



November 5, 2013

The Dow Chemical Company
P.O. Box 8361
South Charleston, WV 25303-8361
USA

Gail Dieter
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau E, Section B
625 Broadway, 12th Floor
Albany, NY 12233-7017

Subject: Pre-removal Waste Characterization of Sediment from
North Shore Deposit of AOC A -Cayuga-Seneca Canal
September 2013, Former Hampshire Chemical Corp.,
Waterloo, New York
Site No. 850001A

Dear Ms. Dieter:

This letter report presents the results of sediment sampling conducted between September 16 and 18, 2013, to further characterize the North Shore Deposit at the former Hampshire Chemical Corp. (HCC) facility in Waterloo, New York. This pre-removal sediment sampling and characterization are based on communications between CH2M HILL and the New York State Department of Environmental Conservation (NYSDEC) on the *Corrective Measures Study for AOC A - Cayuga-Seneca Canal* (CH2M HILL, 2013). Samples were collected from the North Shore Deposit at locations where the highest concentrations of metals were reported during the 2009 sediment sampling event (*Phase II Sediment Investigation Data Report, Waterloo, New York* [CH2M HILL, 2010]).

The primary objective of the September 2013 sampling event was to augment the composited characterization sample results collected in June 2012, and transmitted to NYSDEC via a letter dated October 16, 2012 on *AOC A - Cayuga-Seneca Canal Sediment Sampling for Waste Characterization and Landfill Approval to Seneca Meadows Landfill* (CH2M HILL, 2012). Although NYSDEC accepted the characterization results obtained from the June 2012 event, NYSDEC requested additional characterization of the sediment materials from AOC A in order to confirm the analytical results from the June 2012 event. Using the September 2013 characterization results, a profile of the AOC A sediments will be submitted to Seneca Meadows Landfill in Waterloo, New York for approval. The results from the most recent waste characterization sampling event justify the disposal of the dredged sediment at the Seneca Meadows Landfill as non-hazardous waste.

Background

The work completed during this field event was performed in accordance with the letter work plan for *Pre-removal Waste Characterization of Sediment from North Shore Deposit of AOC A - Cayuga-Seneca Canal*, dated July 3, 2013, that was submitted to NYSDEC and approved by the agency via a letter dated September 10, 2013. The work plan specified the sampling methods, locations, and analyses. No additional permitting was necessary for completing

the work, and all activities were covered under the existing Department of the Army Permit Number 2011-01621 Nationwide Permit No. 38.

Based on the 2009 sediment results (CH2M HILL, 2010), the maximum total metals concentrations of cadmium, chromium, lead, and mercury were found to be higher than 20 times their respective toxicity characteristic leaching procedure (TCLP) regulatory limit at a few locations within the North Shore deposit. In addition to these four metals, the collected samples were analyzed for TCLP arsenic because it is a constituent of potential concern (COPC) within AOC D, which is adjacent to AOC A. Sampling within the North Shore Deposit area was biased toward the following sampling locations that reported elevated concentrations of the COPC metals during the 2009 sampling event: SCC-SD-03 (lead, mercury, and arsenic exceeded their 20 times TCLP limits), SCC-SD-24 (cadmium exceeded its 20 times TCLP limit), and SCC-SD-26 (lead, mercury, chromium, and arsenic exceeded their 20 times TCLP limits). Figure 1 shows the locations of the 2009 sediment sampling locations.

In June 2012, an in-situ TCLP composite sampling program was performed to determine if the sediment locations exhibiting higher than 20 times the TCLP regulatory limit would leach metals at levels with the potential to be hazardous waste as suggested by the 2009 sediment results from select locations in both the North Shore and Gorham Street Deposits. The metals assessed during the June 2012 sampling program were not present above the laboratory limits of detection.

Sampling Method

CH2M HILL subcontracted an environmental construction company, Op-Tech Environmental Services, Syracuse, New York (Op-Tech), to collect sediment samples near three previous sampling locations of SD-3, SD-24, and SD-26 (Figure 1) using a shore-based, long-reach track excavator. The rationale for collecting samples from the shaded areas was to collect samples not only from the previously sampled location but also from the surrounding areas.

Prior to the start of the sampling, Op-Tech installed a turbidity curtain within the canal surrounding the sampling locations as a best management practice to address potential turbidity issues. The general layout of the turbidity curtain is shown on Figure 1. Silt curtain depths were long enough to cover the depth of the water column and were weighted down on the bottom of the canal with anchors and sandbags. Turbidity was visually monitored at upstream and downstream locations of the sampling area to assess changes in water quality conditions attributable to the sampling procedures. Movement of the turbidity curtain was observed one time during the sediment sampling; therefore, the sampling was stopped and the turbidity curtain was repositioned and secured along the bottom of the canal using the anchors and sandbags.

Once the turbidity curtain was installed within the canal waters, the excavator was moved along the back roadway to set up near each of the three proposed sampling locations of

TCLP-SD-3, TCLP-SD-24, and TCLP-SD-26 (Figure 1). Soft sediment samples were collected at each location using the bucket on the excavator. Because of the amount of rock, riprap, and other debris on the bottom of the canal, the operator of the excavator had to make several passes with the bucket along the canal bottom to collect enough soft sediment material from each location. Therefore, sediment material from each location was collected over an area rather than from a single point. The vertical extent of sampling in each identified area was between the 0.5- to 2-foot depth below the sediment surface, depending on the sampling location. The approximate center of each sampled area was marked and surveyed from a boat using a Trimble hand-held global positioning system unit. A total of approximately 10 cubic yards of soft sediment material was collected from the three shaded areas near TCLP-SD-3, TCLP-SD-24, and TCLP-SD-26 (Figure 1) and composited in a truck mounted 25-cubic yard dewatering box.

Once the 10 cubic yards of sediment were collected, the dewatering box with sediment was offloaded from the truck and staged in a secondary containment area near Solid Waste Management Unit 1 at the former HCC facility. The dewatering box was equipped with a perforated basket lined with a geotextile fabric filter liner (to filter the larger-grained materials), valved drains, and tarp covering. A dual bag filter system, using both 50-micron and 5-micron bag filters, was connected at one of the drains to the dewatering box to filter the effluent water as it drained from the wet sediment and out of the dewatering box. The effluent water passed through the bag filter units and into a portable polyethylene tank. Approximately 150 gallons of effluent water was filtered and collected in the tank.

The post-filtration effluent water collected in the polyethylene tank was analyzed for total suspended solids (TSS) using a Hach DR890 field spectrophotometer and turbidity using a Hach portable turbidimeter. HCC/CH2M HILL proposed a daily average TSS limit on the effluent water of 25 milligrams per liter (mg/L), with a daily maximum not to exceed 50 mg/L. As identified in the HCC responses to the NYSDEC comments on the work plan in a letter dated August 28, 2013, these TSS values were to be protective of the State of New York's water quality standards for suspended solids, Part 703.2 Narrative Water Quality Standard. However, the post-filtration effluent water collected in the polyethylene tank was silty and turbid, with field measurements of both TSS and turbidity exceeding the limits of the instruments of >750 mg/L and >1,000 Nephelometric Turbidity Units (NTUs), respectively. Therefore, the effluent water collected in the polyethylene tank was not discharged back to the canal and is currently staged within a secondary containment at the site for characterization and offsite disposal.

Six grab samples from locations evenly spaced around the 10 cubic yards of sediment in the dewatering box were collected and composited in a clean pan consistent with the procedures presented in the approved Work Plan. One composite sample was collected using clean, dedicated disposable trowels and placed in a 4-ounce jar and packed in accordance with the CH2M HILL standard operating procedure for sample shipment via Federal Express. The sediment sample was submitted to Microbac Laboratories, Inc. (New

York State Laboratory ID No. 10861) in Marietta, Ohio, under chain-of-custody control and analyzed for TCLP metals (arsenic, cadmium, chromium, lead, and mercury) in accordance with U.S. Environmental Protection Agency (USEPA) methods SW846 6010B/7470A.

Investigation-derived waste (personal protective equipment, sampling materials, and sediment) was segregated and stored onsite in the dewatering box, 55-gallon drums, or the polyethylene tank for subsequent characterization and offsite disposal. Based on field assessment of the material, no drying agent was added to the sediment in the dewatering box. The dewatering box is currently covered while awaiting disposal, so that rainwater does not collect in the container.

Analytical Results

The TCLP analytical results obtained for the composite sample from the September 2013 field event are presented below, and the analytical report is presented in Attachment A.

All five metals analyzed were reported below their respective reporting limits. The results obtained from the September 2013 event are consistent with the results obtained from the June 2012 event, when all seven sediment sample results were non-detect for four TCLP metals of concern (metals that exceeded the 20 times TCLP limit from previous sampling events). Therefore, the September 2013 results confirm the original non-hazardous characterization of the sediment material from AOC A.

Based on the results from the June 2012 and September 2013 events, the profile for the sediment material from AOC A will be identified as non-hazardous and will be submitted for Seneca Meadows Landfill's final approval. Based on the discussions with NYSDEC and the results of the TCLP sediment sample from the North Shore Deposit, no additional waste characterization samples will be collected during the corrective measures at AOC A scheduled for 2014.

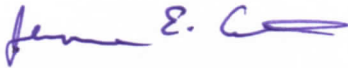
Analyte	USEPA Allowable TCLP Limits (mg/L)	Results (mg/L)
Arsenic	5.0	1 U
Cadmium	1.0	0.1 U
Chromium	5.0	0.2 U
Lead	5.0	1 U
Mercury	0.2	0.002 U

U = Not detected at or above adjusted sample reporting limit.

Ms. Gail A. Dieter
November 5, 2013
Page 5

If you have any questions or comments regarding the sampling or results, please feel free to contact me at 304-747-7788.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jerome E. Cibrik", with a stylized flourish at the end.

Jerome E. Cibrik, P.G.
Remediation Leader

cc: Mr. Pete Hoffmire, NYSDEC Region 8
Mr. Pete Miller, NYSDEC Region 8
Mr. Brian Carling, CH2M HILL
Mr. Steve Brusso, Evans Chemetics
Mr. David Pannucci, SML
CH2M HILL Project File

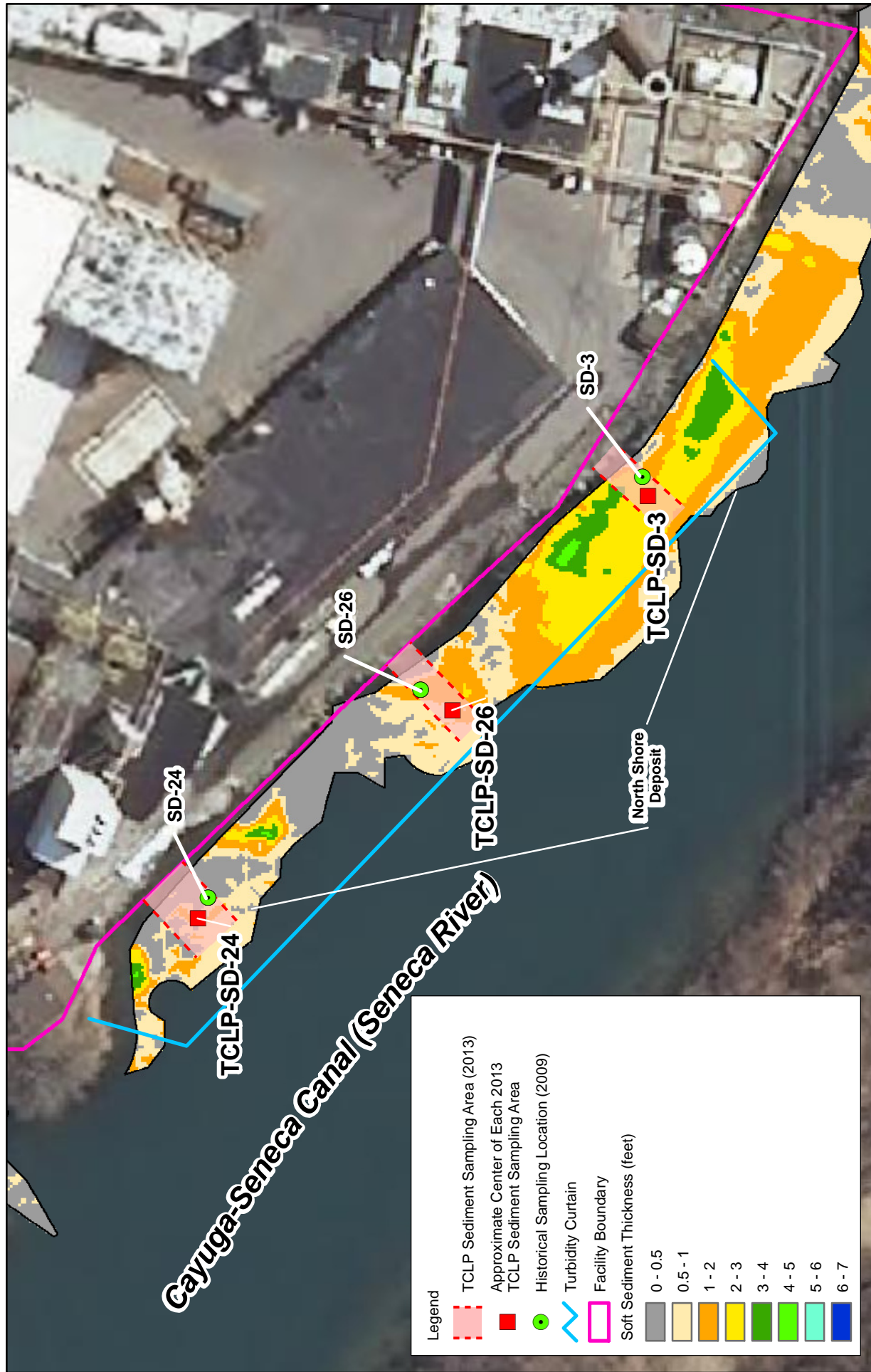


Figure 1
 Sample Locations for Pre-Removal Sediment Evaluation
 September 2013
 Former Hampshire Chemical Corp. Facility
 Waterloo, New York

Laboratory Report Number: L13100140

Shane Lowe
CH2MHILL, Inc
CH2MHILL
Richmond Heights, MO 63117

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Kathy Albertson – Team Chemist/Data Specialist
(740) 373-4071
Kathy.Albertson@microbac.com

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on October 09 2013



David Vandenberg – Managing Director

State of Origin: NY
Accrediting Authority: Department of Health ID:10861
QAPP: WATERLOO



Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution
-------------	------------

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0017831	I	1.0		1001845310160004575000864117579189	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	NA
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Lab Report #: L13100140

Lab Project #: 2736.104

Project Name: DOW WATERLOO

Lab Contact: Kathy Albertson

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
SEDIMENT092513	L13100140-01	10/01/2013 11:45	10/02/2013 12:31

Certificate of Analysis

Certificate of Analysis

Sample #: L13100140-01	PrePrep Method:	Instrument: ICP-THERMO2
Client ID: SEDIMENT092513	Prep Method: 3015	Prep Date: 10/04/2013 11:32
Matrix: TCLP Leach	Analytical Method: 6010B	Cal Date: 10/08/2013 16:20
Workgroup #: WG447313	Analyst: SLP	Run Date: 10/08/2013 16:55
Collect Date: 10/01/2013 11:45	Dilution: 1	File ID: T2.100813.165531
Sample Tag: 02	Units: mg/L	

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Arsenic, TCLP		U	1.00	0.500	D004	5
Cadmium, TCLP		U	0.100	0.0500	D006	1
Chromium, TCLP		U	0.200	0.100	D007	5
Lead, TCLP		U	1.00	0.500	D008	5
U	Not detected at or above adjusted sample detection limit.					

Sample #: L13100140-01	PrePrep Method:	Instrument: CVAA1
Client ID: SEDIMENT092513	Prep Method: 7470A	Prep Date: 10/04/2013 09:04
Matrix: TCLP Leach	Analytical Method: 7470A	Cal Date: 10/04/2013 14:29
Workgroup #: WG447302	Analyst: PDM	Run Date: 10/04/2013 14:54
Collect Date: 10/01/2013 11:45	Dilution: 1	File ID: M7.100413.145442
Sample Tag: 01	Units: mg/L	

Analyte	Result	Qual	RL	MDL	EPA HW#	Reg. Limit
Mercury		U	0.00200	0.00100	D009	0.2
U	Not detected at or above adjusted sample detection limit.					

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
October 9, 2013

001 - BIO-CHEM TESTING WVDEP 220	002 - REIC Consultants, Inc. WVDEP 060
003 - Sturm Environmental	004 - MICROBAC PITTSBURGH
ADC - ANTHONY D. CANTER	ADG - APRIL D. GREENE
AJF - AMANDA J. FICKIESEN	AML - TONY M. LONG
AZH - AFTER HOURS	BAF - BRICE A. FENTON
BLG - BRENDA L. GREENWALT	BRG - BRENDA R. GREGORY
CAA - CASSIE A. AUGENSTEIN	CAF - CHERYL A. FLOWERS
CEB - CHAD E. BARNES	CLC - CHRYS L. CRAWFORD
CLS - CARA L. STRICKLER	CLW - CHARISSA L. WINTERS
CPD - CHAD P. DAVIS	CRW - CHRISTINA R. WILSON
CSH - CHRIS S. HILL	CTB - CHRIS T. BUCINA
DAK - DEAN A. K	DCM - DAVID C. MERCKLE
DDE - DEBRA D. ELLIOTT	DEV - DAVID E. VANDENBERG
DIH - DEANNA I. HESSON	DLB - DAVID L. BUMGARNER
DLP - DOROTHY L. PAYNE	DLR - DIANNA L. RAUCH
DSM - DAVID S. MOSSOR	ECL - ERIC C. LAWSON
EDL - ERIN D. LONG	ENY - EMILY N. YOAK
EPT - ETHAN P. TIDD	ERP - ERIN R. PORTER
FJB - FRANCES J. BOLDEN	HJR - HOLLY J. REED
JBK - JEREMY B. KINNEY	JDH - JUSTIN D. HESSON
JKS - JANE K. SCHAAD	JLL - JOHN L. LENT
JWR - JOHN W. RICHARDS	JWS - JACK W. SHEAVES
JYH - JI Y. HU	KDW - KATHRYN D. WELCH
KEB - KATIE E. BARNES	KHR - KIM H. RHODES
KRA - KATHY R. ALBERTSON	KRB - KAEELY R. BECKER
LKN - LINDA K. NEDEFF	LSB - LESLIE S. BUCINA
MDA - MIKE D. ALBERTSON	MDC - MIKE D. COCHRAN
MES - MARY E. SCHILLING	MLW - MATTHEW L. WARREN
MMB - MAREN M. BEERY	MRT - MICHELLE R. TAYLOR
MSW - MATT S. WILSON	PDM - PIERCE D. MORRIS
PIT - MICROBAC WARRENDALE	PSW - PEGGY S. WEBB
QX - QIN XU	RAH - ROY A. HALSTEAD
REK - BOB E. KYER	RLB - BOB BUCHANAN
RNP - RICK N. PETTY	RS - ROSEMARY SCOTT
RWC - RODNEY W. CAMPBELL	SAV - SARAH A. VANDENBERG
SEP - SUZANNE J. PAUGH	SLM - STEPHANIE L. MOSSBURG
SLP - SHERI L. PFALZGRAF	TMB - TIFFANY M. BAILEY
TMM - TAMMY M. MORRIS	TPA - TYLER P. AMRINE
VC - VICKI COLLIER	WJB - WILL J. BEASLEY
WTD - WADE T. DELONG	XXX - UNAVAILABLE OR SUBCONTRACT

<u>Qualifier</u>	<u>Description</u>
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Result is greater than the associated numerical value.
A	See the report narrative
B	Analyte detected in the method blank
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to interference.
E	Semiquantitative result (out of calibration range)
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
FL	Free Liquid
H1	Sample analysis performed past holding time.
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration.
J	The analyte was positively identified, but the quantitation was below the RL.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	Analyte detected in both the method blank and sample above the MDL.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Tentatively identified compound(TIC)
NA	Not applicable
ND	Not detected at or above the reporting limit (RL/MDL).
ND, H1	Not detected; Sample analysis performed past holding time.
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
TIC	Library Search Compound
TNTC	Too numerous to count
U	Not detected at or above adjusted sample detection limit.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

Fax: 740-373-4835

*Water (W), Soil (S), Solid Waste (SD), Unknown (X)

Internal Chain of Custody Report

Login: L13100140**Account:** 2736**Project:** 2736.104**Samples:** 1**Due Date:** 09-OCT-2013

<u>Samplenum</u>	<u>Container ID</u>	<u>Products</u>
L13100140-01	255105	TC-EX

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	02-OCT-2013 16:37	RS		
2	ANALYZ	W1	TCL	03-OCT-2013 09:13	BRG	RS	
3	STORE	TCL	W1	04-OCT-2013 12:55	RS	BRG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login



NELAP Addendum - April 25, 2013

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVL NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO₃)
Thiodiglycol (TDG-LCMS)

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVL HPLC02/HPLC-UV

Nitroglycerin
Nitroguanidine
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVL KNITRO-C-WUV-VIS

Nitrocellulose

OVL MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVL MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVL RSK01/GC-FID

Isobutane
n-Butane
Propane
Propylene
Propyne

OVL HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

SOLID AND HAZARDOUS CHEMICALS

OVL HPLCOS-HPLC-UV

Nitroguanidine

OVL KNITRO-C-S/UV-VIS

Nitrocellulose

OVL MSS01/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVL MSV01/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)