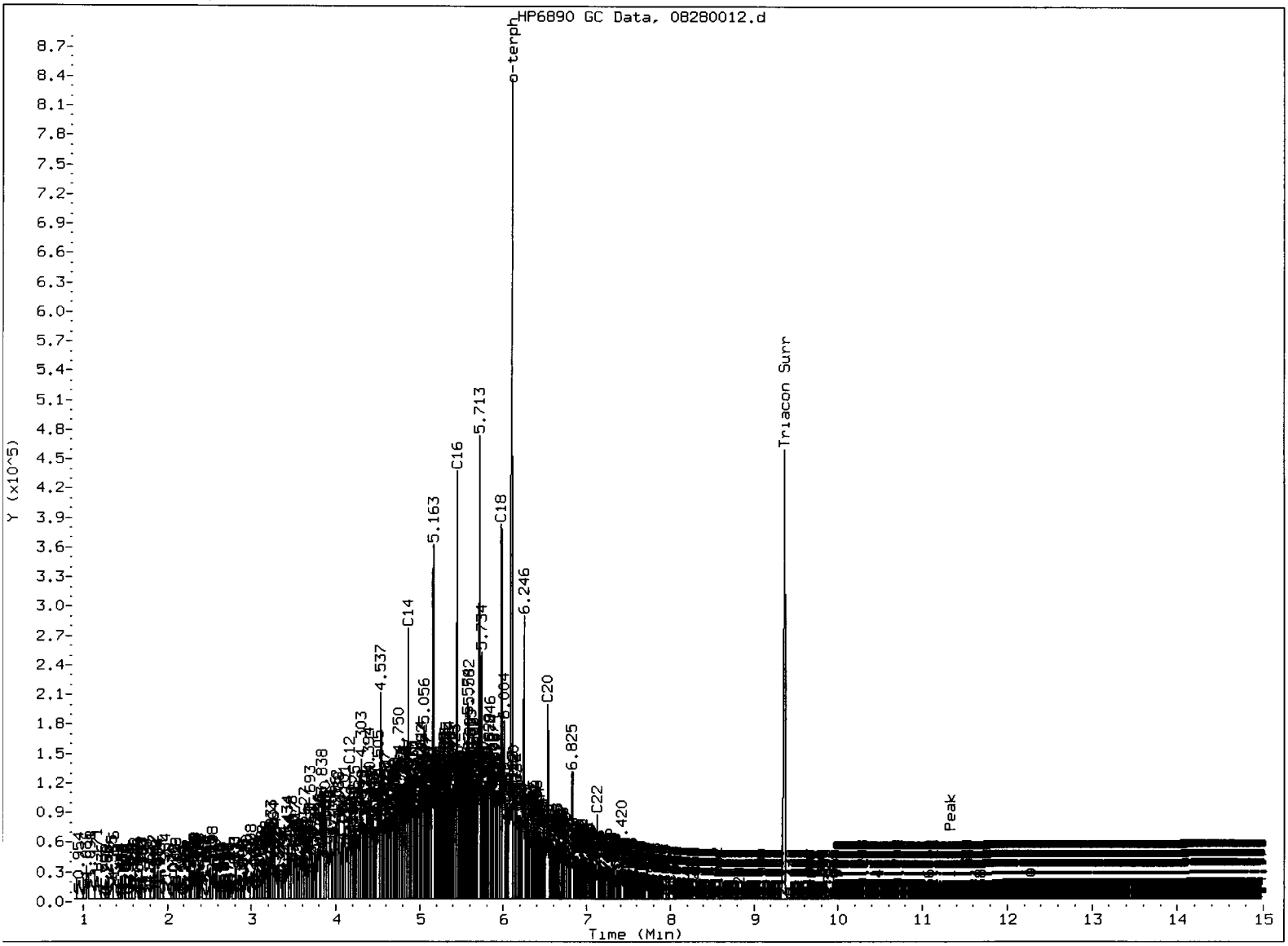
Operator: JW

Column phase: RTX-1

Column diameter: 0.25



FID:3B-2C/RTX-1 YW72LCSDW2 FID:3B SIGNAL



MANUAL INTEGRATION

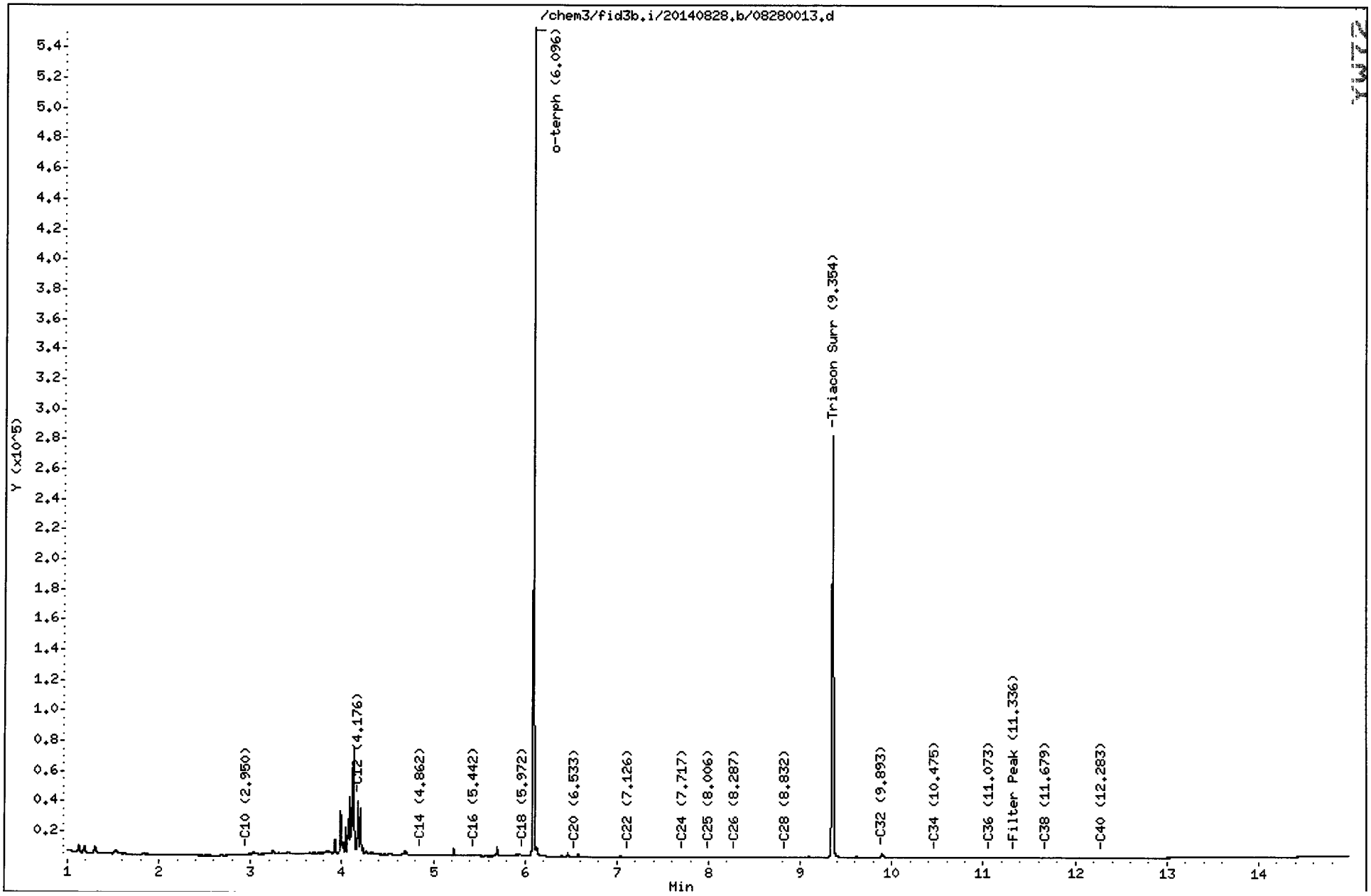
1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: SW Date: 3/29/19

Data File: /chem3/fid3b.i/20140828.b/08280013.d
Date : 28-AUG-2014 13:19
Client ID: MW-10R
Sample Info: YW72ERE

Instrument: fid3b.i
Operator: JW
Column diameter: 0.25

Column phase: RTX-1



SAMPLE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Client ID: MW-7
ARI ID: 14-16907 YW72A

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.200	14.5
N-Nitrate	08/16/14	Calculated	mg-N/L	0.010	< 0.010 U
N-Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.022
Nitrate + Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.024
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	2.0	19.7
Sulfide	08/19/14 081914#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Client ID: MW-9
ARI ID: 14-16908 YW72B

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.010	0.376
N-Nitrate	08/16/14	Calculated	mg-N/L	0.010	< 0.010 U
N-Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Nitrate + Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	< 0.010 U
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	2.0	10.8
Sulfide	08/19/14 081914#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Client ID: MW-2R
ARI ID: 14-16909 YW72C

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.010	0.116
N-Nitrate	08/16/14	Calculated	mg-N/L	0.020	1.31
N-Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.011
Nitrate + Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.020	1.32
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	10.0	64.3
Sulfide	08/19/14 081914#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Client ID: MW-4R
ARI ID: 14-16910 YW72D

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.010	0.022
N-Nitrate	08/16/14	Calculated	mg-N/L	0.010	0.603
N-Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.111
Nitrate + Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.714
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	10.0	96.0
Sulfide	08/19/14 081914#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Client ID: MW-10R
ARI ID: 14-16911 YW72E

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.100	4.61
N-Nitrate	08/16/14	Calculated	mg-N/L	0.010	0.012
N-Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.072
Nitrate + Nitrite	08/16/14 081614#1	EPA 353.2	mg-N/L	0.010	0.084
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	10.0	98.6
Sulfide	08/21/14 082114#1	SM4500-S2D	mg/L	0.050	0.100

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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	08/20/14	mg-N/L	< 0.010 U	FB
N-Nitrite	EPA 353.2	08/16/14	mg-N/L	< 0.010 U	FB
Nitrate + Nitrite	EPA 353.2	08/16/14	mg-N/L	< 0.010 U	FB
Sulfate	EPA 375.2	08/22/14	mg/L	< 2.0 U	FB
Sulfide	SM4500-S2D	08/19/14	mg/L	< 0.050 U	
		08/21/14		< 0.050 U	
		08/21/14		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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	08/19/14	mg/L	0.483	0.501	96.4%
SM4500-S2D	ICVL	08/21/14		0.516	0.500	103.2%
	PREP	08/21/14		6.39	6.07	105.3%

STANDARD REFERENCE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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 #040912	EPA 350.1M	08/20/14	mg-N/L	0.499	0.500	99.8%
N-Nitrite ERA #141113	EPA 353.2	08/16/14	mg-N/L	0.493	0.500	98.6%
Nitrate + Nitrite ERA #220912	EPA 353.2	08/16/14	mg-N/L	0.492	0.500	98.4%
Sulfate ERA 131013	EPA 375.2	08/22/14	mg/L	15.2	15.0	101.3%

REPLICATE RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: YW72A Client ID: MW-7						
N-Ammonia	EPA 350.1M	08/20/14	mg-N/L	14.5	14.5	0.0%
N-Nitrite	EPA 353.2	08/16/14	mg-N/L	0.022	0.024	8.7%
Nitrate + Nitrite	EPA 353.2	08/16/14	mg-N/L	0.024	0.024	0.0%
Sulfide	SM4500-S2D	08/19/14	mg/L	< 0.050	< 0.050	NA

MS/MSD RESULTS-CONVENTIONALS
YW72-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: YW72A Client ID: MW-7							
N-Ammonia	EPA 350.1M	08/20/14	mg-N/L	14.5	42.4	25.0	111.6%
N-Nitrite	EPA 353.2	08/16/14	mg-N/L	0.022	0.515	0.500	98.6%
Nitrate + Nitrite	EPA 353.2	08/16/14	mg-N/L	0.024	0.501	0.500	95.4%
Sulfide	SM4500-S2D	08/19/14	mg/L	< 0.050	0.277	0.500	55.4%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-7
SAMPLE

Lab Sample ID: YW72A
LIMS ID: 14-16907
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	**7439-89-6**	**Iron**	0.05	**14.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-9
SAMPLE

Lab Sample ID: YW72B
LIMS ID: 14-16908
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/14/14
Date Received: 08/16/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-2R
SAMPLE

Lab Sample ID: YW72C
LIMS ID: 14-16909
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-4R
SAMPLE

Lab Sample ID: YW72D
LIMS ID: 14-16910
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: MW-10R
SAMPLE

Lab Sample ID: YW72E
LIMS ID: 14-16911
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: 08/15/14
Date Received: 08/16/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	**7439-89-6**	**Iron**	0.05	**2.07**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: YW72MB
LIMS ID: 14-16911
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
6010C	08/19/14	6010C	08/22/14	7439-89-6	Iron	0.05	0.05	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: YW72LCS
LIMS ID: 14-16911
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW72-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010*00
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Iron	6010C	1.96	2.00	98.0%	

Reported in mg/L

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

Analytical Resources, Incorporated
Analytical Chemists and Consultants

29 August 2014

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

RE: Client Project: EcologyCornet Bay Marina, 1396010.00
ARI Job No: YW97

Dear Ty:

Please find enclosed the original Chain-of-Custody (COC) record and the final results for the sample from the project referenced above. One water sample was received on August 19, 2014. The sample was analyzed for BETX, NWTPH-G, methane, NWTPH-Dx and conventional parameters as instructed.

There were no 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 YW97

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: VW97	Turn-around Requested: STD	Date: 8/18/14	
ARI Client Company: Kennedy Jenks (KJ)	Phone: (253) 835-6400	Page: 1 of 1	
Client Contact: Ty Schreiner		No. of Coolers: 1	Cooler Temps: On-Ice
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)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx w/SGC	NWTPH-Gx BTEX (8260)	Nitrate/Nitrite	Ammonia	Sulfate/Sulfide	Methane			Notes/Comments
MW-1R	8/18/14	1505	GW	12	✓	✓	✓	✓	✓	✓			(SO_4, NO_3, NO_3 Container Turb.)

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
After Hour Drop Off	Printed Name: Matt Wilson	Printed Name: Taylor Scott	Printed Name	Printed Name
	Company: KJ	Company: ARI	Company	Company
	Date & Time: 8/18/14 1920	Date & Time: 8-19-14 900	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: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Kennedy Jenks

COC No(s): _____ NA

Assigned ARI Job No: YW97

Project Name: Ecology Cornet Bay Marina

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

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) 3.1
Time: _____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90870451

Cooler Accepted by: TB Date: 8-19-14 Time: 0900

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)		

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

Samples Logged by: _____ Date: 8-19-14 Time: 937

*** 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)

YW97 0003

PRESERVATION VERIFICATION 08/19/14
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **YW97**

Inquiry Number:
Analysis Requested: 08/19/14
Contact: Faragalli, Jessica
Client: Kennedy Jenks Consultants, Inc.
Logged by: TS
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Mark
VTSR: 08/19/14

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
14-17008 **YW97A**	MW-1R			Pass									Pass									

YW97 08/19/14

Checked By TS Date 8-19-14

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YW97
Client: Kennedy Jenks Consultants, Inc.
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	YW97A	14-17008	Water	08/18/14 15:05	08/19/14 09:00

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-082014A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-082014A
LIMS ID: 14-17008
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/LH
Date Analyzed: 08/20/14 10:45

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	100%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	102%

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: YW97A
LIMS ID: 14-17008
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 08/18/14
Date Received: 08/19/14

Instrument/Analyst: NT2/LH
Date Analyzed: 08/20/14 11:14

Sample Amount: 2.00 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
179601-23-1	m,p-Xylene	2.0	< 2.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	99.4%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	99.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082014A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-082014A
LIMS ID: 14-17008
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/LH
LCSD: NT2/LH
Date Analyzed LCS: 08/20/14 09:53
LCSD: 08/20/14 10:19

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	10.8	10.0	108%	10.5	10.0	105%	2.8%
Toluene	10.2	10.0	102%	10.3	10.0	103%	1.0%
Ethylbenzene	9.85	10.0	98.5%	9.82	10.0	98.2%	0.3%
m,p-Xylene	20.6	20.0	103%	20.8	20.0	104%	1.0%
o-Xylene	10.3	10.0	103%	10.4	10.0	104%	1.0%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	103%	105%
d8-Toluene	105%	103%
Bromofluorobenzene	104%	106%
d4-1,2-Dichlorobenzene	102%	106%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-082014A	Method Blank	10	106%	100%	103%	102%	0
LCS-082014A	Lab Control	10	103%	105%	104%	102%	0
LCSD-082014A	Lab Control Dup	10	105%	103%	106%	106%	0
YW97A	MW-1R	10	102%	99.4%	103%	99.0%	0

	LCS/MB LIMITS	QC LIMITS
SW8260C		
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(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: 14-17008 to 14-17008

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010.00

Data Release Authorized:
Reported: 08/28/14

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-082714	Method Blank	08/27/14	1.0	Gasoline	< 0.25 U
14-17008		PID1		HC ID	---
				Trifluorotoluene	91.4%
				Bromobenzene	90.8%
YW97A	MW-1R	08/27/14	1.0	Gasoline	< 0.25 U
14-17008		PID1		HC ID	---
				Trifluorotoluene	96.8%
				Bromobenzene	95.7%

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-082714
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082714
LIMS ID: 14-17008
Matrix: Water
Data Release Authorized:
Reported: 08/28/14

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/27/14 09:37
LCSD: 08/27/14 10:06
Instrument/Analyst LCS: PID1/LH
LCSD: PID1/LH

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	1.02	1.00	102%	0.93	1.00	93.0%	9.2%

Reported in mg/L (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	94.3%	94.6%
Bromobenzene	92.1%	92.6%

ANALYTICAL RESOURCES INCORPORATED

TPHG WATER SURROGATE RECOVERY SUMMARY

ARI Job: YW97
Matrix: Water

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
Event: 1396010.00

Client ID	TFT	BBZ	TOT OUT
MB-082714	91.4%	90.8%	0
LCS-082714	94.3%	92.1%	0
LCSD-082714	94.6%	92.6%	0
MW-1R	96.8%	95.7%	0

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

Log Number Range: 14-17008 to 14-17008

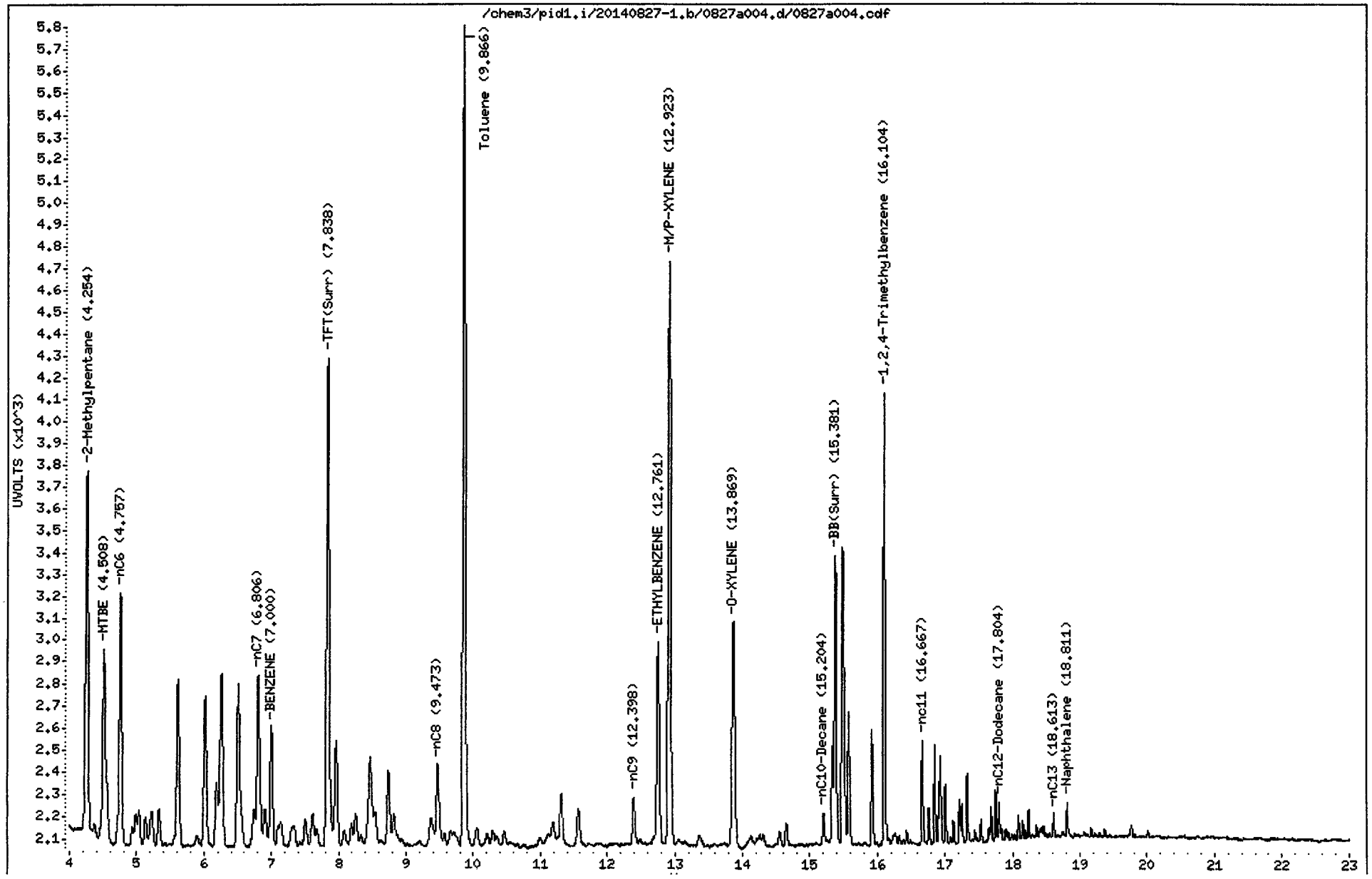
FORM II TPHG

Data File: /chem3/pid1.i/20140827-1.b/0827a004.d
Date : 27-AUG-2014 09:37
Client ID:
Sample Info: LCS0827

Instrument: pid1.i

Operator: LH/PC
Column diameter: 0.18

Column phase: RTX 502-2 FID



Data File: /chem3/pid1.i/20140827-2.b/0827a004.d

Date : 27-AUG-2014 09:37

Client ID:

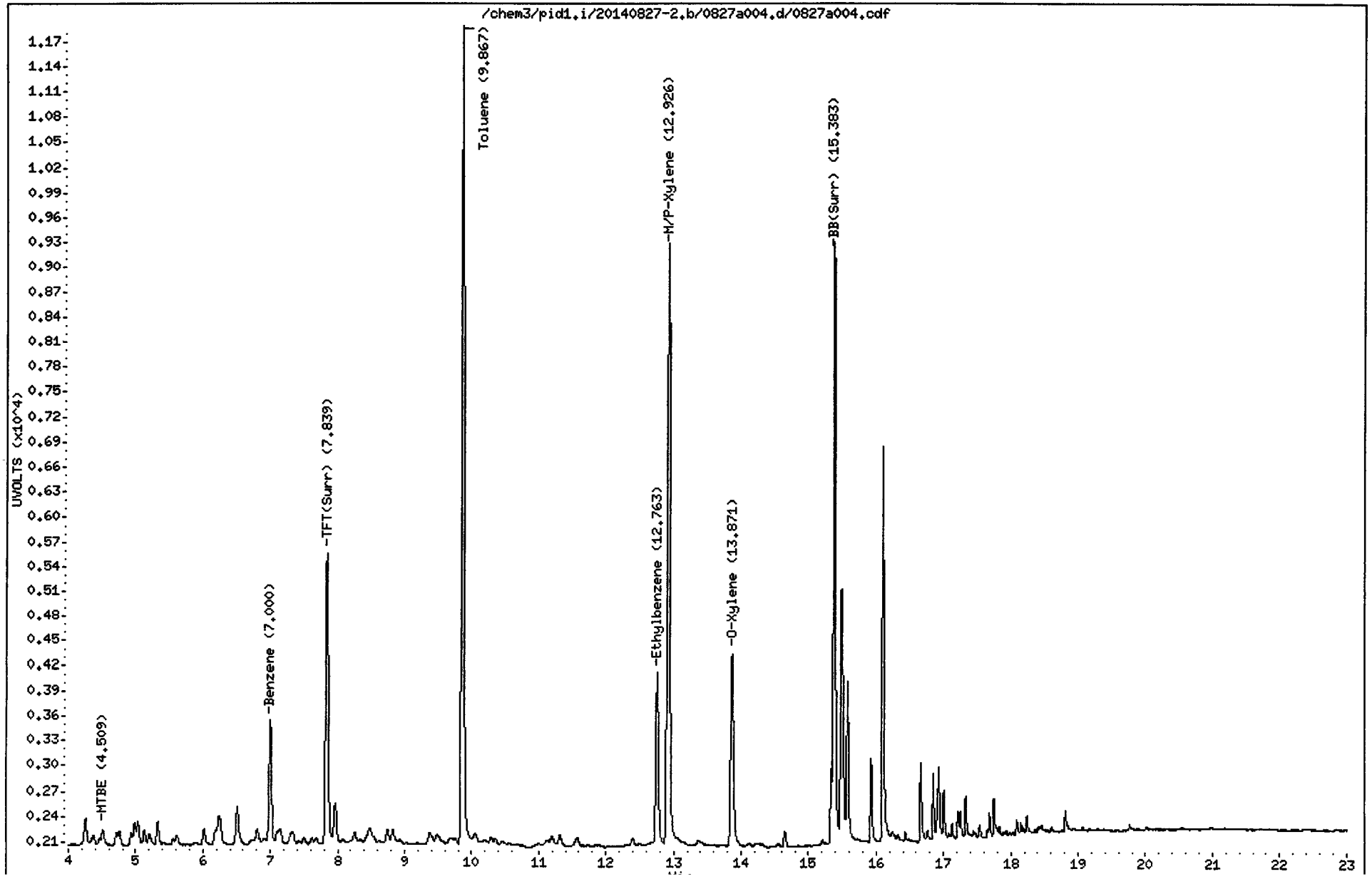
Sample Info: LCS0827

Column phase: RTX 502-2 PID

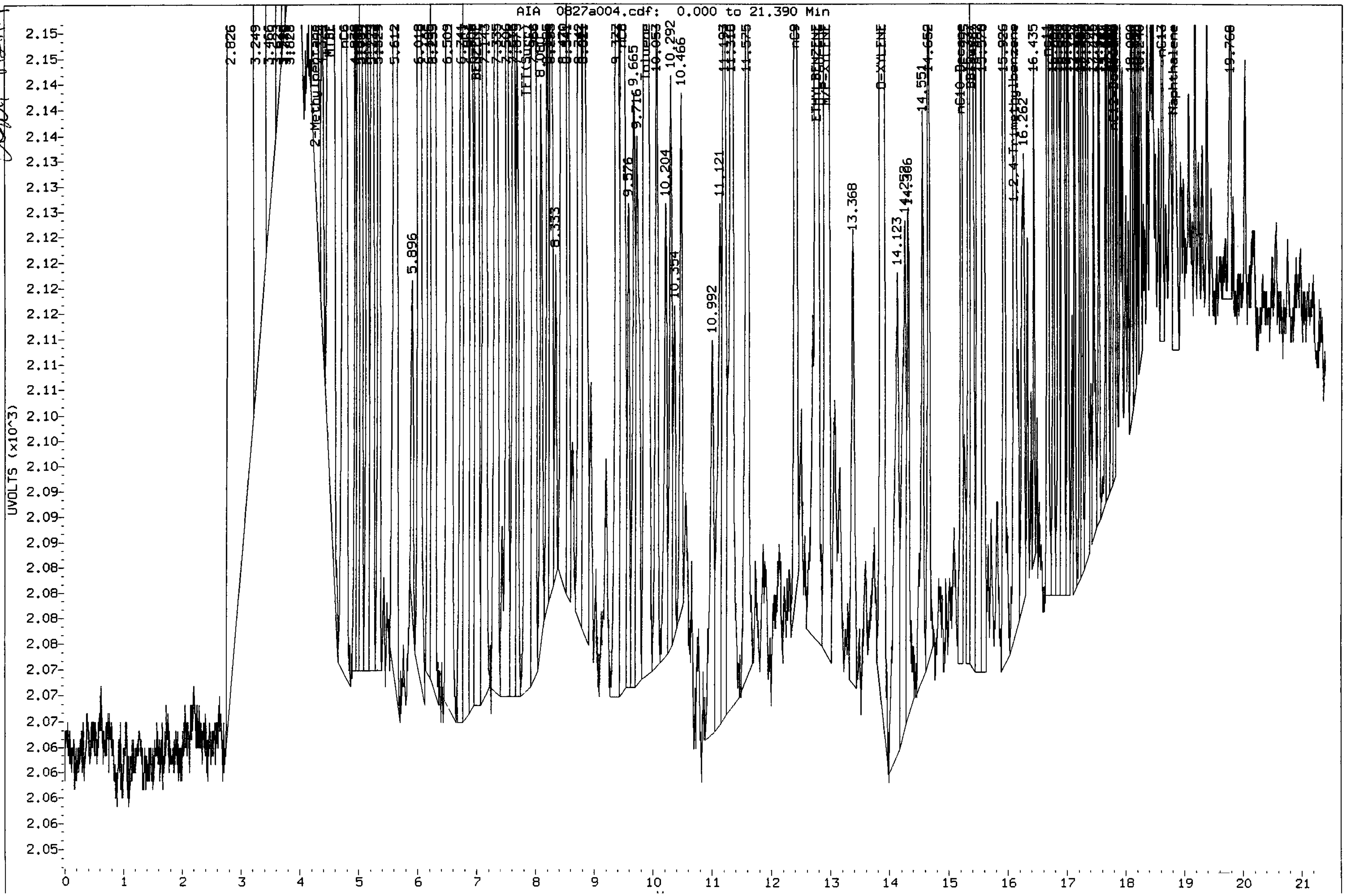
Instrument: pid1.i

Operator: LH/PC

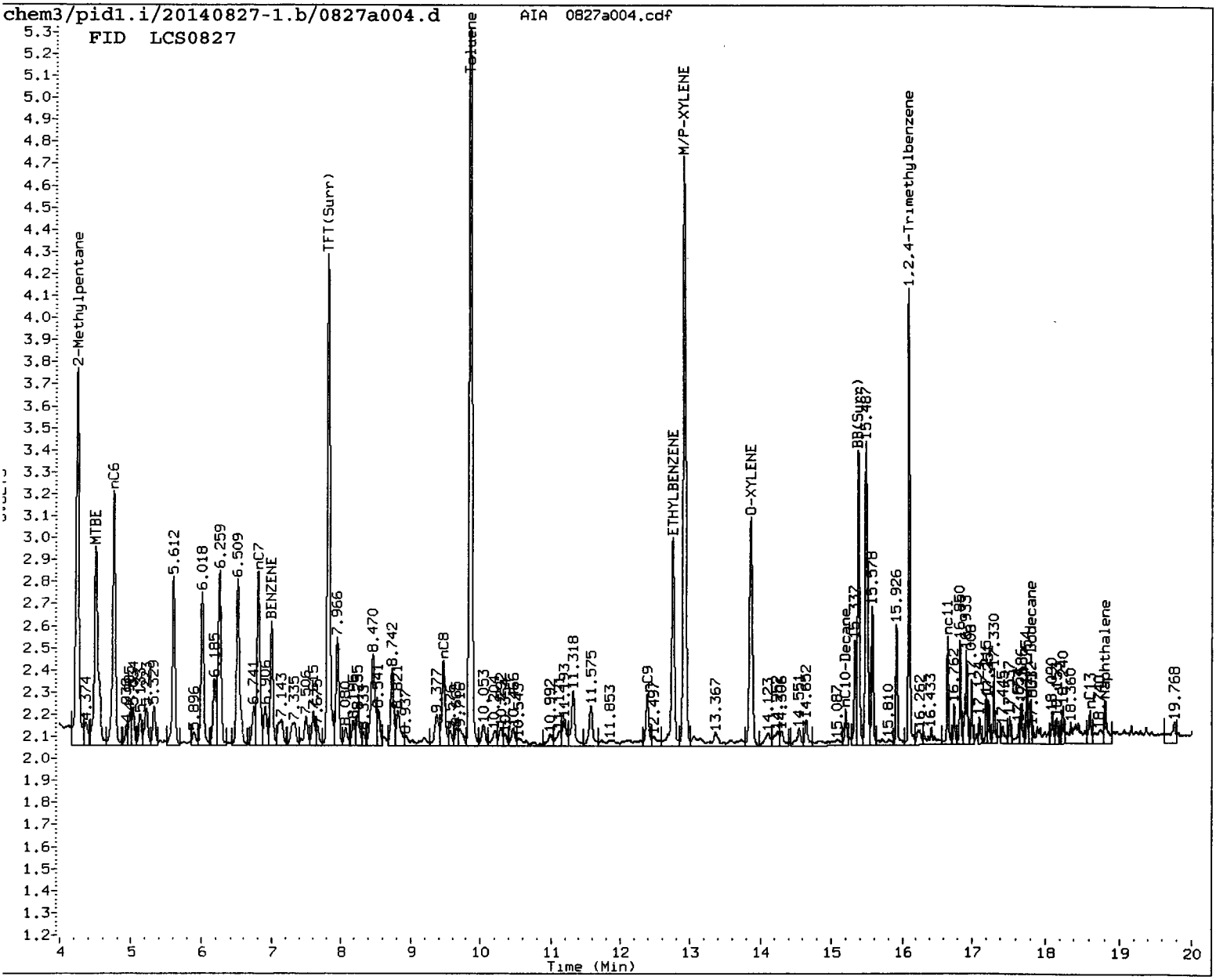
Column diameter: 0.18



Data File: /chem3/pid1.i/20140827-1.b/0827a004.d/0827a004.cdf
Injection Date: 27-AUG-2014 09:37
Instrument: pid1.i
Client Sample ID:



DGW 8/28/14



MANUAL INTEGRATION

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

5. Other _____

Analyst: _____ Date: 8/28/14

Data File: /chem3/pid1.i/20140827-1.b/0827a005.d

Date : 27-AUG-2014 10:06

Client ID:

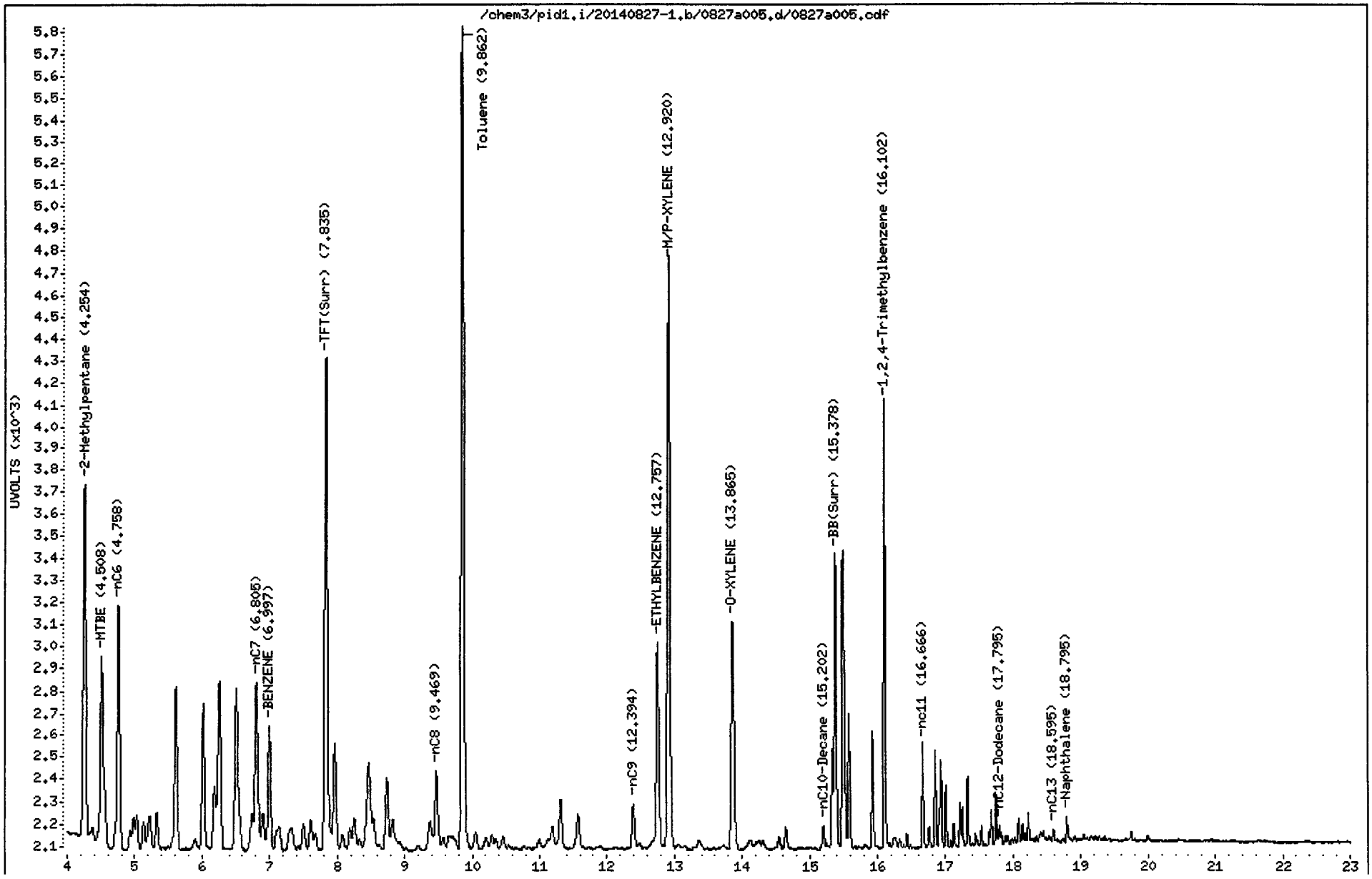
Sample Info: LCSD0827

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140827-2.b/0827a005.d

Date : 27-AUG-2014 10:06

Client ID:

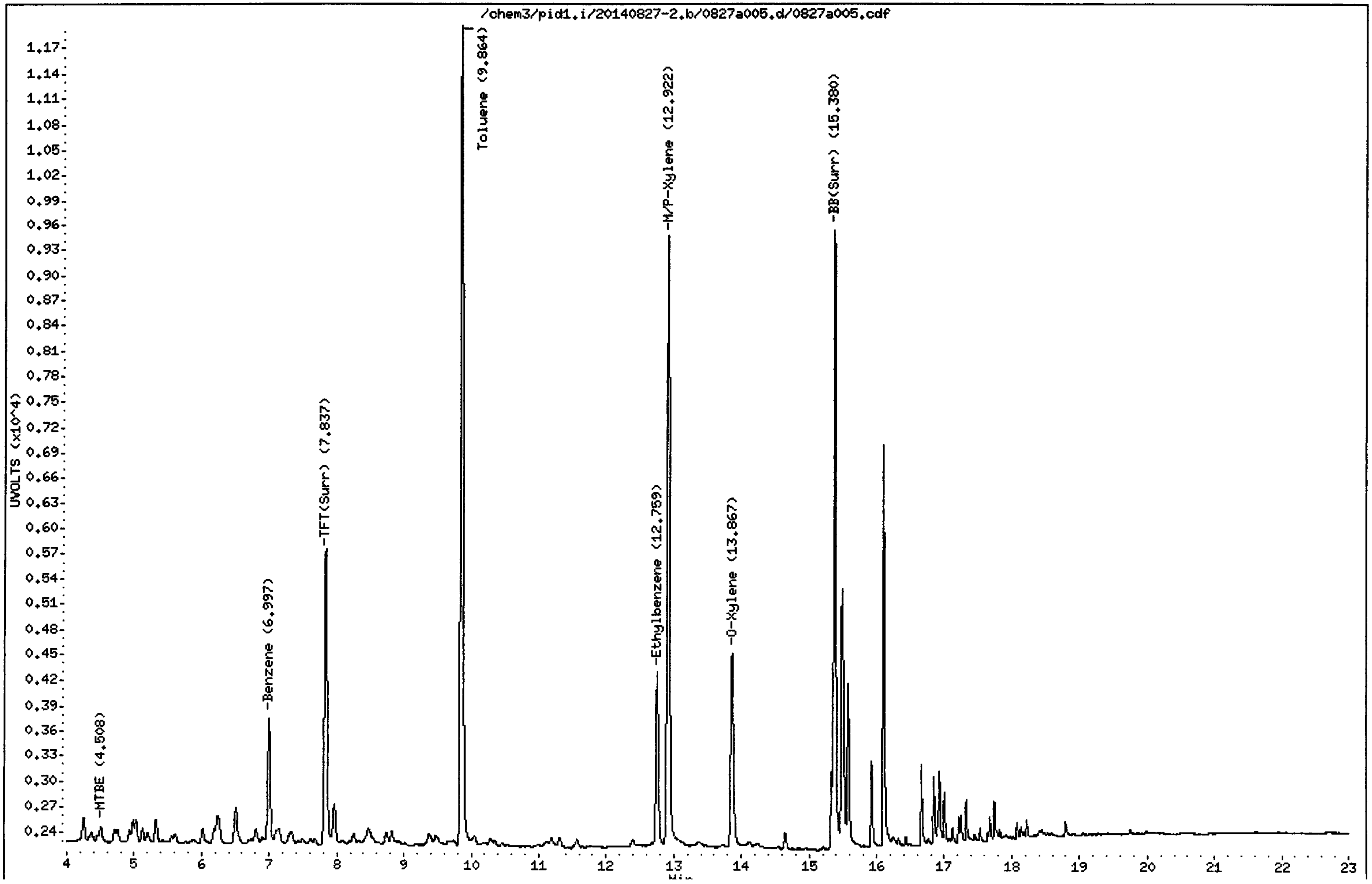
Sample Info: LCSD0827

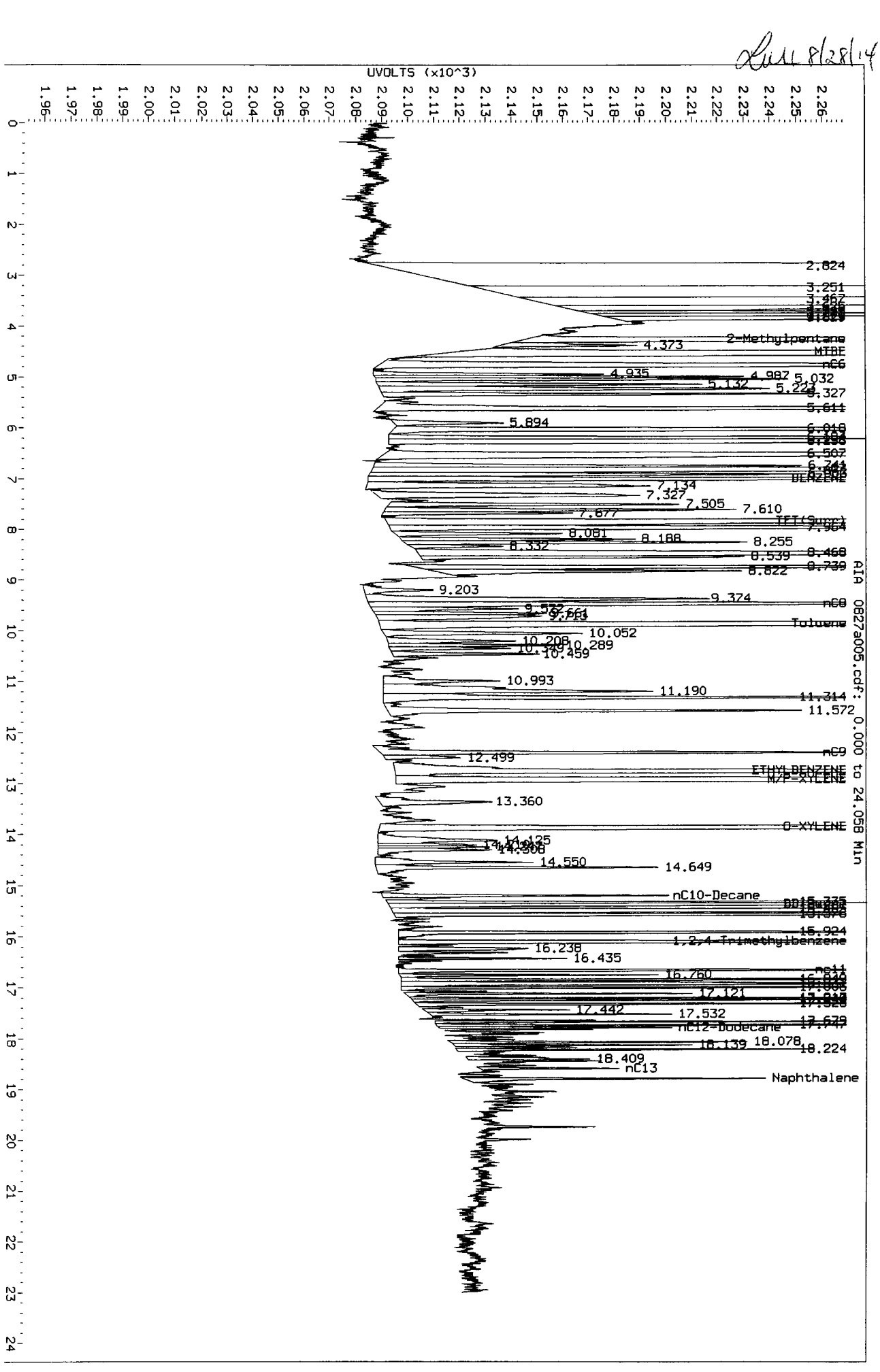
Column phase: RTX 502-2 PID

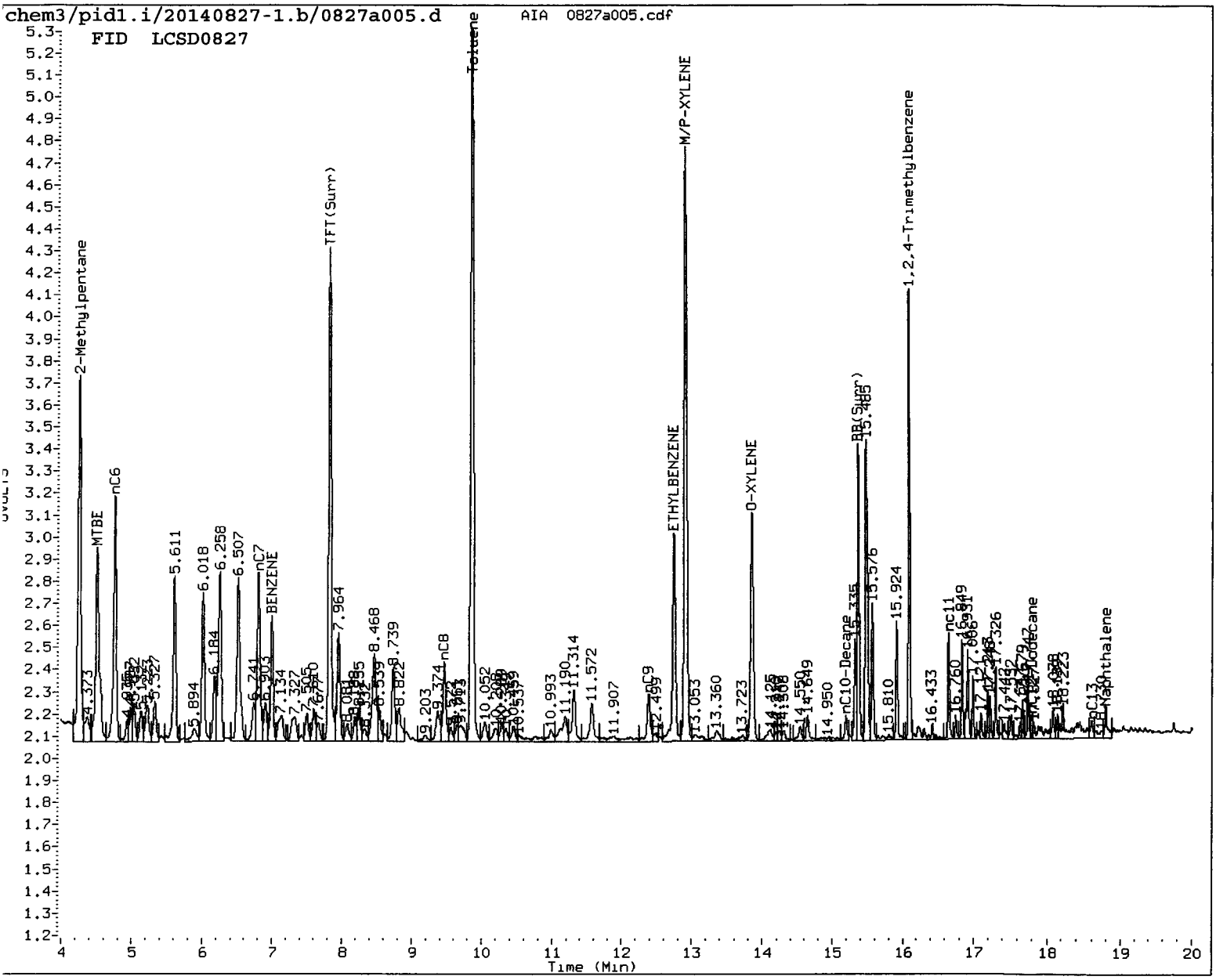
Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18




Data File: /chem3/pid1.i/20140827-1.b/0827a005.d/0827a005.cdf
Injection Date: 27-AUG-2014 10:06
Instrument: pid1.i
Client Sample ID:
UVOLTS (x10^3)
AIA 0827a005.cdf: 0.000 to 24.058 Min
2.824
3.251
4.373
2-Methylpentane
MTBE
nC6
4.935
4.987
5.032
5.132
5.223
5.894
6.567
BENZENE
7.134
7.327
7.505
7.610
7.677
8.081
8.188
8.255
8.332
8.822
9.203
9.374
nC8
Toluene
10.052
10.289
10.459
10.993
11.190
11.572
nC9
12.499
ETHYLBENZENE
M/P-XYLENE
13.360
O-XYLENE
14.125
14.550
14.649
nC10-Decane
16.238
16.435
16.760
17.121
17.442
17.532
nC12-Dodecane
18.139
18.078
18.224
18.409
nC13
Naphthalene



MANUAL INTEGRATION

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

5. Other _____

Analyst: _____ Date: 8/28/14

Data File: /chem3/pid1.i/20140827-1.b/0827a006.d

Date : 27-AUG-2014 10:35

Client ID:

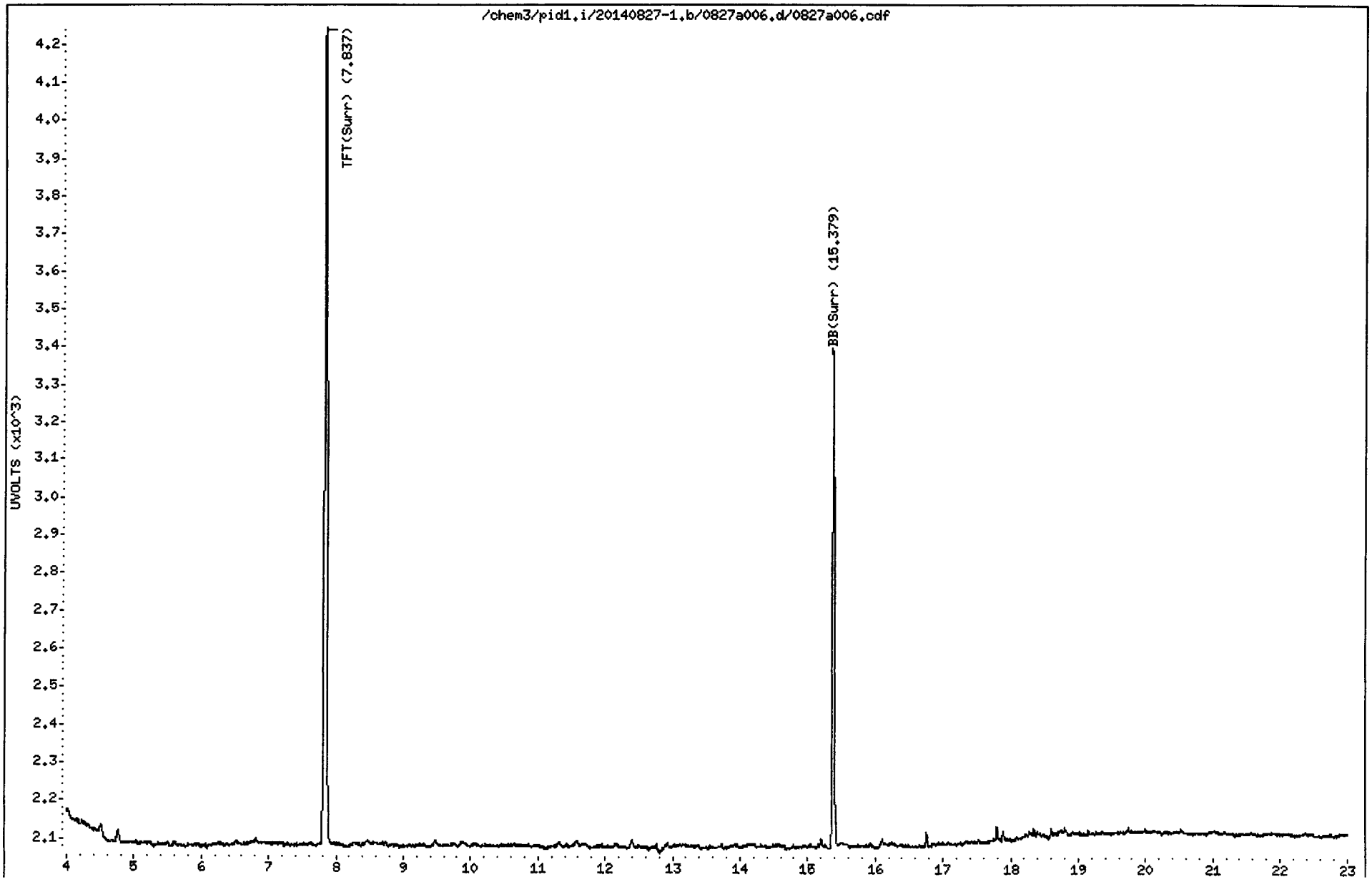
Sample Info: MB0827

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140827-2.b/0827a006.d

Date : 27-AUG-2014 10:35

Client ID:

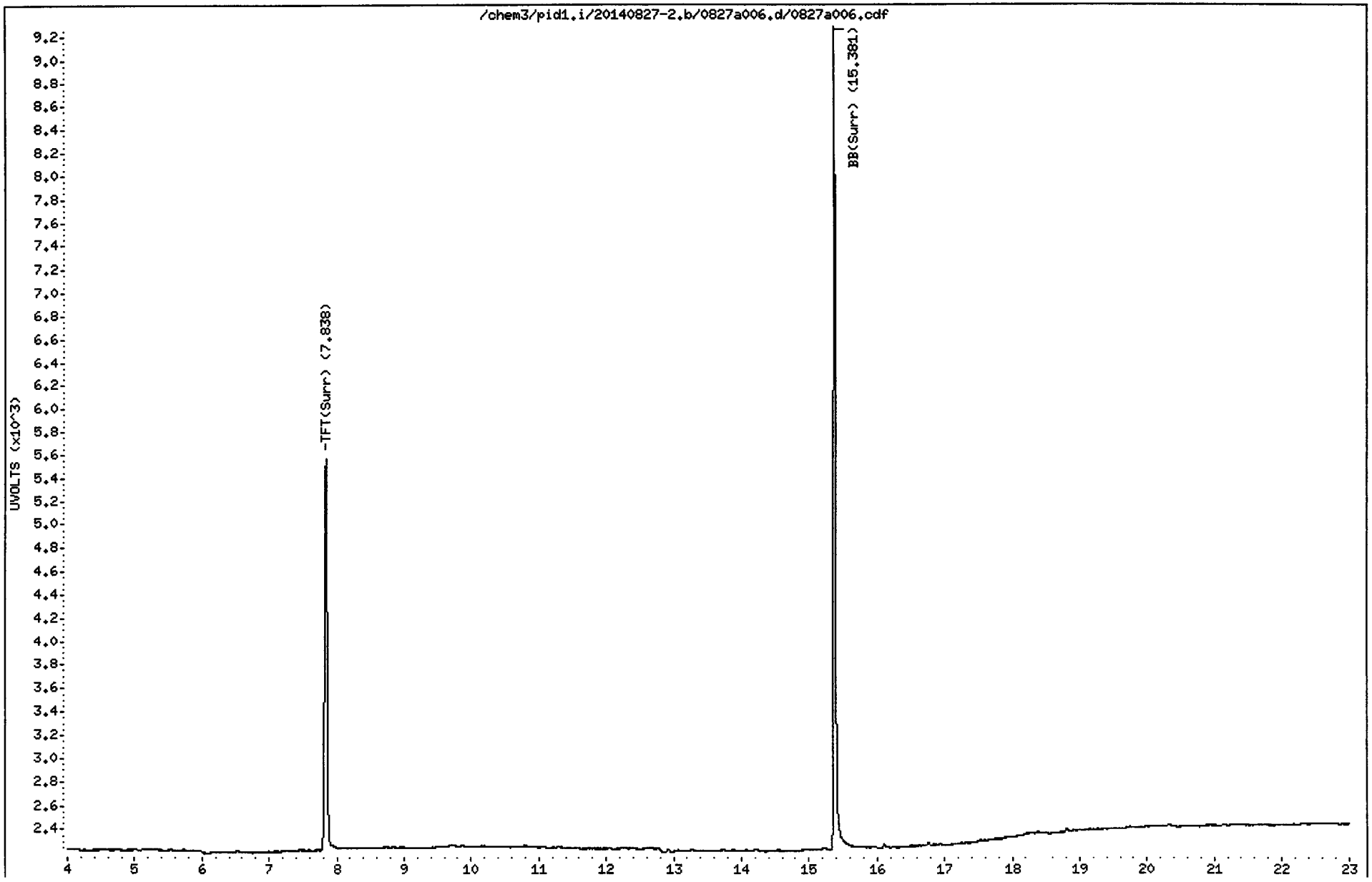
Sample Info: MB0827

Column phase: RTX 502-2 PID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140827-1.b/0827a029.d

Date : 27-AUG-2014 23:25

Client ID: MW-1R

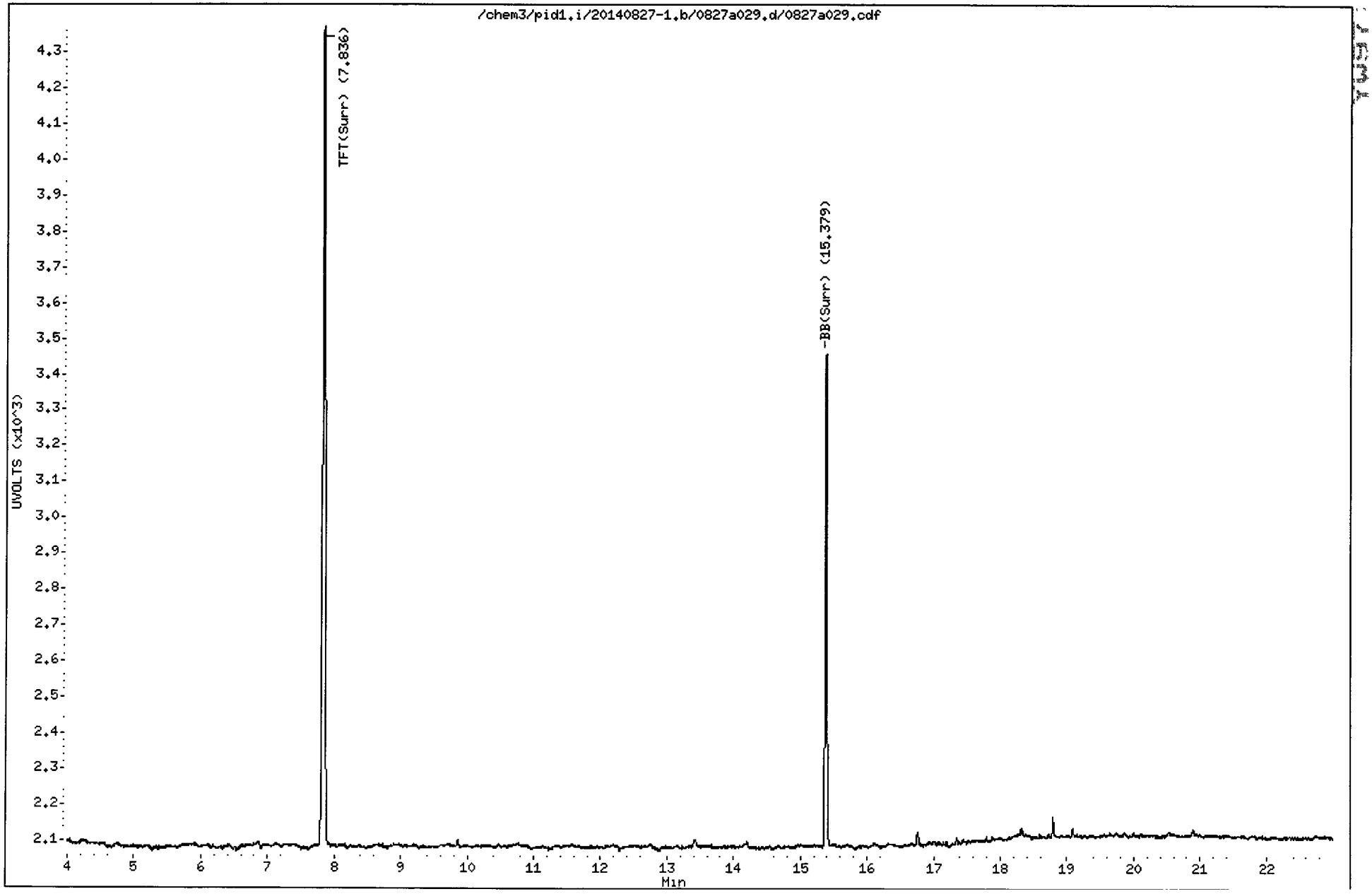
Sample Info: YW97A

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: LH/PC

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: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Received: 08/19/14

Data Release Authorized:
Reported: 08/27/14

ARI ID	Sample ID	Analysis Date	DL	Analyte	RL	Result
YW97A 14-17008	MW-1R	08/21/14	1.0	**Methane**	**0.7**	**11.8**
082114MB	Method Blank	08/21/14	1.0	Methane	0.7	< 0.7 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: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Received: 08/19/14

Data Release Authorized:
Reported: 08/27/14

ARI ID	Analysis Date	Analyte	Spike	Result	Recovery	RPD
082114LCS	08/21/14	Methane	654	719	109.9%	4.3%
082114LCSD				689	105.3%	

Reported in ug/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

RSK 175 WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	PRP	TOT OUT
YW97A	MW-1R	96.1%	0
MB-082114	Method Blank	97.2%	0
LCS-082114	Lab Control	102%	0
LCSD-082114	Lab Control Dup	98.4%	0

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

Log Number Range: 14-17008 to 14-17008

FORM-II RSK 175

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS

NWTPHD by GC/FID-Silica and Acid Cleaned
Extraction Method:

QC Report No: YW97-Kennedy Jenks Consultants,
Project: Ecology Cornet Bay Marina
1396010.00

Matrix: Water
Data Release Authorized:
Reported: 08/27/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-082214	Method Blank	08/22/14	08/27/14	1.00	Diesel Range	0.10	< 0.10 U
14-17008	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		83.4%
YW97A	MW-1R	08/22/14	08/27/14	1.00	Diesel Range	0.10	< 0.10 U
14-17008	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		60.7%

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

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-082214**
Page 1 of 1 **LAB CONTROL**

Lab Sample ID: LCS-082214
LIMS ID: 14-17008
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00
Date Sampled: 08/18/14
Date Received: 08/19/14

Date Extracted: 08/22/14
Date Analyzed: 08/27/14 15:30
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	2.34	3.00	78.0%

TPHD Surrogate Recovery

o-Terphenyl	81.1%

Results reported in mg/L

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 08/19/14

ARI Job: YW97
Project: Ecology Cornet Bay Marina
1396010.00

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-17008-082214MB1	Method Blank	500 mL	1.00 mL	08/22/14
14-17008-082214LCS1	Lab Control	500 mL	1.00 mL	08/22/14
14-17008-YW97A	MW-1R	500 mL	1.00 mL	08/22/14

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YW97-Kennedy Jenks Consultants, Inc.
Project: Ecology Cornet Bay Marina
1396010.00

Client ID	OTER	TOT OUT
MB-082214	83.4%	0
LCS-082214	81.1%	0
MW-1R	60.7%	0

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

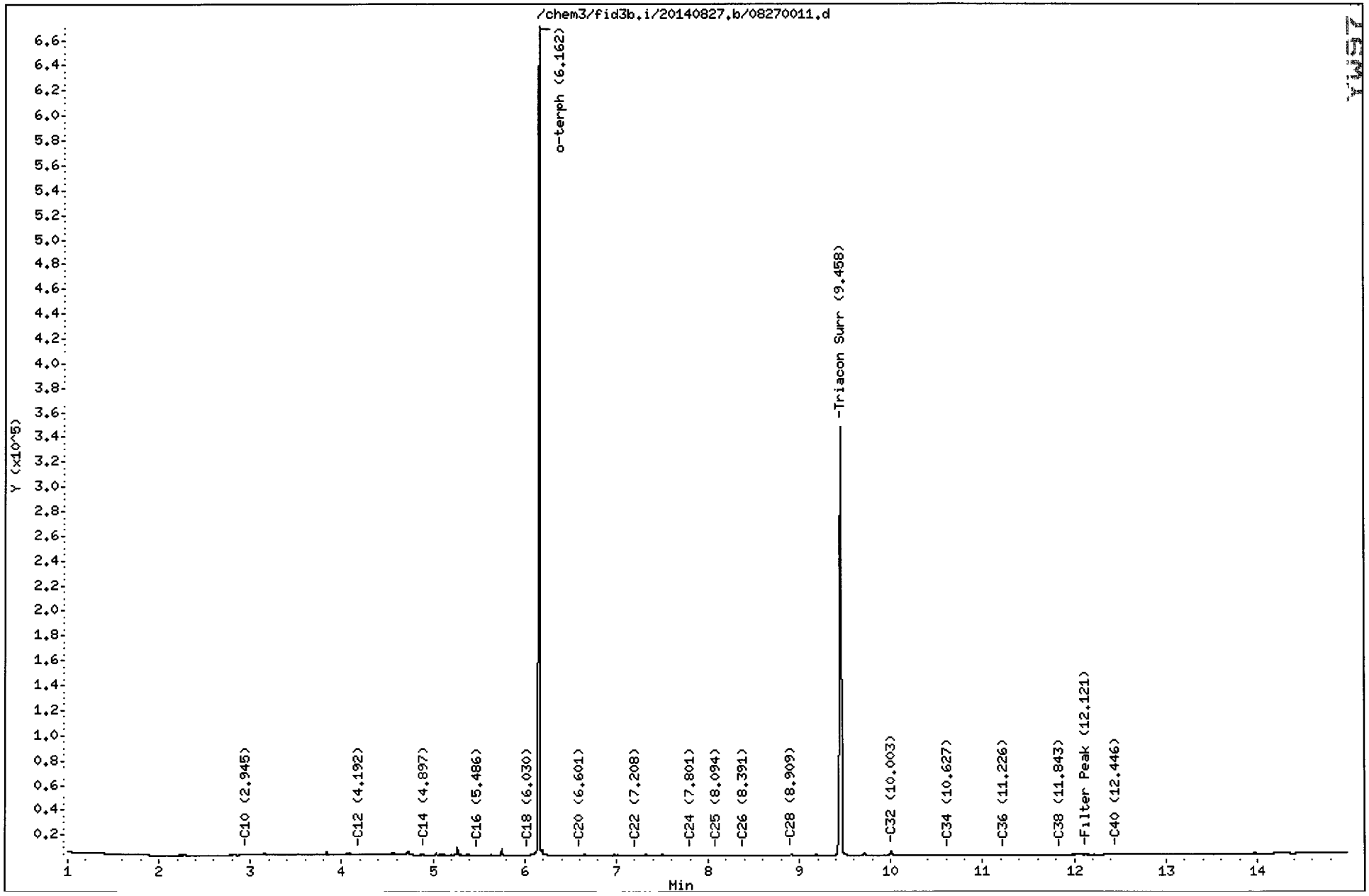
Prep Method: SW3510C
Log Number Range: 14-17008 to 14-17008

FORM-II TPHD

Data File: /chem3/fid3b.i/20140827.b/08270011.d
Date : 27-AUG-2014 15:04
Client ID: YW97MBW1
Sample Info: YW97MBW1

Instrument: fid3b.i
Operator: VTS
Column diameter: 0.25

Column phase: RTX-1



Data File: /chem3/fid3b.i/20140827.b/08270012.d

Date : 27-AUG-2014 15:30

Client ID: YW97LCSW1

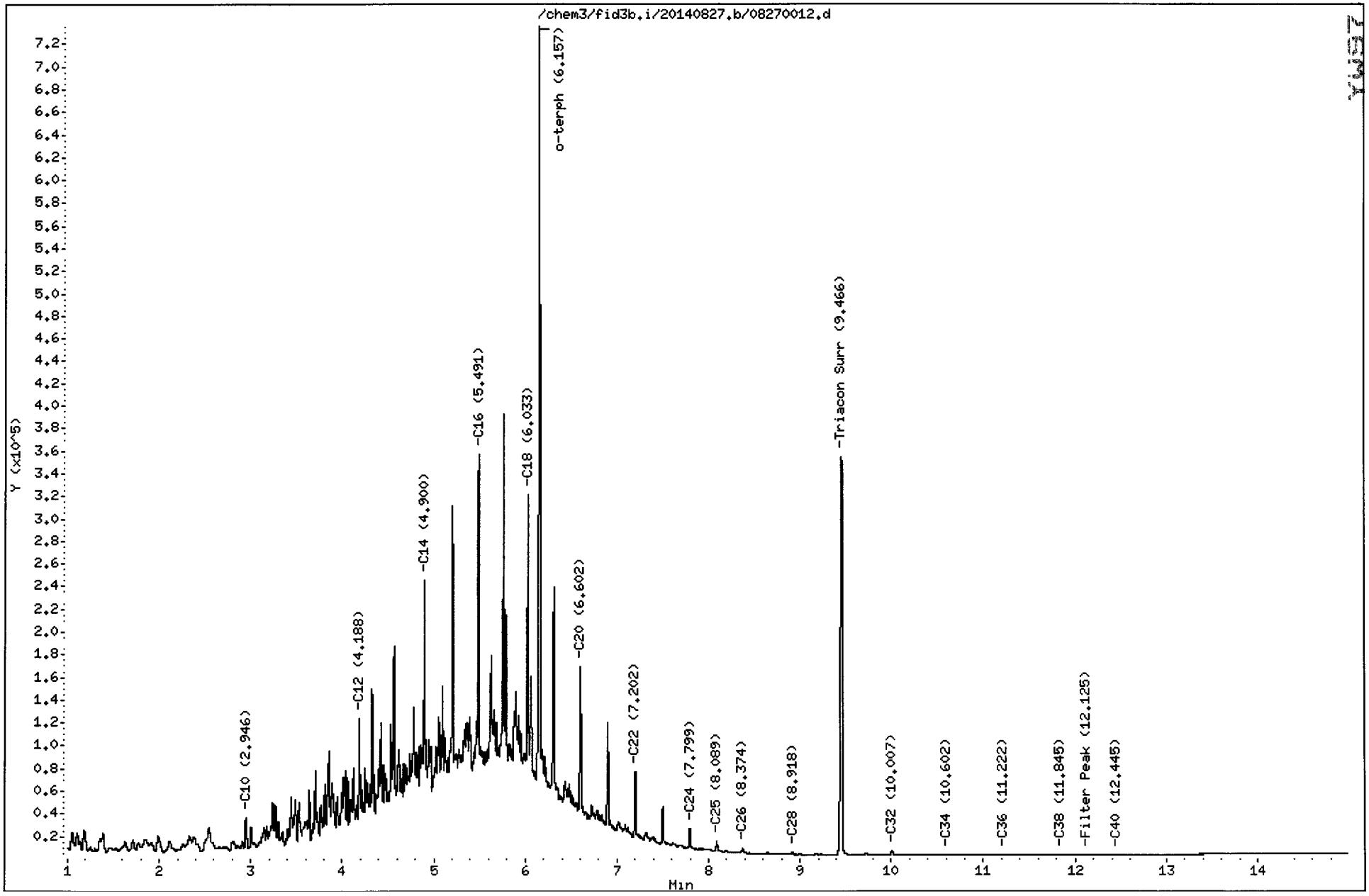
Sample Info: YW97LCSW1

Column phase: RTX-1

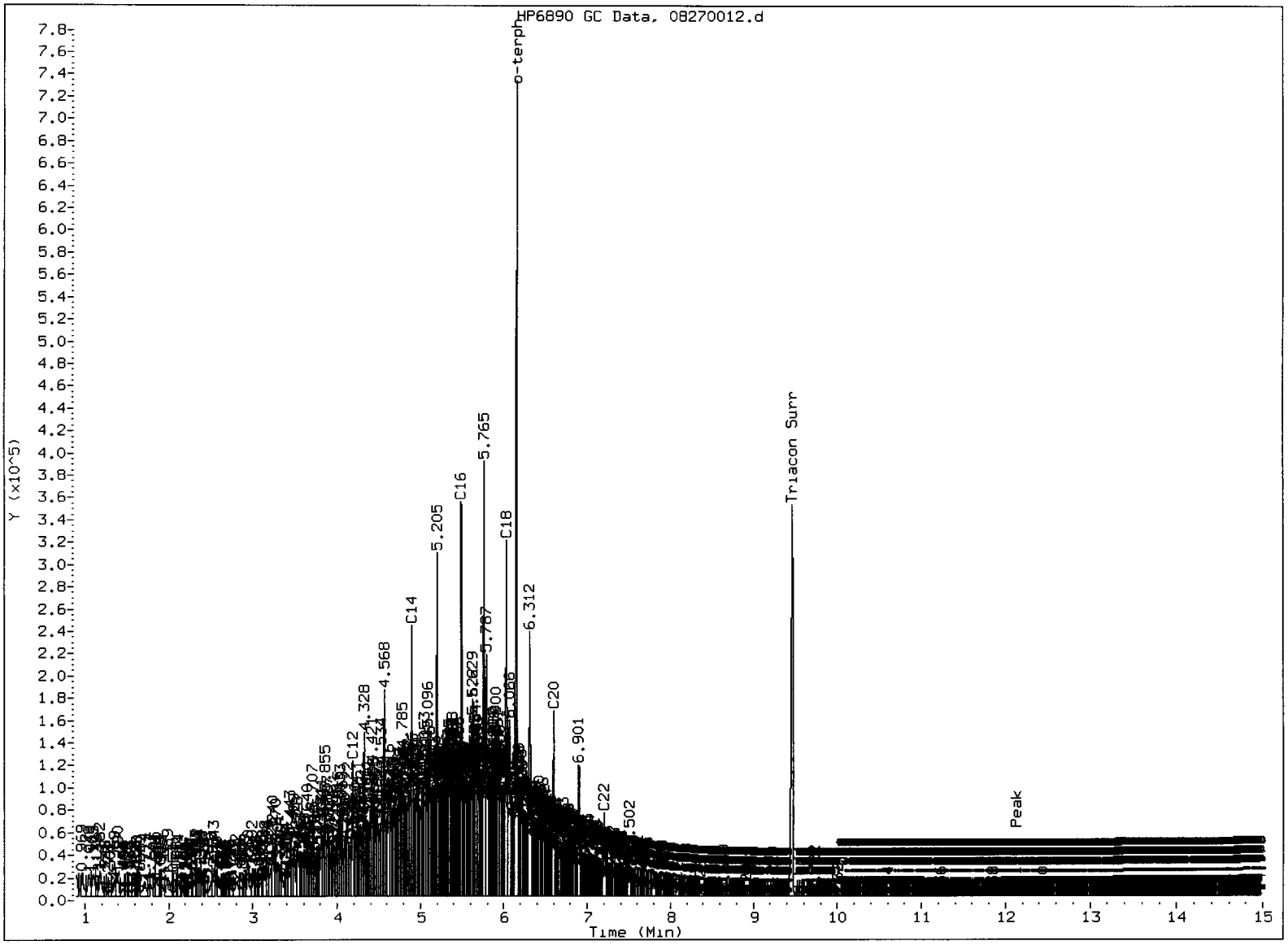
Instrument: fid3b.i

Operator: VTS

Column diameter: 0.25



FID:3B-2C/RTX-1 YW97LCSW1 FID:3B SIGNAL



MANUAL INTEGRATION

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

Analyst: JW Date: 8/27/14

YW97:00036

Data File: /chem3/fid3b.i/20140827.b/08270013.d

Date : 27-AUG-2014 15:55

Client ID: MW-1R

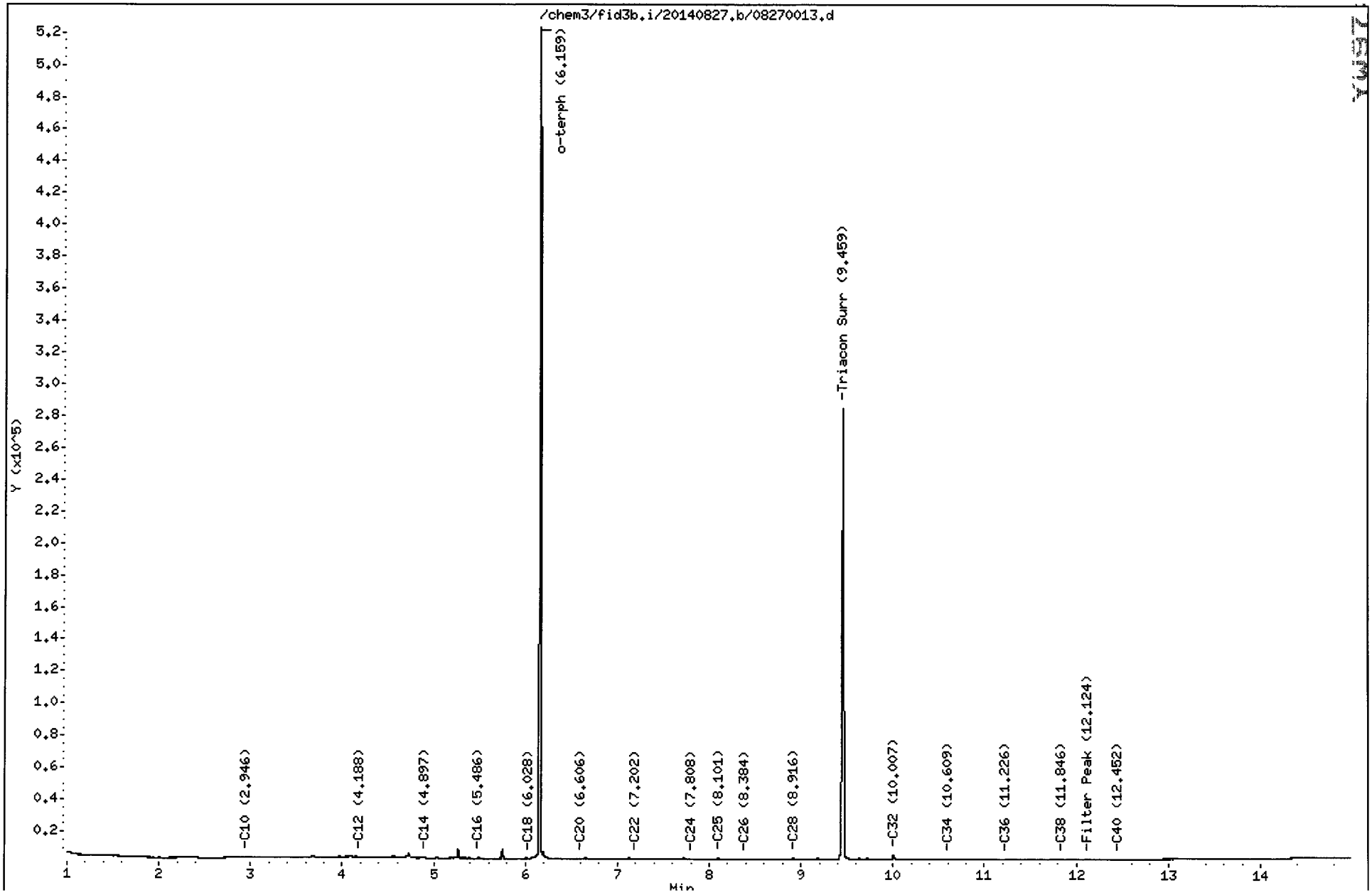
Sample Info: YW97A

Column phase: RTX-1

Instrument: fid3b.i

Operator: VTS

Column diameter: 0.25



SAMPLE RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 08/18/14
Date Received: 08/19/14

Client ID: MW-1R
ARI ID: 14-17008 YW97A

Analyte	Date Batch	Method	Units	RL	Sample
N-Ammonia	08/20/14 082014#1	EPA 350.1M	mg-N/L	0.020	1.17
N-Nitrate	08/20/14	Calculated	mg-N/L	0.010	0.090
N-Nitrite	08/20/14 082014#1	EPA 353.2	mg-N/L	0.010	0.090
Nitrate + Nitrite	08/19/14 081914#1	EPA 353.2	mg-N/L	0.010	0.180
Sulfate	08/22/14 082214#1	EPA 375.2	mg/L	10.0	64.5
Sulfide	08/21/14 082114#1	SM4500-S2D	mg/L	0.050	< 0.050 U

RL Analytical reporting limit
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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	08/20/14	mg-N/L	< 0.010 U	FB
N-Nitrite	EPA 353.2	08/20/14	mg-N/L	< 0.010 U	FB
Nitrate + Nitrite	EPA 353.2	08/19/14	mg-N/L	< 0.010 U	FB
Sulfate	EPA 375.2	08/22/14	mg/L	< 2.0 U	FB
Sulfide	SM4500-S2D	08/21/14	mg/L	< 0.050 U	
		08/21/14		< 0.050 U	

FB Filtration Blank

LAB CONTROL RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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	08/21/14	mg/L	0.516	0.500	103.2%
SM4500-S2D	PREP	08/21/14		6.39	6.07	105.3%

STANDARD REFERENCE RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

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 #040912	EPA 350.1M	08/20/14	mg-N/L	0.499	0.500	99.8%
N-Nitrite ERA #141113	EPA 353.2	08/20/14	mg-N/L	0.494	0.500	98.8%
Nitrate + Nitrite ERA #220912	EPA 353.2	08/19/14	mg-N/L	0.494	0.500	98.8%
Sulfate ERA 131013	EPA 375.2	08/22/14	mg/L	15.2	15.0	101.3%

REPLICATE RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 08/18/14
Date Received: 08/19/14

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: YW97A Client ID: MW-1R						
N-Nitrite	EPA 353.2	08/20/14	mg-N/L	0.090	0.093	3.3%
Sulfide	SM4500-S2D	08/21/14	mg/L	< 0.050	< 0.050	NA

MS/MSD RESULTS-CONVENTIONALS
YW97-Kennedy Jenks Consultants, Inc.

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 08/25/14

Project: Ecology Cornet Bay Marina
Event: 1396010.00
Date Sampled: 08/18/14
Date Received: 08/19/14

Analyte	Method	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: YW97A Client ID: MW-1R							
N-Nitrite	EPA 353.2	08/20/14	mg-N/L	0.090	0.592	0.500	100.4%
Sulfide	SM4500-S2D	08/21/14	mg/L	< 0.050	5.74	6.07	94.6%