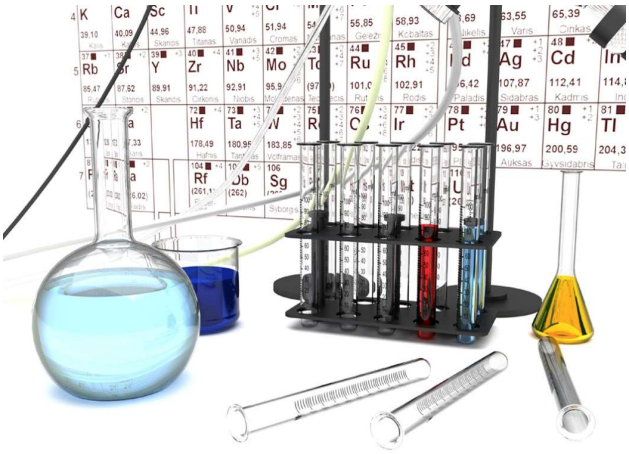
CITY OF PHOENIX
INDUSTRIAL PRETREATMENT
COMPLIANCE ACADEMY

Laboratory Analytical Issues

Welcome to
The City of Phoenix
Industrial Pretreatment Program
2024 Compliance Academy

Laboratory Analytical Issues



Laboratory Analytical Issues

- Kerri Keller
  - Chemist III - Quality Assurance
- Kyle Smith
  - Environmental Quality Specialist, Pretreatment

Pretreatment Group:
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Pretreatment Compliance Coordinator - PCC
Environmental Services Supervisor/Chief Water Quality Inspector – ESS/CWQI
Environmental Quality Specialist - EQS
Principal Engineering Technician – PET
Water Services Projects Planner - WSPP
(Senior) Water Quality Inspector – (S)WQI

Join us for the next class:

Enforcement
Wednesday, July 24, 2024
WebEx – Webinar & In-Person
9:00 a.m. - 11:00 a.m.

Request class registration using our website:

www.phoenix.gov/IPPCompAcademy

Jesse Flores is the enrollment officer

2024 Compliance Academy Schedule

Class Name	Date
Wastewater Discharge Permit	January 24
Wastewater Compliance Sampling	March 27
Laboratory Analytical Issues	May 22
Enforcement	July 24
Pollution Prevention (P2)	September 25
Stormwater Compliance Overview	November 13

PHX WATER SMART

ENSURE YOUR BUSINESS COMPLIES

WASTEWATER DISCHARGE LAWS

Attend the 2024 Pretreatment Compliance Academy to learn how to maintain compliance with the requirements of the Industrial Pretreatment Program.

- Phoenix has nearly 170 permitted Industrial Facilities that have Wastewater Discharge permits.
- Since 2000, hundreds of participants have graduated from the City of Phoenix Industrial Pretreatment Compliance Academy.

WHAT IS PRETREATMENT AND WHY IS IT IMPORTANT?

Pretreatment means the treatment of wastewater by commercial and industrial facilities to remove harmful pollutants before being discharged to a sewer system under the control of a publicly owned treatment works (POTW), like Phoenix Water Dept.

Most POTWs are designed to treat sanitary (domestic) wastes from households, but not to treat toxic pollutants from industrial or commercial facilities.

2024 PRETREATMENT COMPLIANCE ACADEMY

This training program is designed for Phoenix's Class A, B and C Permitted Industrial Users staff. Register ahead of time for the free virtual/in-person classes that typically run 2 hours.

Participants are awarded 2-3 Professional Development Hours (PDHs) at the end of each class and those who complete all six classes will receive a diploma.

Class Name	*Date*	*Time*	*Enrollment Period*
Wastewater Discharge Permit	January 24	9 – 11 a.m.	Dec 28 – Jan 23
Wastewater Compliance Sampling	March 27	9 – 11 a.m.	Feb 28 – Mar 26
Laboratory Analytical Issues	May 22	8 – 11 a.m.	April 24 – May 21
Enforcement	July 24	9 – 11 a.m.	June 26 – July 23
Pollution Prevention (P2)	September 25	9 – 11 a.m.	Aug 28 – Sept 24
Stormwater Compliance Overview	November 13	9 – 11 a.m.	Oct 16 – Nov 12

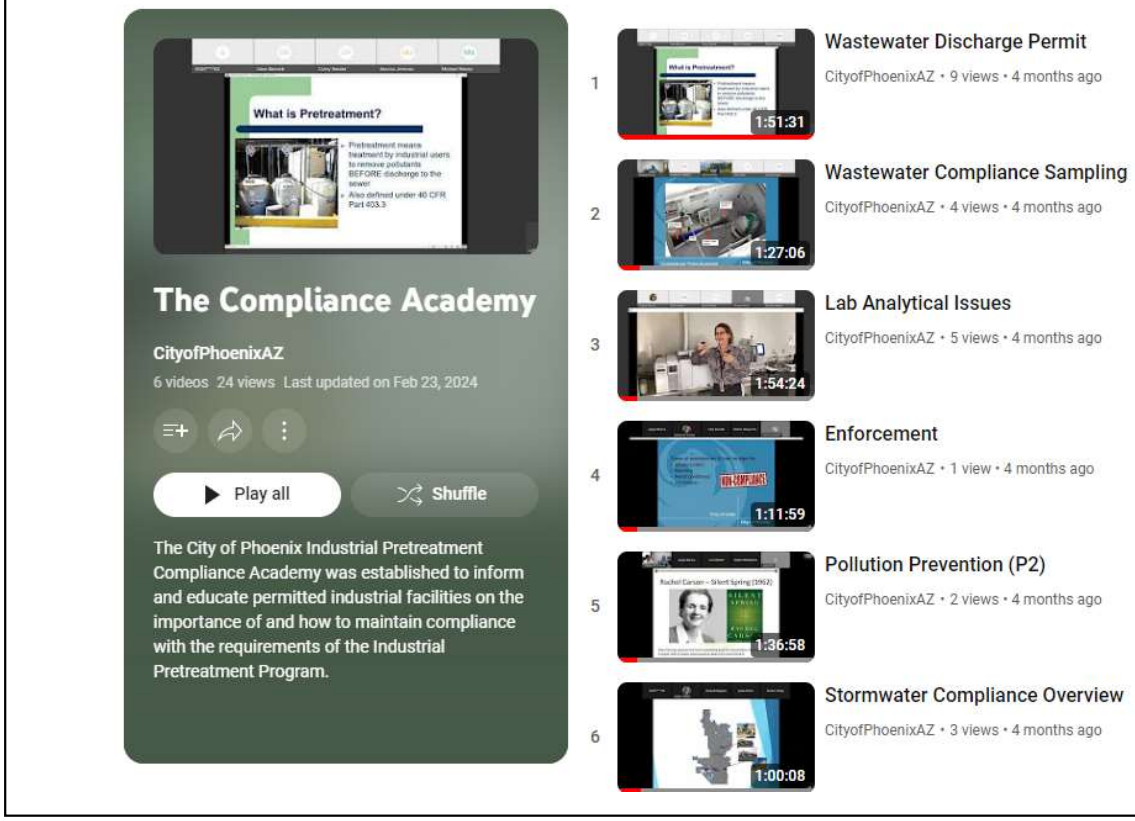
For enrollment status information or confirmations, please contact Principal Engineering Technician - Jesse Flores by phone at (602) 534-7588 or by email at jesse.flores@phoenix.gov.

LEARN MORE AND REGISTER BY VISITING:

phoenix.gov/IPPCompAcademy

CITY OF PHOENIX WATER SERVICES DEPARTMENT | QUALITY. RELIABILITY. VALUE. | PHOENIX.GOV/WATER /PHXWATER

YouTube



- Link to YouTube Channel: https://www.youtube.com/playlist?list=PL22YB12L5NbRHyW8rSF7O1pqfhce_9nGw
- We have recordings for all of our courses available for you to view!

Reminders

- Attendance
- Mute & Chat Functions
- Booklet & Video Link
- Certificates
- Survey Link

- Everyone is muted open entrance under settings. You can unmute yourself but please be respectful of the speakers and other attendees. The chat function will be monitored continuously.

SYLLABUS

- Definitions
- Laboratory Tour – Recording
- ADHS Lab Licensure Requirements
- What Determines the Method I Request?
- Reporting Limits vs. Detection Limits

SYLLABUS- Continued

- QC Documentation
- What a Laboratory Can Do For You
- What to tell the Laboratory
- Quiz

Note: This class contains detailed information. The quiz indicates the minimum “Take-Away” information.

You are not expected to grasp all the details covered in this 2-3-hour session

DEFINITIONS

- Analyte
- Aliquot
- Digestion
- Extraction
- QA / QC
- Calibration

Analyte: Parameter, e.g., Copper, Benzene, Cyanide, pH

Aliquot: A portion of the sample needed to run the analysis.

Digestion: A procedure to solubilize suspended material and to destroy possible organic-metal complexes.

Extraction: A procedure to prepare samples for organic analysis

QA / QC: Quality Assurance / Quality Control

Quality Assurance (QA) is a ***written plan*** that establishes an integrated system of activities to ensure that laboratory data is valid and defensible.

Quality Control (QC) are the activities (Blank, Blank Spike, etc.) performed during analyses to ensure the laboratory methods are acceptable.

Calibration: The determination, by measurement or comparison with a standard, of the correct value of each scale reading on a meter, instrument, or other device.

DEFINITIONS

- Duplicate Sample
- Spiked Sample
- Matrix Spike Duplicate
- Blank
- Blank Spike

Duplicate Sample: Two aliquots of the same sample that are each analyzed for a parameter and used to evaluate reproducibility.

Spiked Sample: A sample with a known amount of a parameter added and used to evaluate sample recovery.

Matrix Spike

Duplicate: A second spiked aliquot of the same sample, analyzed and used to evaluate sample recovery reproducibility.

Blank : Analyte free water analyzed to establish zero or used to check for contamination.

Blank Spike: Analyte free water with a known amount of a parameter added and used to evaluate method recovery.

DEFINITIONS

- CFR
- 40 CFR 136
- AA
- ICP
- GC / MS

CFR:	Code of Federal Regulations
40 CFR 136:	EPA Guidelines establishing test procedures for the analysis of pollutants – Wastewater Methods
AA:	Atomic Absorption Spectrometer
ICP:	Inductively Coupled Plasma
GC / MS:	Gas Chromatograph / Mass Spectrophotometer

DEFINITIONS

- LIMS
- SOPs
- ADHS
- VOC
- SVOC

Attached: Arizona Data Qualifiers, Tables from 40 CFR 136.3, Periodic Table of Elements, Glossary, List of Acronyms, and the List of Federal Point Source Categories

LIMS: Laboratory Information Management System

SOPs: Standard Operating Procedures

ADHS: Arizona Department of Health Services

VOC: Volatile Organic Compounds

SVOC: Semi-Volatile Organic Compounds

Attached: Arizona Data Qualifiers, Tables from 40 CFR 136.3, Periodic Table of Elements, Glossary, Acronyms, List of Federal Point Source Categories

LABORATORY TOUR VIDEO starring Kerri Keller

GOALS w.r.t. PERMIT COMPLIANCE

- Determine which laboratories can be used
- Determine methods for analysis
- Determine reporting limits for analysis
- Understand basics of QC results
- Determine what to request from lab

NOTES:

ADHS Licensed Laboratories

1. Are issued a license for specific media or matrices
2. Are issued a license for specific parameters and methods
3. May be licensed for one analytical method but not another
4. Have a QA / QC program

All laboratories performing environmental compliance analysis that do business in the State of Arizona must be licensed by the Arizona Department of Health Services (ADHS).

Your Wastewater Discharge Permit requires you to use an ADHS licensed laboratory.

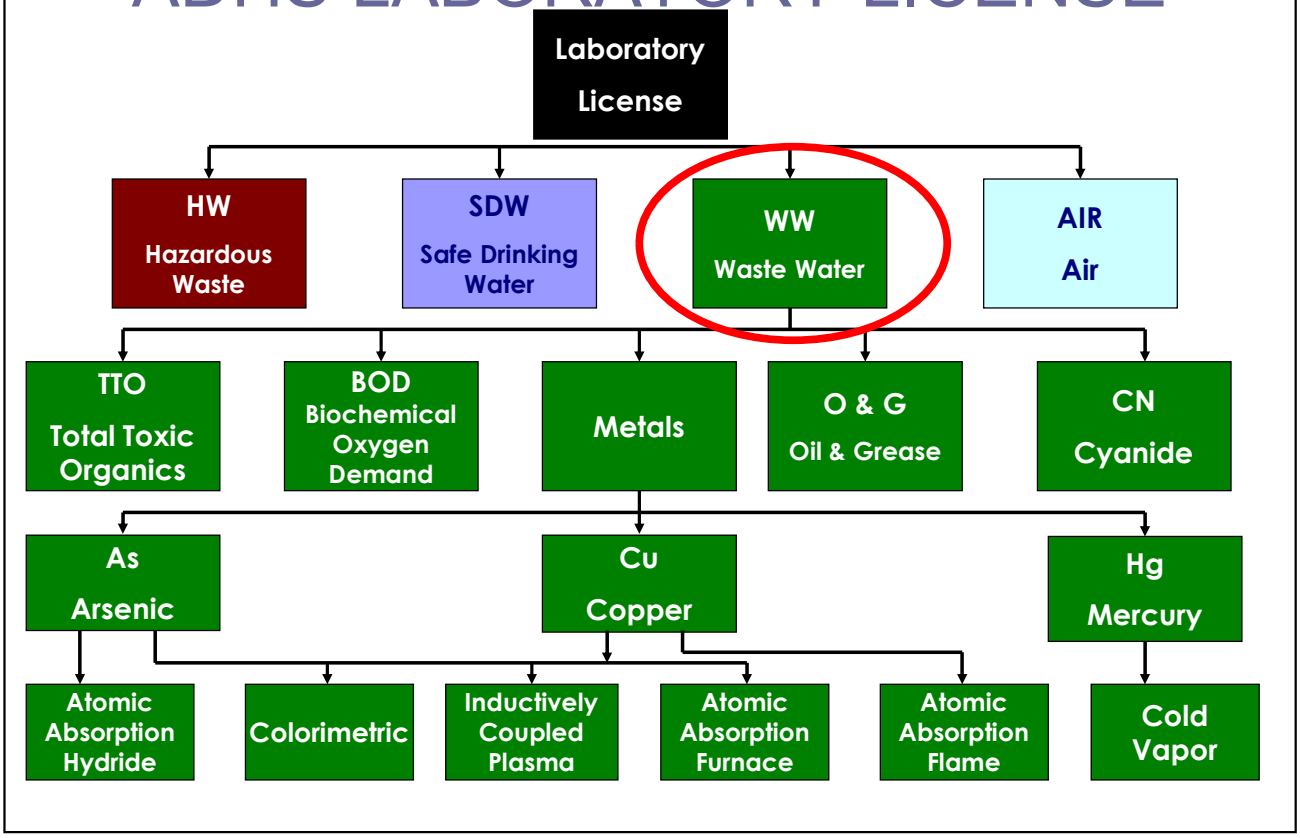
1. The media or matrices are; Safe Drinking Water (SDW), Wastewater (WW), Hazardous Waste(HW), and Air (AIR).
2. These can be Total Cyanide, Copper or Method EPA 1664 HEM for Oil & Grease. A lab that is licensed for one parameter is **NOT** automatically licensed for another parameter.
3. For instance, a lab may be licensed to analyze drinking water samples for copper, but, may not be licensed to analyze copper in wastewater.
4. The QA/QC program must be appropriate for the analysis you need.

ADHS Licensed Laboratories

5. Have demonstrated to ADHS their ability to meet required QA/QC criteria.
6. Use standardized environmental compliance testing methods.
7. Have passed annual ADHS required proficiency tests.
8. Provide the *benefit* of having some confidence in the analytical results provided by the laboratory.

5. QA/QC criteria must be specific to the analysis you need.
6. Methods listed in 40 CFR 136, 40 CFR 140, etc.
7. These proficiency tests consist of appropriate analysis of unknown or "mystery" samples.
8. Without State licensure, periodic state audits, and a QA/QC program there is no way of knowing whether the lab's instrumentation, methodology, results, etc. are valid.

ADHS LABORATORY LICENSE



NOTES:

ARIZONA DEPARTMENT
OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY LICENSE

Issued to:

Laboratory Director: Britney Dempster
Owner/Representative: Ms. Jennifer Calles

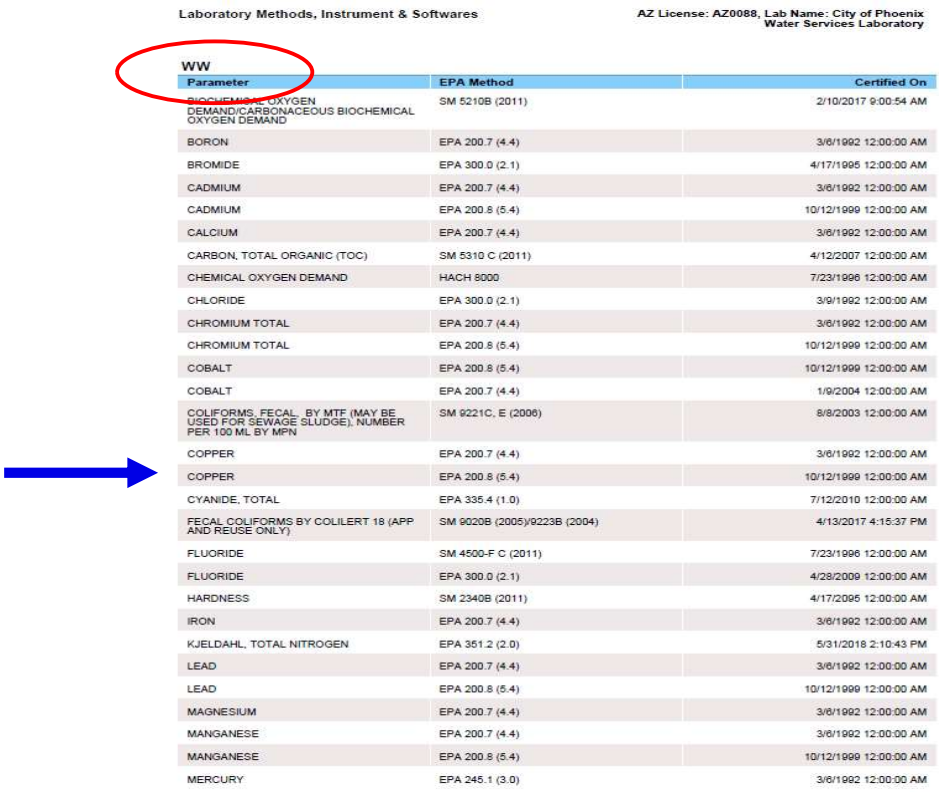
City of Phoenix Water Services Laboratory
AZ0088

is in compliance with Environmental Laboratory's applicable standards for the State of Arizona and maintains on file a List of Parameters for which the laboratory is certified to perform analysis.

PERIOD OF LICENSURE FROM: 05/05/2023 TO: 05/04/2024

Steven D. Baker, Chief
Office of Laboratory Licensure & Certification
Bureau of State Laboratory Services

ADHS LABORATORY LICENSE



Laboratory Methods, Instrument & Softwares

AZ License: AZ0088, Lab Name: City of Phoenix Water Services Laboratory

WW

Parameter	EPA Method	Certified On
BIOCHEMICAL OXYGEN DEMAND/CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND	SM 5210B (2011)	2/10/2017 9:00:54 AM
BORON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
BROMIDE	EPA 300.0 (2.1)	4/17/1995 12:00:00 AM
CADMIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CADMIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CALCIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CARBON, TOTAL ORGANIC (TOC)	SM 5310 C (2011)	4/12/2007 12:00:00 AM
CHEMICAL OXYGEN DEMAND	HACH 8000	7/23/1996 12:00:00 AM
CHLORIDE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
CHROMIUM TOTAL	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CHROMIUM TOTAL	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
COBALT	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
COBALT	EPA 200.7 (4.4)	1/9/2004 12:00:00 AM
COLIFORMS, FECAL, BY MTF (MAY BE USED FOR SEWAGE SLUDGE), NUMBER PER 100 ML BY MPN	SM 9221C, E (2006)	8/8/2003 12:00:00 AM
COPPER	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
COPPER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CYANIDE, TOTAL	EPA 335.4 (1.0)	7/12/2010 12:00:00 AM
FECAL COLIFORMS BY COLILERT 18 (APP AND REUSE ONLY)	SM 9020B (2005)/9223B (2004)	4/13/2017 4:15:37 PM
FLUORIDE	SM 4500-F C (2011)	7/23/1996 12:00:00 AM
FLUORIDE	EPA 300.0 (2.1)	4/28/2009 12:00:00 AM
HARDNESS	SM 2340B (2011)	4/17/2095 12:00:00 AM
IRON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
KJELDAHL, TOTAL NITROGEN	EPA 351.2 (2.0)	5/31/2018 2:10:43 PM
LEAD	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
LEAD	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MAGNESIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MERCURY	EPA 245.1 (3.0)	3/6/1992 12:00:00 AM

WW- Wastewater

The License will list all the parameters and methods the lab has been certified to analyze. The total amount of parameters is listed on the bottom of each parameter section.

ADHS LABORATORY LICENSE

Laboratory Methods, Instrument & Softwares

AZ License: AZ0088, Lab Name: City of Phoenix Water Services Laboratory

SDW

Parameter	EPA Method	Certified On
CYANIDE	EPA 335.4 (1.0)	7/12/2010 12:00:00 AM
CYLINDROSPERMOPSIN AND ANATOXIN-A (LC/ESI-MS/MS)	EPA 545	1/12/2018 12:55:05 PM
FLUORIDE	SM 4500-F C (2011)	7/23/1996 12:00:00 AM
FLUORIDE	EPA 300.0 (2.1)	4/28/2009 12:00:00 AM
GERMANIUM (ICP/MS)	EPA 200.8 (REV 5.4)	1/12/2018 12:56:48 PM
GIARDIA AND CRYPTOSPORIDIUM	EPA 1623	12/18/2014 12:00:00 AM
GLYPHOSATE	EPA 547 (7/90)	11/13/2000 12:00:00 AM
HALOACETIC ACIDS & DALAPON	EPA 552.3 (1.0)	9/12/2017 9:10:21 AM
HARDNESS	SM 2340 B (2011), CA AND MG	7/23/1996 12:00:00 AM
HETEROTROPHIC PLATE COUNT	SIMPLATE	6/16/2005 12:00:00 AM
IRON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
LEAD	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MAGNESIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MERCURY	EPA 245.1 (3.0)	4/16/1998 12:00:00 AM
MICROCYSTINS AND NODULARIN (SPE AND LC/MS/MS)	EPA 544	1/12/2018 12:55:05 PM
MOLYBDENUM	EPA 200.8 (5.4)	4/24/2013 12:00:00 AM
NICKEL	EPA 200.7 (4.4)	5/15/2000 12:00:00 AM
NICKEL	EPA 200.8 (5.4)	1/12/2000 12:00:00 AM
NITRATE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
NITRITE	EPA 300.0 (2.1)	4/19/1995 12:00:00 AM
ORGANICS BY GC/MS	EPA 525.2 (2.0)	10/29/2007 12:00:00 AM
ORTHOPHOSPHATE	EPA 300.0 (2.1)	4/16/1998 12:00:00 AM
RESIDUE, FILTERABLE (TDS)	SM 2540 C (2011)	7/23/1996 12:00:00 AM
SELENIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SILICA	EPA 200.7 (4.4)	4/25/2001 12:00:00 AM
SILVER	EPA 200.7 (4.4)	4/16/1998 12:00:00 AM
SILVER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SODIUM	EPA 200.7 (4.4)	9/27/2001 12:00:00 AM

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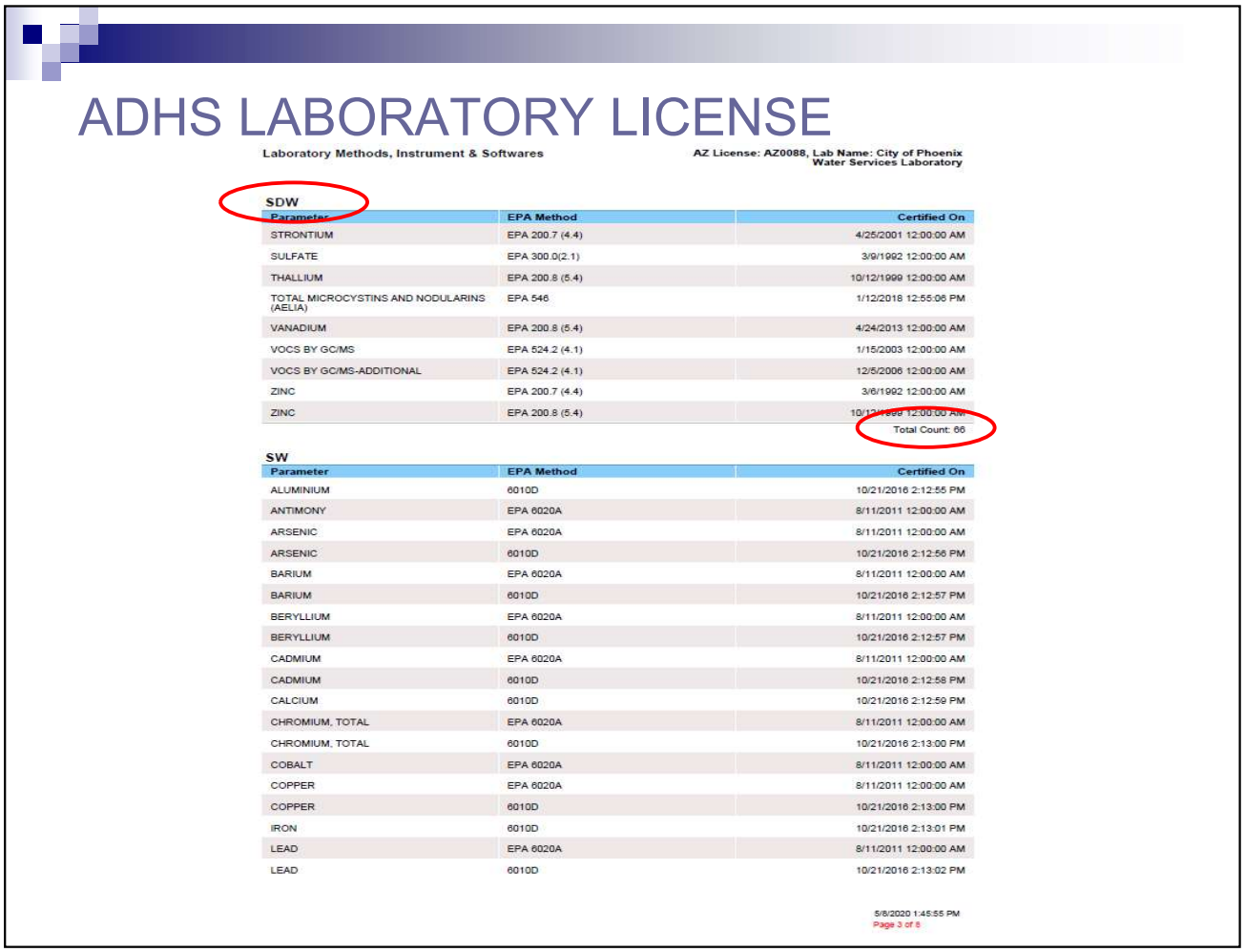
SDW - Safe Drinking water

ADHS LABORATORY LICENSE



Laboratory Methods, Instrument & Softwares

AZ License: AZ0088, Lab Name: City of Phoenix Water Services Laboratory

SDW

Parameter	EPA Method	Certified On
STRONTIUM	EPA 200.7 (4.4)	4/25/2001 12:00:00 AM
SULFATE	EPA 300.0(2.1)	3/9/1992 12:00:00 AM
THALLIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
TOTAL MICROCYSTINS AND NODULARINS (AELIA)	EPA 546	1/12/2018 12:55:06 PM
VANADIUM	EPA 200.8 (5.4)	4/24/2013 12:00:00 AM
VOCS BY GC/MS	EPA 524.2 (4.1)	1/15/2003 12:00:00 AM
VOCS BY GC/MS-ADDITIONAL	EPA 524.2 (4.1)	12/5/2006 12:00:00 AM
ZINC	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
ZINC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM

Total Count: 66

SW

Parameter	EPA Method	Certified On
ALUMINIUM	6010D	10/21/2016 2:12:55 PM
ANTIMONY	EPA 6020A	8/11/2011 12:00:00 AM
ARSENIC	EPA 6020A	8/11/2011 12:00:00 AM
ARSENIC	6010D	10/21/2016 2:12:56 PM
BARIUM	EPA 6020A	8/11/2011 12:00:00 AM
BARIUM	6010D	10/21/2016 2:12:57 PM
BERYLLIUM	EPA 6020A	8/11/2011 12:00:00 AM
BERYLLIUM	6010D	10/21/2016 2:12:57 PM
CADMIUM	EPA 6020A	8/11/2011 12:00:00 AM
CADMIUM	6010D	10/21/2016 2:12:58 PM
CALCIUM	6010D	10/21/2016 2:12:59 PM
CHROMIUM, TOTAL	EPA 6020A	8/11/2011 12:00:00 AM
CHROMIUM, TOTAL	6010D	10/21/2016 2:13:00 PM
COBALT	EPA 6020A	8/11/2011 12:00:00 AM
COPPER	EPA 6020A	8/11/2011 12:00:00 AM
COPPER	6010D	10/21/2016 2:13:00 PM
IRON	6010D	10/21/2016 2:13:01 PM
LEAD	EPA 6020A	8/11/2011 12:00:00 AM
LEAD	6010D	10/21/2016 2:13:02 PM

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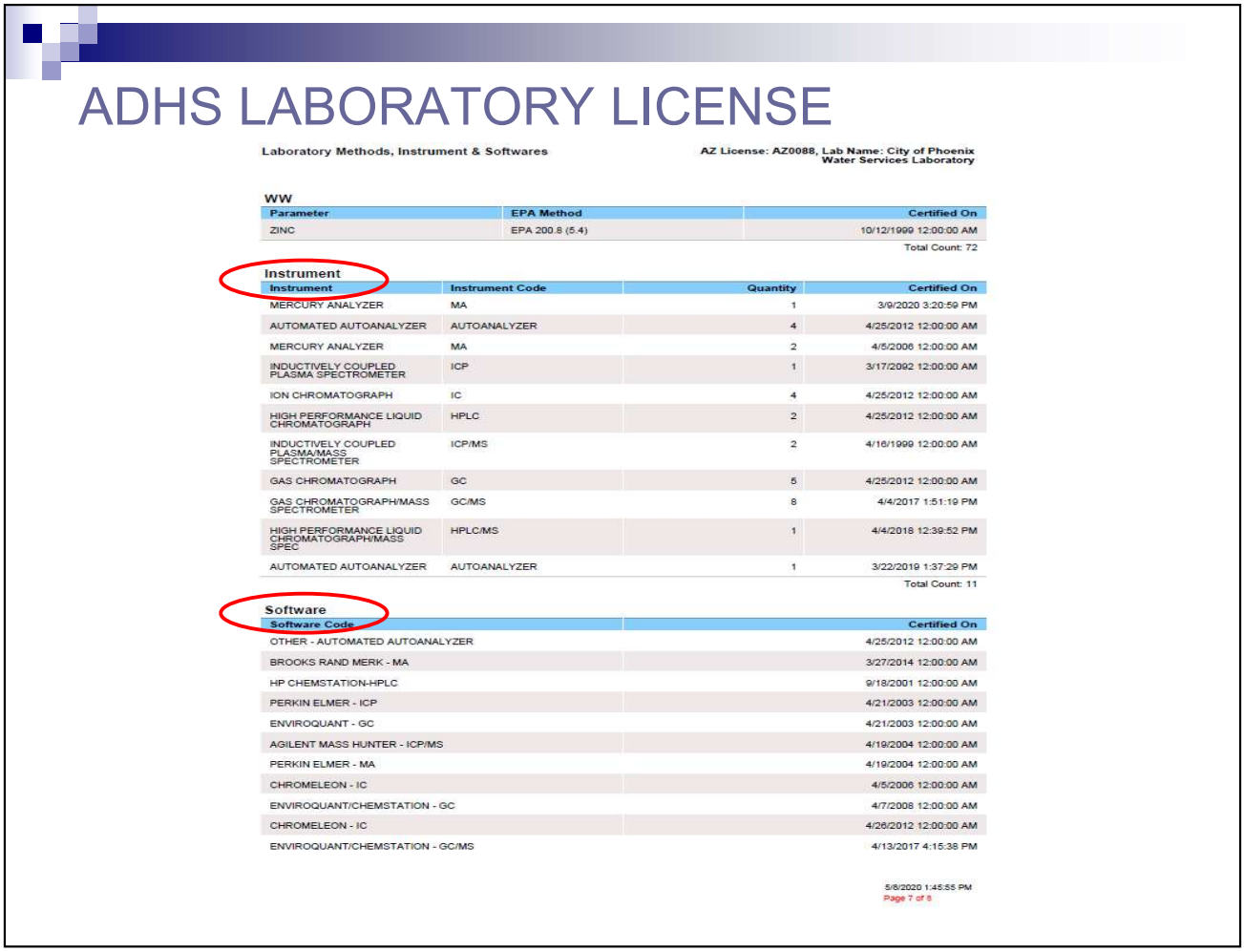
SW (solid waste) is interchangeable with Hazardous waste (HW) on the actual certificate.

ADHS LABORATORY LICENSE



Laboratory Methods, Instrument & Softwares

AZ License: AZ0088, Lab Name: City of Phoenix Water Services Laboratory

WW

Parameter	EPA Method	Certified On
ZINC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM

Total Count: 72

Instrument

Instrument	Instrument Code	Quantity	Certified On
MERCURY ANALYZER	MA	1	3/9/2020 3:20:59 PM
AUTOMATED AUTOANALYZER	AUTOANALYZER	4	4/25/2012 12:00:00 AM
MERCURY ANALYZER	MA	2	4/5/2006 12:00:00 AM
INDUCTIVELY COUPLED PLASMA SPECTROMETER	ICP	1	3/17/2092 12:00:00 AM
ION CHROMATOGRAPH	IC	4	4/25/2012 12:00:00 AM
HIGH PERFORMANCE LIQUID CHROMATOGRAPH	HPLC	2	4/25/2012 12:00:00 AM
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	ICP/MS	2	4/16/1999 12:00:00 AM
GAS CHROMATOGRAPH	GC	5	4/25/2012 12:00:00 AM
GAS CHROMATOGRAPH/MASS SPECTROMETER	GC/MS	8	4/4/2017 1:51:19 PM
HIGH PERFORMANCE LIQUID CHROMATOGRAPH/MASS SPEC	HPLC/MS	1	4/4/2018 12:39:52 PM
AUTOMATED AUTOANALYZER	AUTOANALYZER	1	3/22/2019 1:37:29 PM

Total Count: 11

Software

Software Code	Certified On
OTHER - AUTOMATED AUTOANALYZER	4/25/2012 12:00:00 AM
BROOKS RAND MERK - MA	3/27/2014 12:00:00 AM
HP CHEMSTATION-HPLC	9/18/2001 12:00:00 AM
PERKIN ELMER - ICP	4/21/2003 12:00:00 AM
ENVIROQUANT - GC	4/21/2003 12:00:00 AM
AGILENT MASS HUNTER - ICP/MS	4/19/2004 12:00:00 AM
PERKIN ELMER - MA	4/19/2004 12:00:00 AM
CHROMELEON - IC	4/5/2006 12:00:00 AM
ENVIROQUANT/CHEMSTATION - GC	4/7/2008 12:00:00 AM
CHROMELEON - IC	4/26/2012 12:00:00 AM
ENVIROQUANT/CHEMSTATION - GC/MS	4/13/2017 4:15:38 PM

5/8/2020 1:45:55 PM
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The certificate will also list the instruments and software the laboratory is certified to use. Be sure that all of these components of their certification will meet the needs of the Wastewater discharge permit.

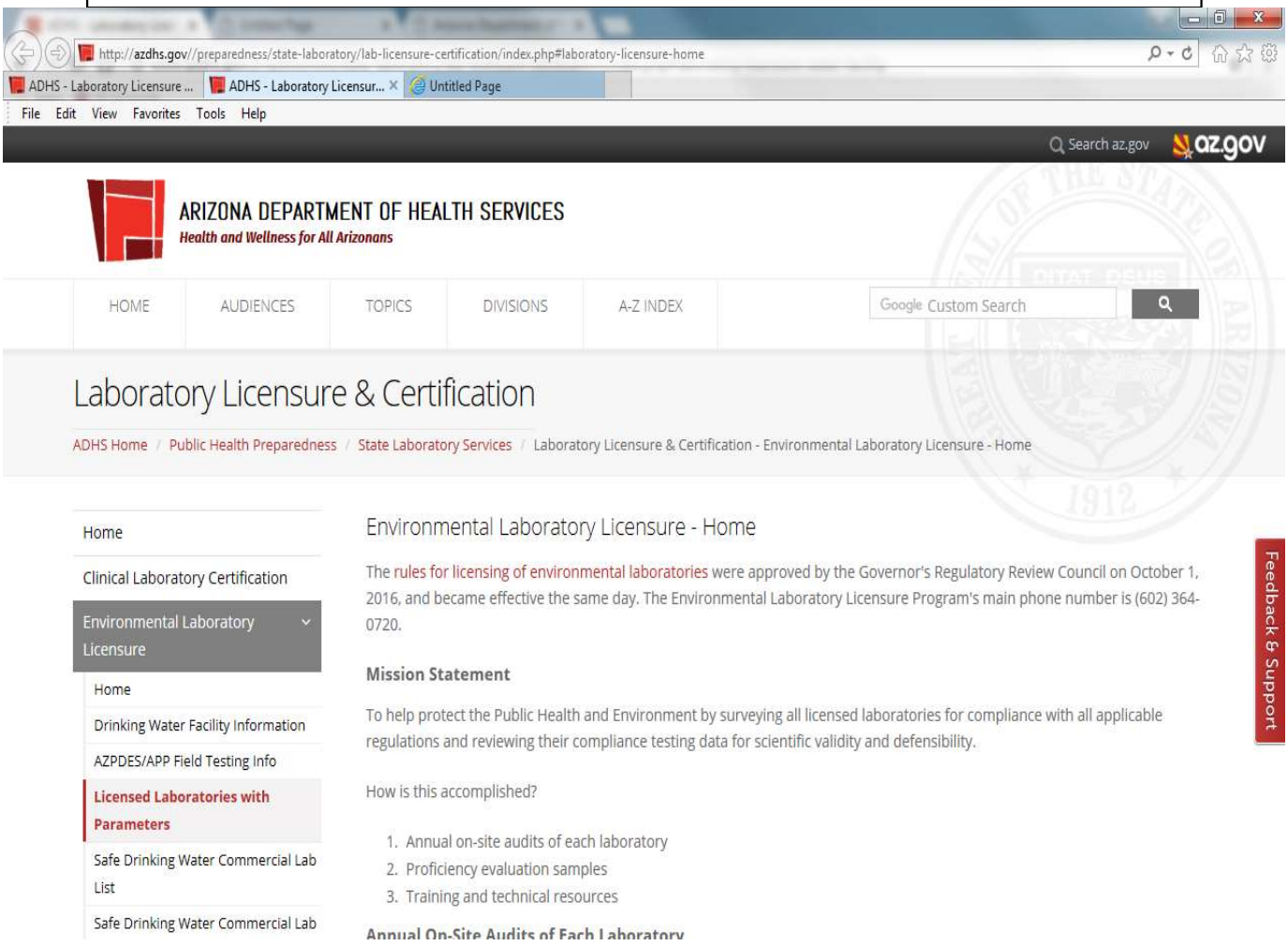
ADHS LABORATORY LICENSE

License and Audits for *any* ADHS licensed lab can be reviewed at:

ADHS Licensing Services
150 North 18th Avenue
Phoenix Arizona 85007
602-364-0720
Fax: 602-364-0759

https://app.azdhs.gov/BFS/LABS/ELBIS/ArizonaCertifiedLabs/LabSearchContentPage.aspx

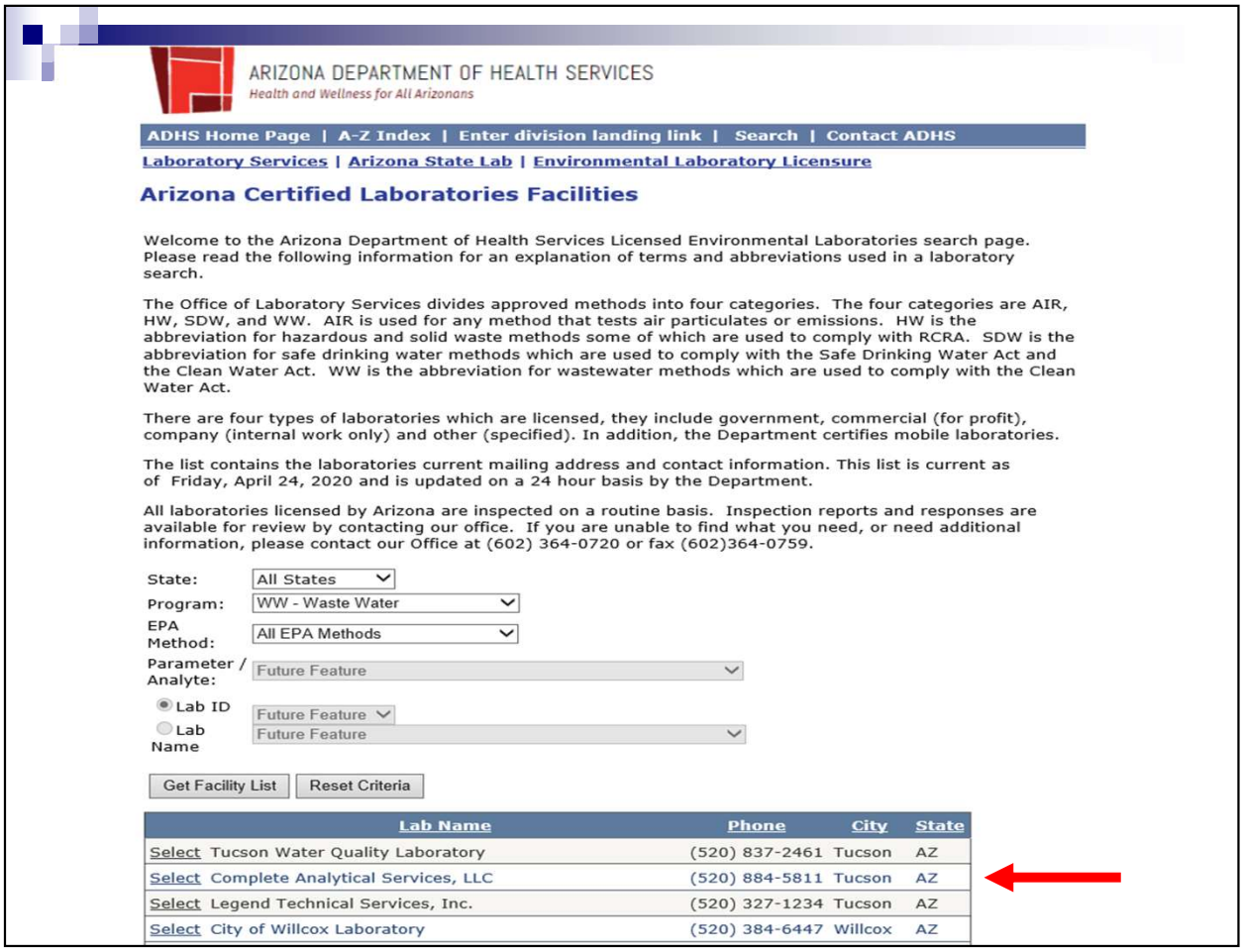
NOTE: Deficiencies are not public information until a response is received from the laboratory.

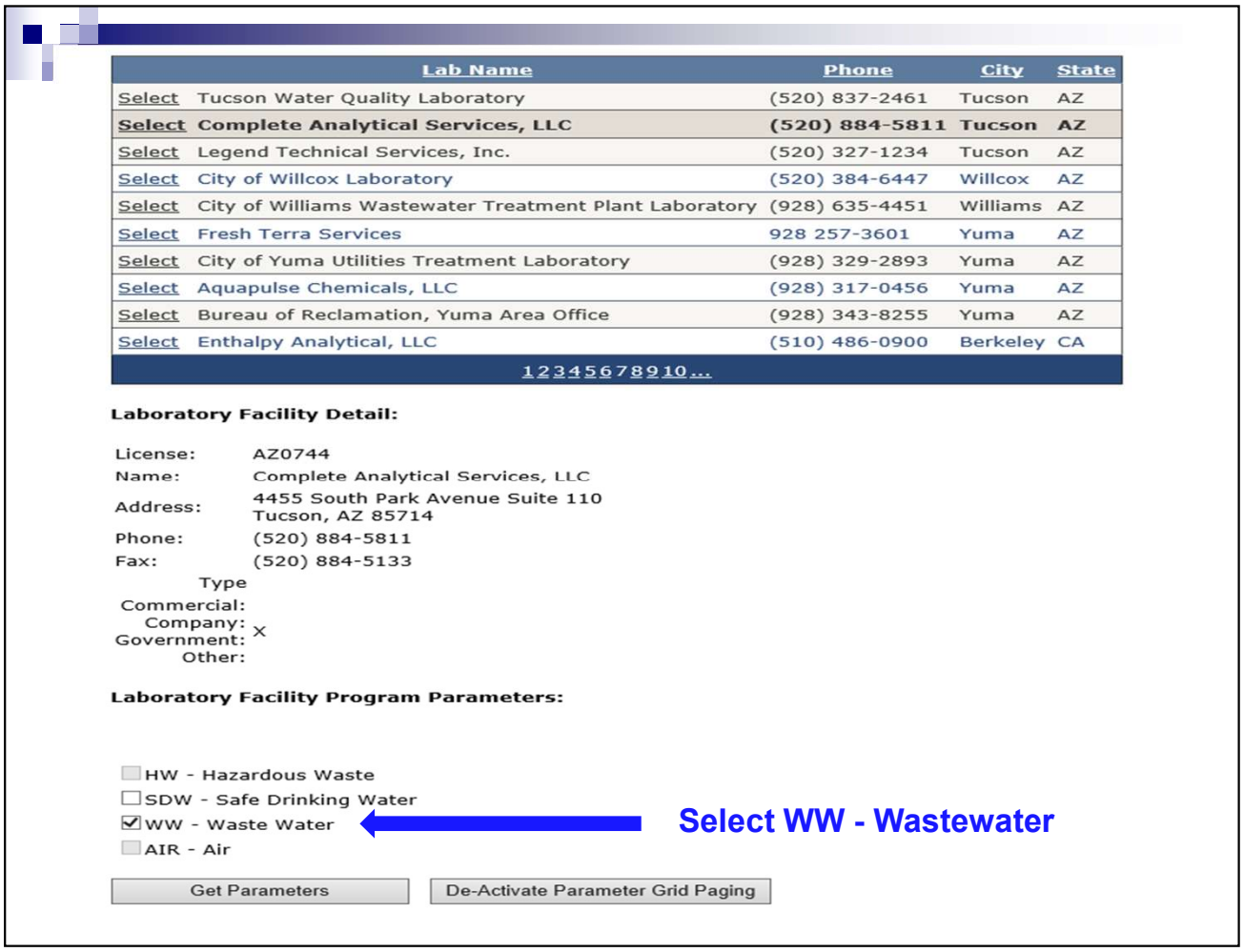


Question #1

Can you use Complete Analytical Services, LLC located in Tucson, AZ for the analysis of Copper for your compliance samples?

NOTES:


ARIZONA DEPARTMENT OF HEALTH SERVICES
Health and Wellness for All Arizonans
ADHS Home Page | A-Z Index | Enter division landing link | Search | Contact ADHS
Laboratory Services | Arizona State Lab | Environmental Laboratory Licensure
Arizona Certified Laboratories Facilities
Welcome to the Arizona Department of Health Services Licensed Environmental Laboratories search page. Please read the following information for an explanation of terms and abbreviations used in a laboratory search.
The Office of Laboratory Services divides approved methods into four categories. The four categories are AIR, HW, SDW, and WW. AIR is used for any method that tests air particulates or emissions. HW is the abbreviation for hazardous and solid waste methods some of which are used to comply with RCRA. SDW is the abbreviation for safe drinking water methods which are used to comply with the Safe Drinking Water Act and the Clean Water Act. WW is the abbreviation for wastewater methods which are used to comply with the Clean Water Act.
There are four types of laboratories which are licensed, they include government, commercial (for profit), company (internal work only) and other (specified). In addition, the Department certifies mobile laboratories.
The list contains the laboratories current mailing address and contact information. This list is current as of Friday, April 24, 2020 and is updated on a 24 hour basis by the Department.
All laboratories licensed by Arizona are inspected on a routine basis. Inspection reports and responses are available for review by contacting our office. If you are unable to find what you need, or need additional information, please contact our Office at (602) 364-0720 or fax (602)364-0759.
State: All States
Program: WW - Waste Water
EPA Method: All EPA Methods
Parameter / Analyte: Future Feature
Lab ID Future Feature
Lab Name Future Feature
Get Facility List
Reset Criteria
Lab Name | Phone | City | State
Select Tucson Water Quality Laboratory (520) 837-2461 Tucson AZ
Select Complete Analytical Services, LLC (520) 884-5811 Tucson AZ
Select Legend Technical Services, Inc. (520) 327-1234 Tucson AZ
Select City of Willcox Laboratory (520) 384-6447 Willcox AZ


Lab Name
Phone
City
State
Select Tucson Water Quality Laboratory (520) 837-2461 Tucson AZ
Select Complete Analytical Services, LLC (520) 884-5811 Tucson AZ
Select Legend Technical Services, Inc. (520) 327-1234 Tucson AZ
Select City of Willcox Laboratory (520) 384-6447 Willcox AZ
Select City of Williams Wastewater Treatment Plant Laboratory (928) 635-4451 Williams AZ
Select Fresh Terra Services 928 257-3601 Yuma AZ
Select City of Yuma Utilities Treatment Laboratory (928) 329-2893 Yuma AZ
Select Aquapulse Chemicals, LLC (928) 317-0456 Yuma AZ
Select Bureau of Reclamation, Yuma Area Office (928) 343-8255 Yuma AZ
Select Enthalpy Analytical, LLC (510) 486-0900 Berkeley CA
1 2 3 4 5 6 7 8 9 10 ...
Laboratory Facility Detail:
License: AZ0744
Name: Complete Analytical Services, LLC
Address: 4455 South Park Avenue Suite 110 Tucson, AZ 85714
Phone: (520) 884-5811
Fax: (520) 884-5133
Type
Commercial:
Company:
Government: X
Other:
Laboratory Facility Program Parameters:
HW - Hazardous Waste
SDW - Safe Drinking Water
WW - Waste Water
AIR - Air
Select WW - Wastewater
Get Parameters
De-Activate Parameter Grid Paging

NOTES:

Laboratory Facility Detail:

License: AZ0744
Name: Complete Analytical Services, LLC
Address: 4455 South Park Avenue Suite 110
Tucson, AZ 85714
Phone: (520) 884-5811
Fax: (520) 884-5133

Type	
Commercial:	
Company:	
Government:	X
Other:	

Laboratory Facility Program Parameters:

- ☐ HW - Hazardous Waste
- ☐ SDW - Safe Drinking Water
- ☑ WW - Waste Water
- ☐ AIR - Air

Get Parameters | De-Activate Parameter Grid Paging

Program	Parameter	EPA Method	Cert Date
WW	CHEMICAL OXYGEN DEMAND	HACH 8000	11/20/2007
WW	HYDROGEN ION (pH)	SM 4500-H B (2011)	11/26/2007
WW	OIL AND GREASE AND PETROLEUM HYDROCARBONS	EPA 1664 REV B	12/19/2016
WW	RESIDUE NONFILTERABLE (TSS)	SM 2540D (2011)	11/20/2007

NOTES:

Question # 1

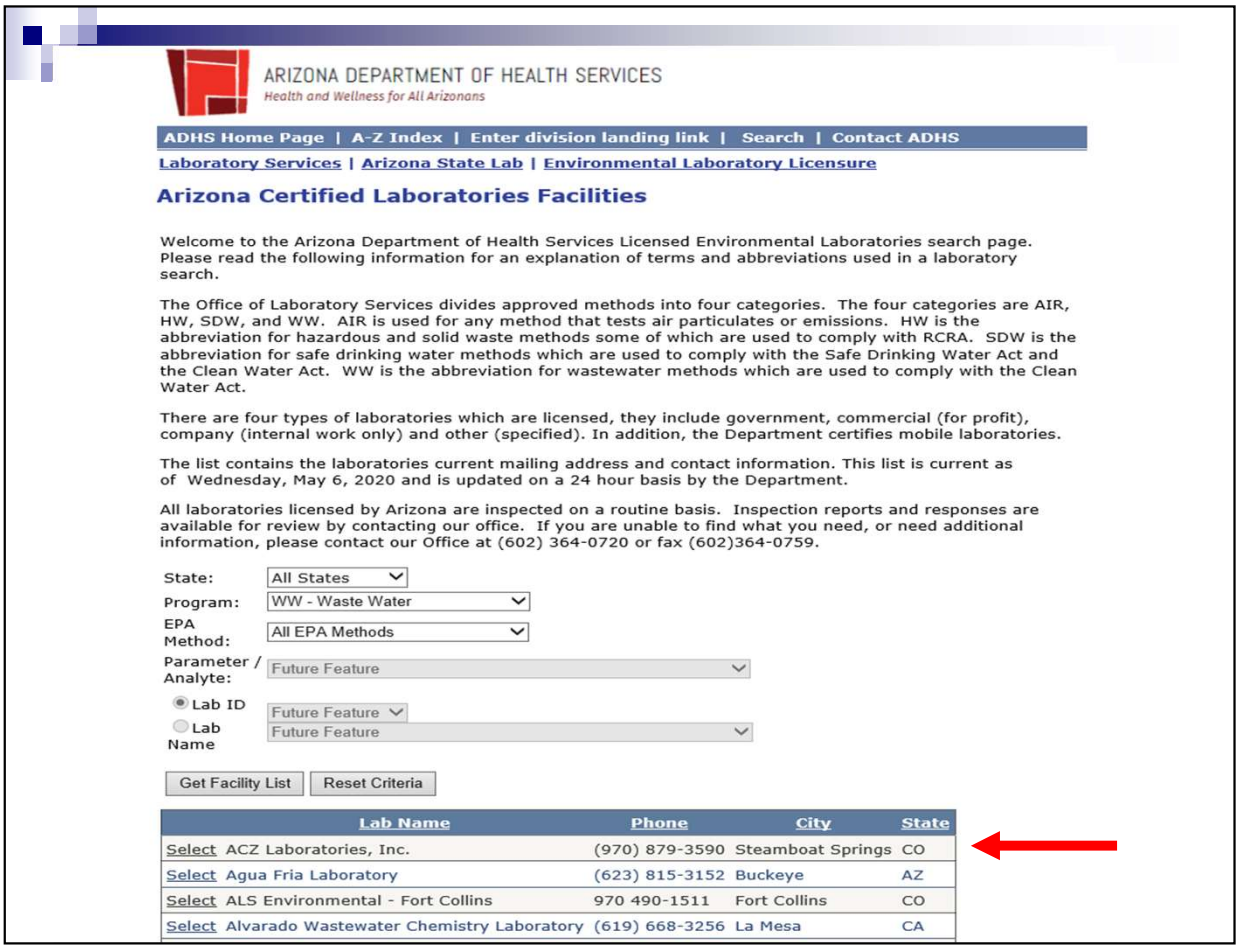
Can you use Complete Analytical Services, LLC located in Tucson, AZ for the analysis of Copper for your compliance samples?

NO

NOTES:

Question #2

Can you use ACZ Laboratories, Inc. located in Steamboat Springs, CO for the analysis of your Copper compliance samples?



ARIZONA DEPARTMENT OF HEALTH SERVICES
Health and Wellness for All Arizonans

ADHS Home Page | A-Z Index | Enter division landing link | Search | Contact ADHS

Laboratory Services | Arizona State Lab | Environmental Laboratory Licensure

Arizona Certified Laboratories Facilities

Welcome to the Arizona Department of Health Services Licensed Environmental Laboratories search page. Please read the following information for an explanation of terms and abbreviations used in a laboratory search.

The Office of Laboratory Services divides approved methods into four categories. The four categories are AIR, HW, SDW, and WW. AIR is used for any method that tests air particulates or emissions. HW is the abbreviation for hazardous and solid waste methods some of which are used to comply with RCRA. SDW is the abbreviation for safe drinking water methods which are used to comply with the Safe Drinking Water Act and the Clean Water Act. WW is the abbreviation for wastewater methods which are used to comply with the Clean Water Act.

There are four types of laboratories which are licensed, they include government, commercial (for profit), company (internal work only) and other (specified). In addition, the Department certifies mobile laboratories.

The list contains the laboratories current mailing address and contact information. This list is current as of Wednesday, May 6, 2020 and is updated on a 24 hour basis by the Department.

All laboratories licensed by Arizona are inspected on a routine basis. Inspection reports and responses are available for review by contacting our office. If you are unable to find what you need, or need additional information, please contact our Office at (602) 364-0720 or fax (602)364-0759.

State: All States
Program: WW - Waste Water
EPA Method: All EPA Methods
Parameter / Analyte: Future Feature
Lab ID: Future Feature
Lab Name: Future Feature

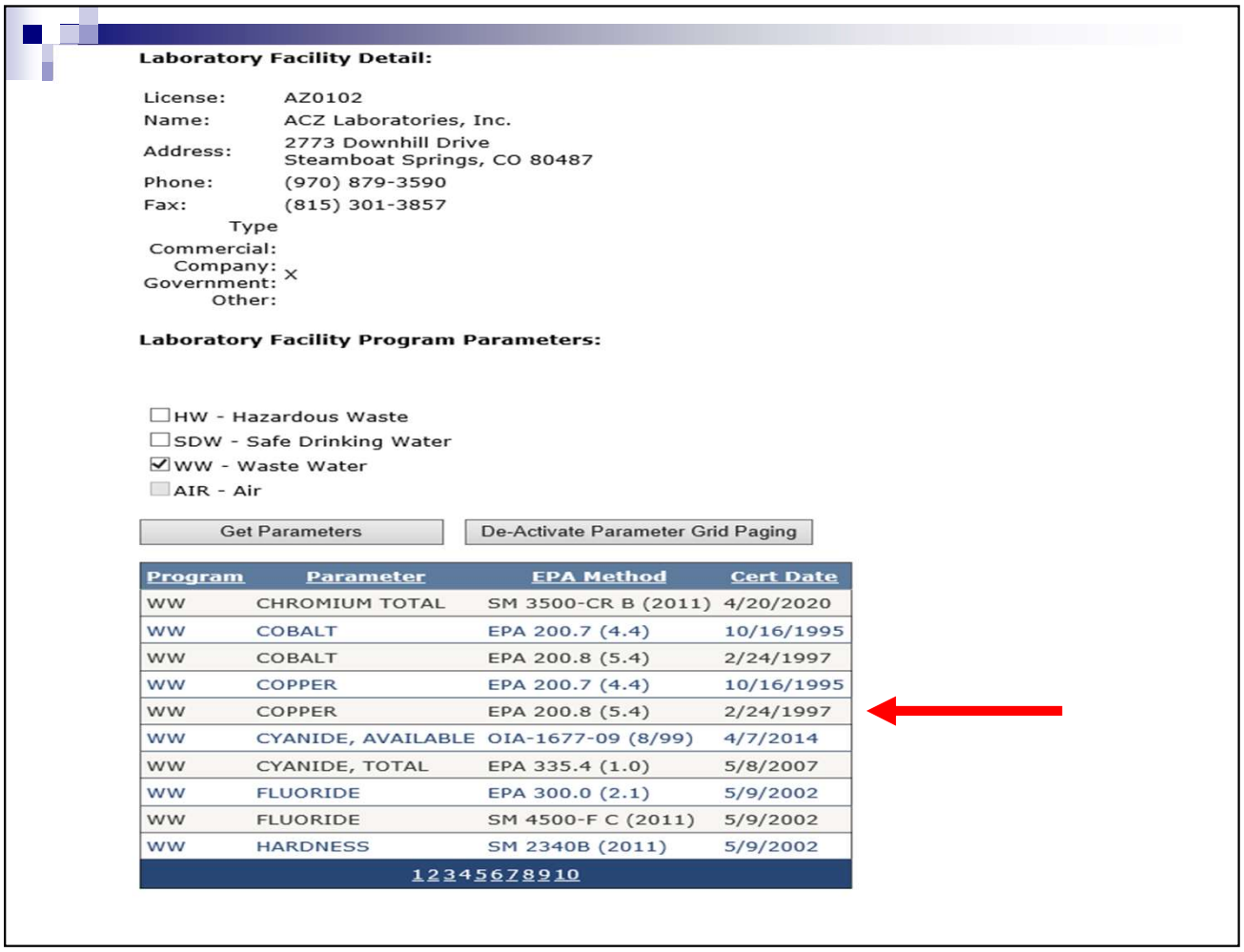
Get Facility List | Reset Criteria

Lab Name	Phone	City	State
Select ACZ Laboratories, Inc.	(970) 879-3590	Steamboat Springs	CO
Select Agua Fria Laboratory	(623) 815-3152	Buckeye	AZ
Select ALS Environmental - Fort Collins	970 490-1511	Fort Collins	CO
Select Alvarado Wastewater Chemistry Laboratory	(619) 668-3256	La Mesa	CA

NOTES:


Lab Name
Phone
City
State
Select ACZ Laboratories, Inc. (970) 879-3590 Steamboat Springs CO
Select Agua Fria Laboratory (623) 815-3152 Buckeye AZ
Select ALS Environmental - Fort Collins 970 490-1511 Fort Collins CO
Select Alvarado Wastewater Chemistry Laboratory (619) 668-3256 La Mesa CA
Select Anatek Labs, Inc 208-883-2839 Moscow ID
Select Apex Analytical Laboratory, LLC (602) 437-0762 Tempe AZ
Select APS Water Resources Lab (623) 393-3093 Tonopah AZ
Select Aquapulse Chemicals, LLC (928) 317-0456 Yuma AZ
Select Aquatic Consulting & Testing, Inc. (480) 921-8044 Tempe AZ
Select Arconic Fastening Systems (520) 519-7554 Tucson AZ
1 2 3 4 5 6 7 8 9 10 ...
Laboratory Facility Detail:
License: AZ0102
Name: ACZ Laboratories, Inc.
Address: 2773 Downhill Drive
Steamboat Springs, CO 80487
Phone: (970) 879-3590
Fax: (815) 301-3857
Type
Commercial:
Company:
Government: X
Other:
Laboratory Facility Program Parameters:
HW - Hazardous Waste
SDW - Safe Drinking Water
WW - Waste Water
AIR - Air
Select WW - Wastewater
Get Parameters
De-Activate Parameter Grid Paging

NOTES:



Laboratory Facility Detail:

License: AZ0102
Name: ACZ Laboratories, Inc.
Address: 2773 Downhill Drive
Steamboat Springs, CO 80487
Phone: (970) 879-3590
Fax: (815) 301-3857

Type	
Commercial:	
Company:	
Government:	X
Other:	

Laboratory Facility Program Parameters:

- ☐ HW - Hazardous Waste
- ☐ SDW - Safe Drinking Water
- ☑ WW - Waste Water
- ☐ AIR - Air

Get Parameters | De-Activate Parameter Grid Paging

Program	Parameter	EPA Method	Cert Date
WW	CHROMIUM TOTAL	SM 3500-CR B (2011)	4/20/2020
WW	COBALT	EPA 200.7 (4.4)	10/16/1995
WW	COBALT	EPA 200.8 (5.4)	2/24/1997
WW	COPPER	EPA 200.7 (4.4)	10/16/1995
WW	COPPER	EPA 200.8 (5.4)	2/24/1997
WW	CYANIDE, AVAILABLE	OIA-1677-09 (8/99)	4/7/2014
WW	CYANIDE, TOTAL	EPA 335.4 (1.0)	5/8/2007
WW	FLUORIDE	EPA 300.0 (2.1)	5/9/2002
WW	FLUORIDE	SM 4500-F C (2011)	5/9/2002
WW	HARDNESS	SM 2340B (2011)	5/9/2002

1 2 3 4 5 6 7 8 9 10

NOTES:

Question # 2

Can you use ACZ Laboratories, Inc. located in Steamboat Springs, CO for the analysis of your Copper compliance samples?

YES

NOTES:

What Determines the METHOD I Request?

For *most* parameters, the City does ***not*** specify analytical procedures.

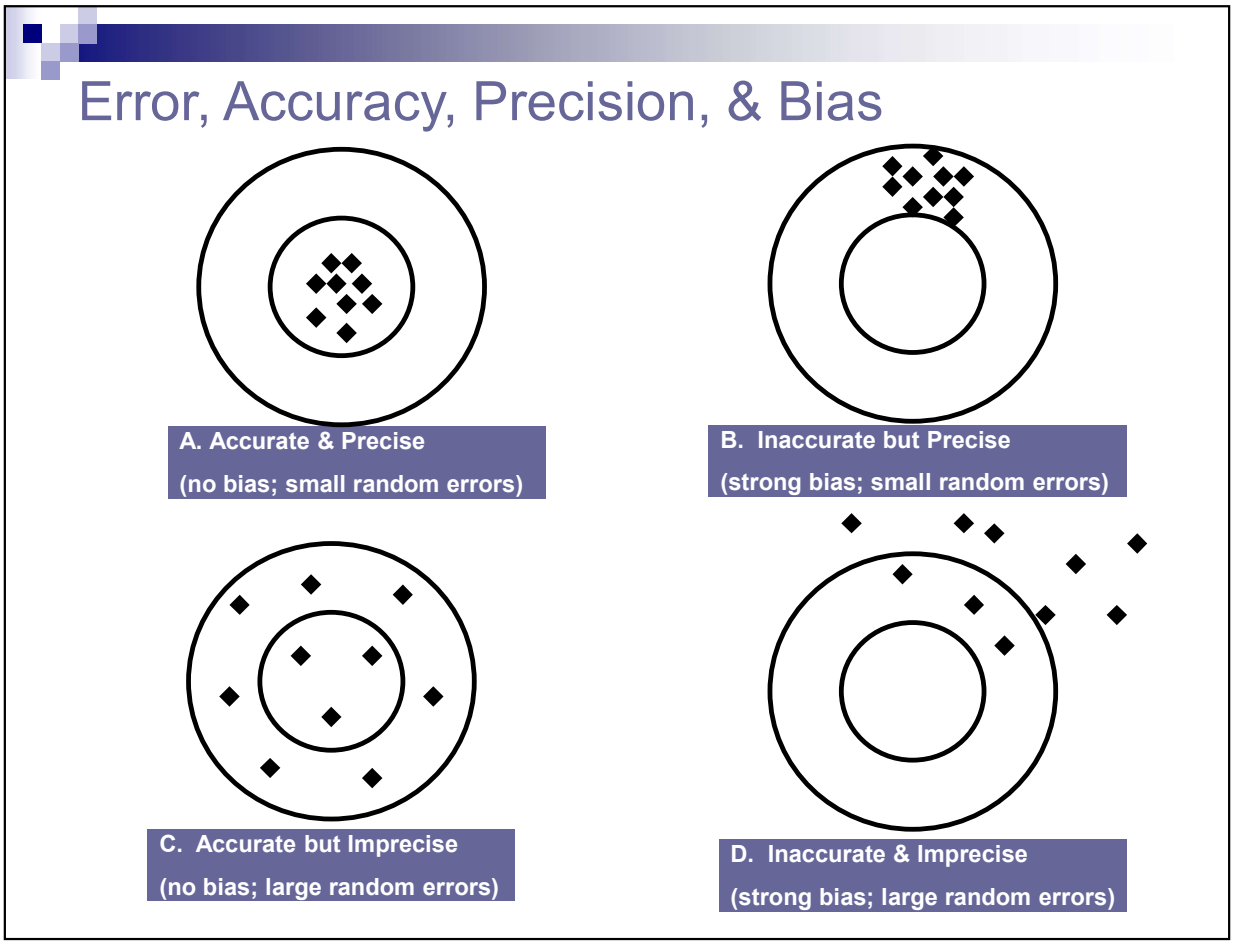
Choosing which analytical test method to request for demonstrating compliance depends on:

- Wastewater Discharge Permit Limits & Conditions
- Phoenix City Code, Chapter 28 - Sewers
- 40 CFR 136.3 **https://www.ecfr.gov**
- 40 CFR 403, 405 – 471 Point Source Categories for Categorical Industrial Users (CIU's)
- ADHS Method Licensure Availability

1. Standard Permit Conditions Part D (a) of your Wastewater Discharge Permit (Permit) requires the use of "Approved Laboratory Procedures." The Permit may also restrict the test method and/or require the use of a particular method approved by 40 CFR 136 (such as for Total Copper).
2. EPA specifies test methods that are approved for use in wastewater analysis in 40 CFR 136. Tables 1A, 1B, and 1C in Part 136.3 list the various analytical methods that may be used to analyze for a pollutant parameter. Part 136.2(e) allows alternative procedures to be proposed for approval by the EPA. ***This is not easy to do; in fact, it is quite difficult.***
3. Federal Categorical Regulations may also specify a method. For example, the Can Making regulation (40 CFR 465-D) specifies EPA Method 1664 Silica Gel Treated Hexane Extractable Material for the analysis of Oil & Grease.

BREAK TIME!!

10 minutes please. Thank you!



Error: Error is the collective noun for any departure of the result from the "true" value*. Analytical errors can be:

1. Random or unpredictable deviations between replicates, quantified with the "standard deviation".

2. Systematic or predictable regular deviation from the "true" value, quantified as "mean difference" (i.e. the difference between the true value and the mean of replicate determinations).

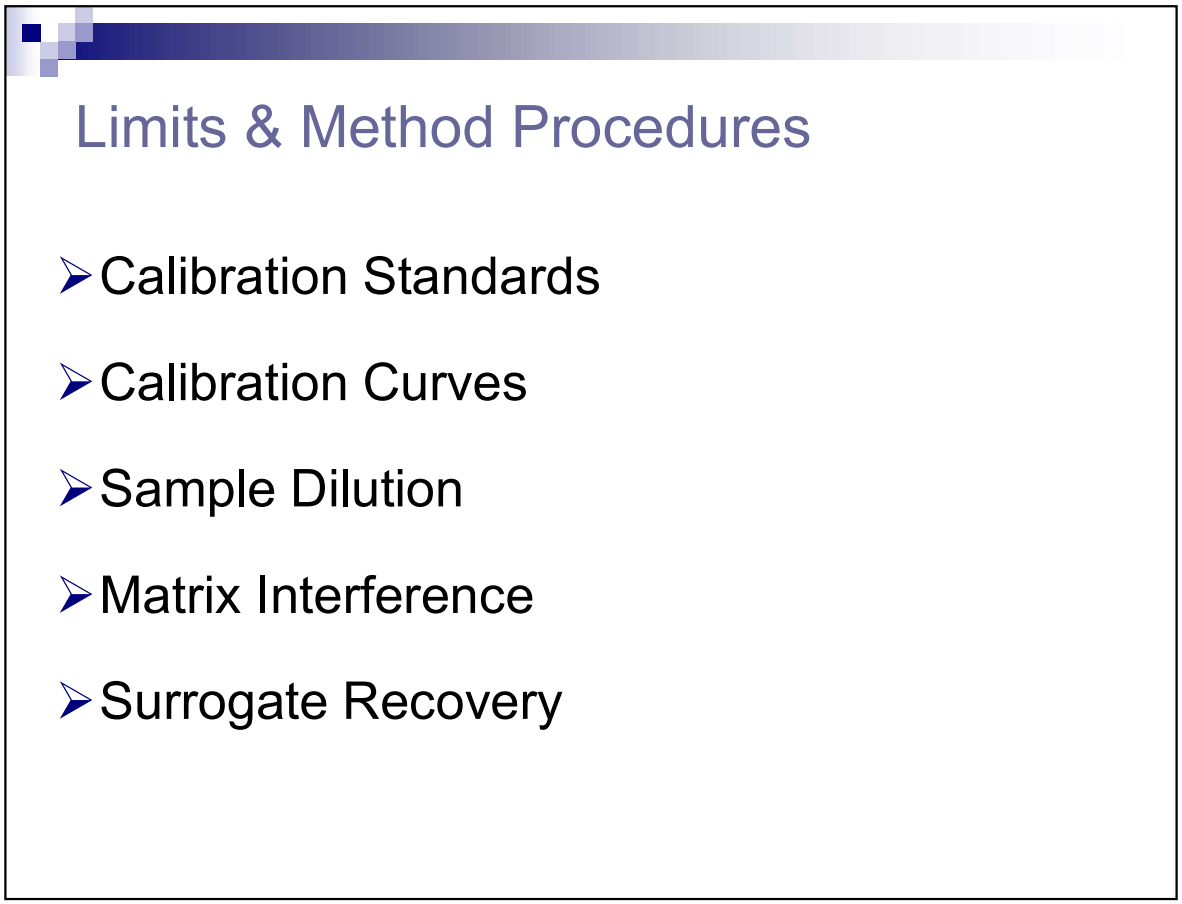
3. Constant, unrelated to the concentration of the substance analyzed (the *analyte).*

4. Proportional, i.e. related to the concentration of the analyte.

Accuracy: The "trueness" or the closeness of the analytical result to the "true" value. It is constituted by a combination of random and systematic errors (precision and bias) and cannot be quantified directly. The test result may be a mean of several values. An accurate determination produces a "true" quantitative value, i.e. it is precise and free of bias.

Precision: The closeness with which results of replicate analyses of a sample agree. It is a measure of dispersion or scattering around the mean value and usually expressed in terms of standard deviation, standard error or a range (difference between the highest and the lowest result).

Bias: The consistent deviation of analytical results from the "true" value caused by systematic errors in a procedure. Bias is the opposite but most used measure for "trueness" which is the agreement of the mean of analytical results with the true value, i.e. excluding the contribution of randomness represented in precision. There are several components contributing to bias: Method bias, Laboratory bias, and Sample bias



All types of analytical methods require calibration for quantitation. Calibration is a process that relates the measured analytical signal to the concentration of analyte. We can't just run a sample and know the relationship between signal and concentration without calibrating the response

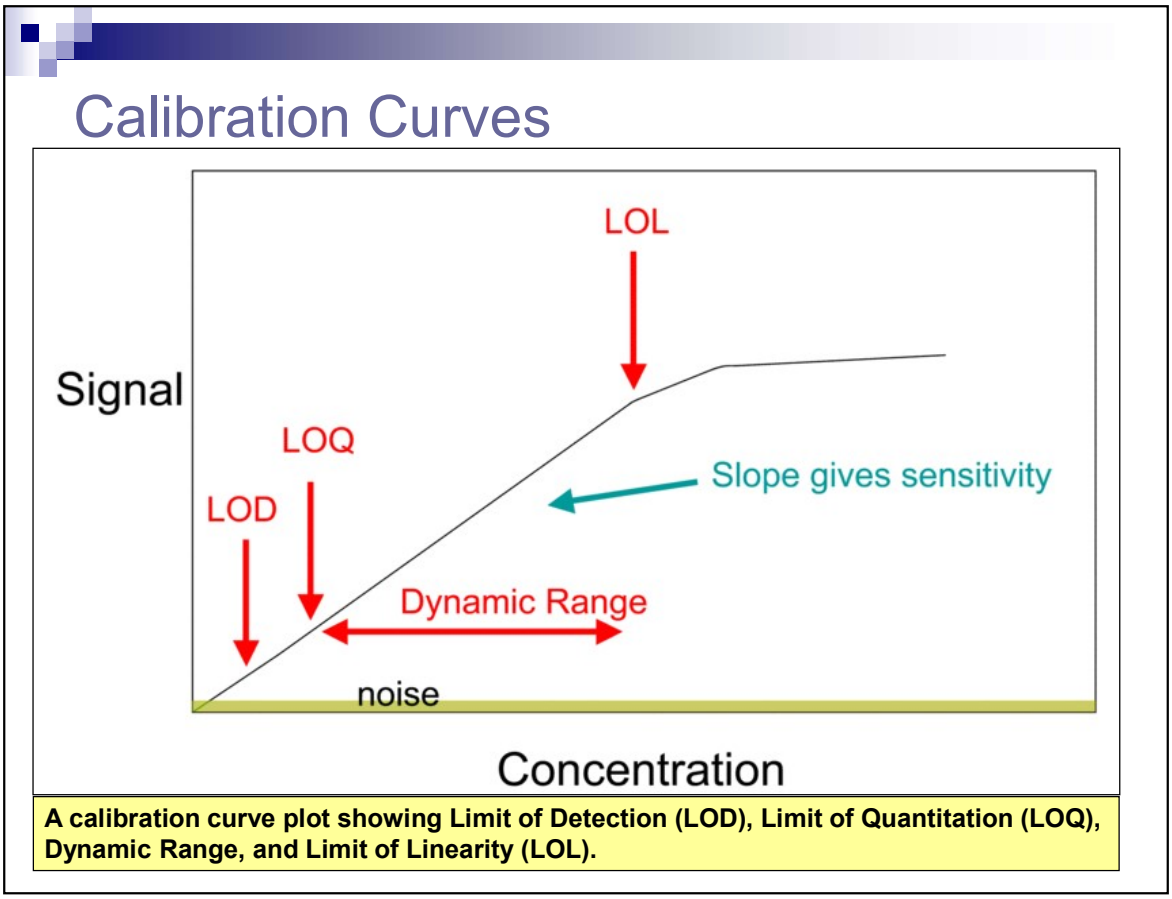
The **three** most common calibration methods are:

- Calibration curve
- Standard addition method
- Internal standard method

Why are the detection limits sometimes elevated in a result?
The detection limits that can be achieved on actual environmental samples can be influenced by a number of factors such as sample size, final extraction volume, injection volume, dilutions, instrument sensitivity, and matrix interference.

What is matrix interference?
Matrix interference refers to sample characteristics that interfere with the test method execution such that reliable data cannot be generated. Examples of matrix interference include samples with extreme pH, high alkalinity or acidity, and chemical constituents that react with target analytes. Common matrix interference is the presence of a non-target compound in high concentrations. Even though this compound may not be of interest to the client, the sample often requires dilution in order to prevent contamination of instrumentation.

What is a surrogate? Why is it reported with my sample results?
Surrogates are known analytes added in known amounts to samples and method blanks to evaluate the efficiencies of sample preparation steps for some methods. They are similar chemically to the target analytes of the method but are not found naturally in samples. For that reason, many are isotope-labeled target analytes (i.e. toluene-d8). Because surrogates are added to each sample, the surrogate recovery result (expressed as percent of recovery) is reported with each sample report.



A calibration curve plot showing Limit of Detection (LOD), Limit of Quantitation (LOQ), Dynamic Range, and Limit of Linearity (LOL).

Limit of Detection: Limit of detection (LOD) is defined as the lowest concentration of an analyte in a sample that can be distinguished from a blank. It is expressed as a concentration at a certain specified signal-to-noise ratio, usually two-or three to one.

Limit of Quantitation (LOQ) or Practical Limit of Quantitation (PQL) is the lowest amount of analyte in a sample that can be quantitatively determined with acceptable precision and accuracy.

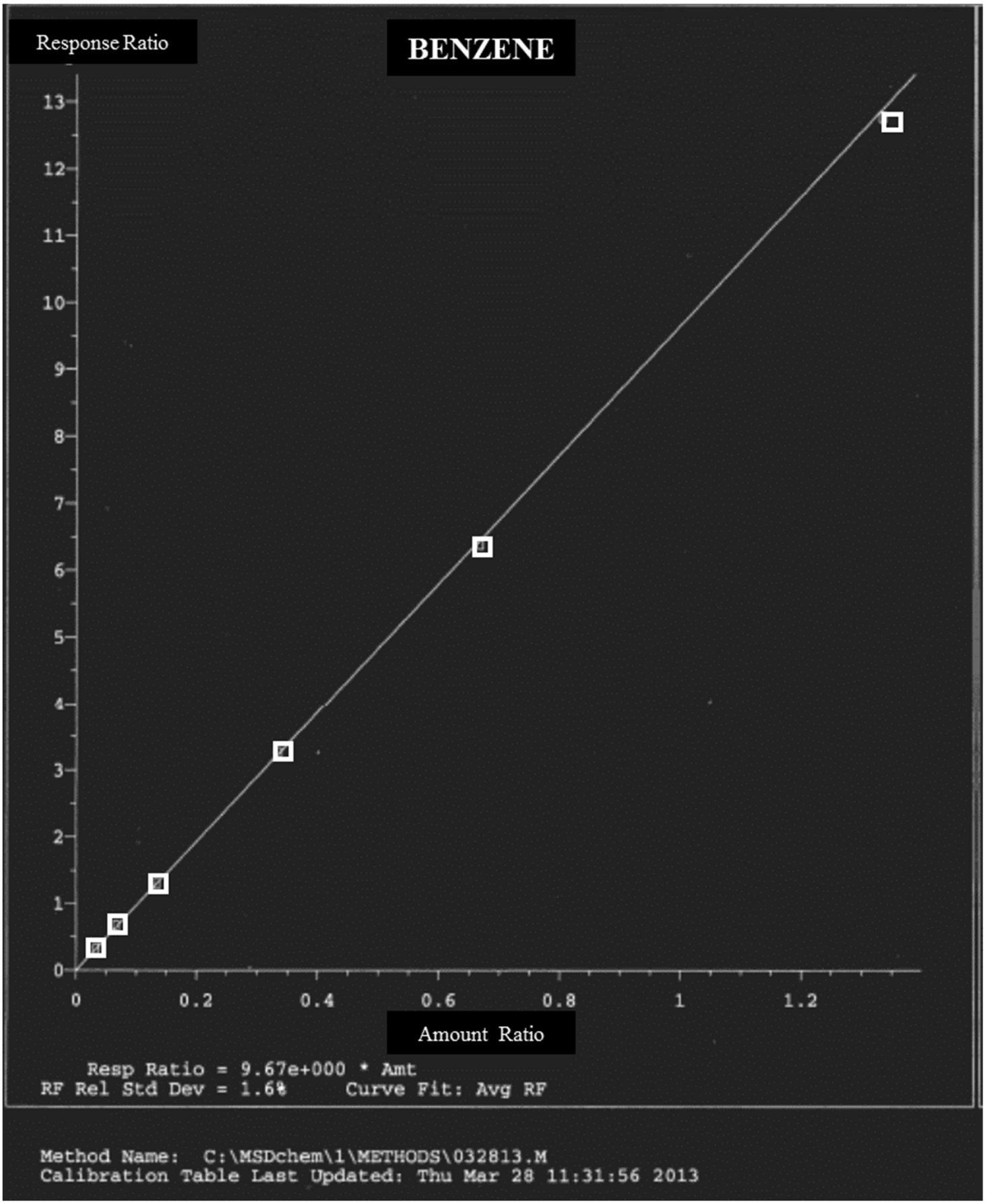
Dynamic Range The lowest concentration at which quantitative measurements can be made (limit of quantitation, or LOQ) to the concentration at which the calibration curve departs from linearity (limit of linearity, or LOL). Dynamic range is the range over which detector still responds to changing concentration (at high concentrations – usually saturates – quits responding)

Limit of Linearity (LOL)

EXAMPLE: It is often difficult to understand the concept of detection limit. The following example may help to clarify the concepts.

Suppose you are at an airport with lots of noise from jets taking off. If the person next to you speaks softly, you will probably not hear them. Their voice is less than the LOD. If they speak a bit louder, you may hear them but it is not possible to be certain of what they are saying and there is still a good chance you may not hear them. Their voice is >LOD but <LOQ. If they speak even louder, then you can understand them and take action on what they are saying and there is little chance you will not hear them. Their voice is then >LOD and >LOQ. Likewise, their voice may stay at the same loudness, but the noise from jets may be reduced allowing their voice to become >LOD. Detection limits are dependent on both the signal intensity (voice) and the noise (jet noise).

Calibration Curves



Quantitation Report – Volatile Organics

Quantitation Report (QT Reviewed)

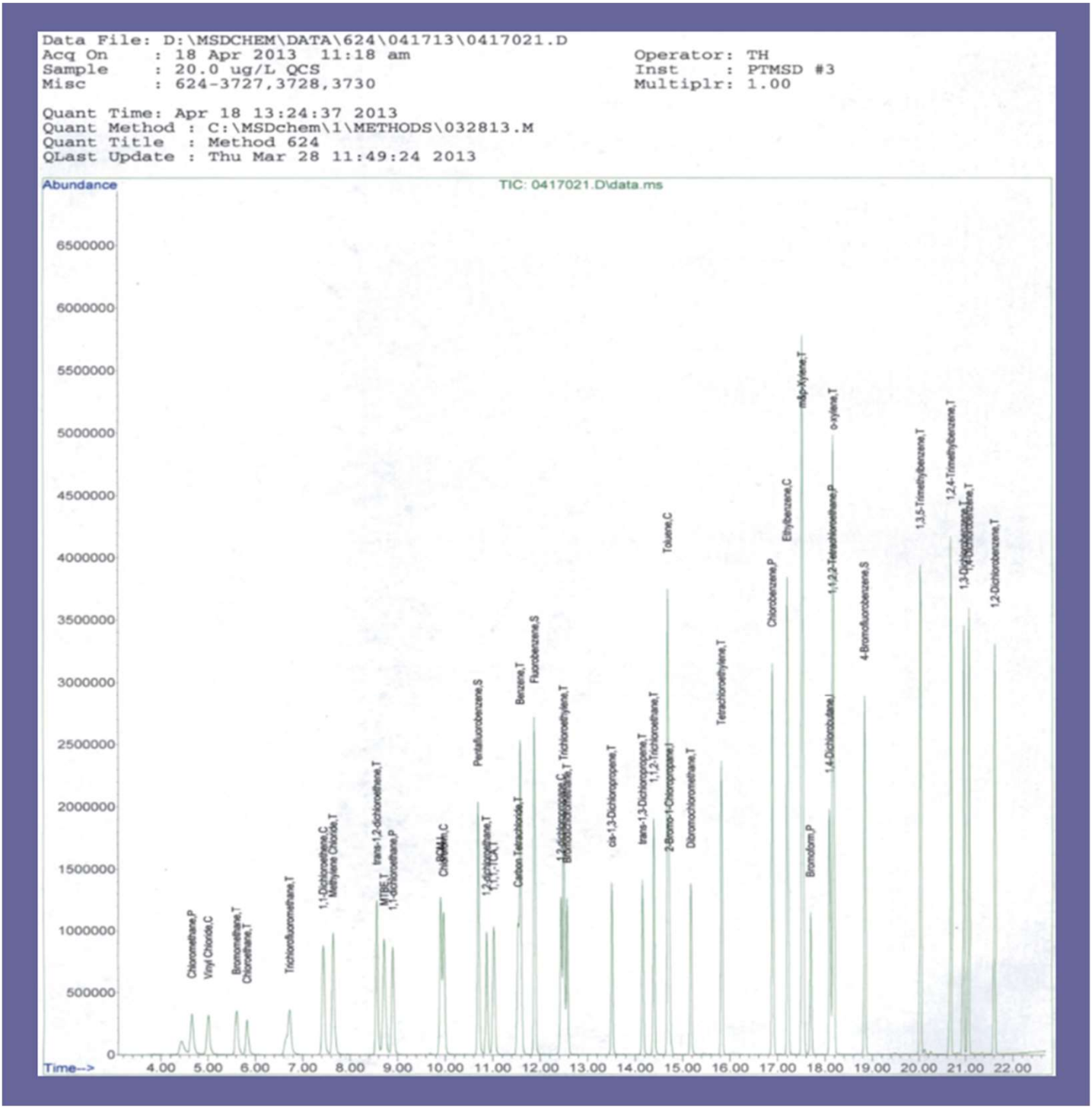
Data File: D:\MSDCHEM\DATA\624\041713\0417021.D
Acq On : 18 Apr 2013 11:18 am Operator: TH
Sample : 20.0 ug/L QCS Inst : PTMSD #3
Misc : 624-3727,3728,3730 Multiplr: 1.00

Quant Time: Apr 18 13:24:37 2013
Quant Method : C:\MSDchem\1\METHODS\032813.M
Quant Title : Method 624
QLast Update : Thu Mar 28 11:49:24 2013

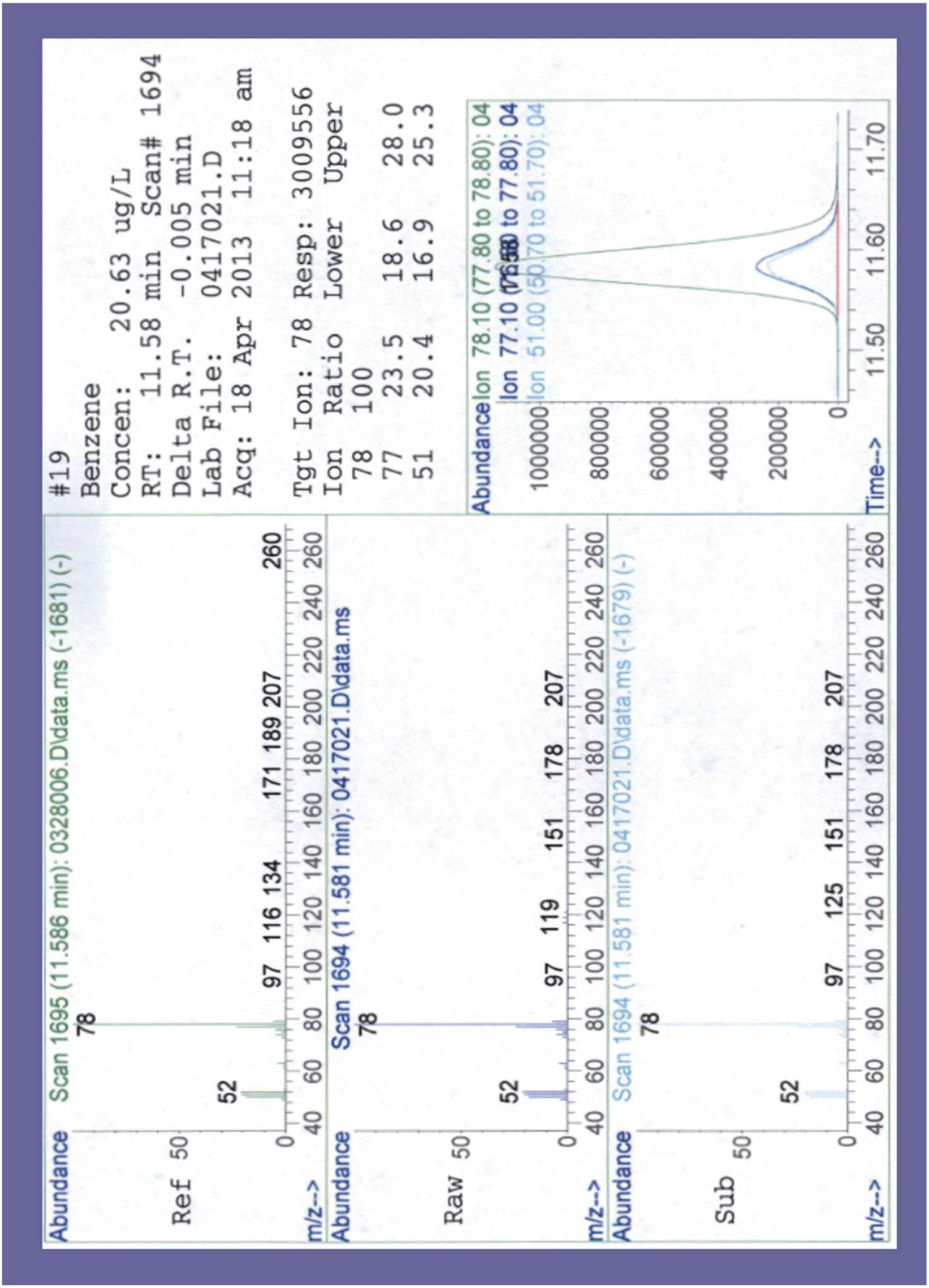
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) BCM	9.91	130	725952	30.00	ug/L	0.00
13) 2-Bromo-1-Chloropropane	14.72	79	452689	30.00	ug/L	0.00
29) 1,4-Dichlorobutane	18.10	55	1992038	30.00	ug/L	0.00
System Monitoring Compounds						
12) Pentafluorobenzene	10.69	168	2094055	29.55	ug/L	0.00
Spiked Amount 30.000	Range 70 - 130		Recovery = 98.50%			
14) Fluorobenzene	11.88	96	3504929	30.91	ug/L	0.00
Spiked Amount 30.000	Range 70 - 130		Recovery = 103.03%			
36) 4-Bromofluorobenzene	18.84	174	1196353	31.47	ug/L	0.00
Spiked Amount 30.000	Range 70 - 130		Recovery = 104.90%			
Target Compounds						Qvalue
2) Chloromethane	4.66	50	929475	16.60	ug/L	100
3) Vinyl Chloride	5.00	62	881152	19.95	ug/L	99
4) Bromomethane	5.60	94	573984	18.23	ug/L	100
5) Chloroethane	5.82	64	554190	18.54	ug/L	100
6) Trichlorofluoromethane	6.72	101	993869	19.10	ug/L	99
7) 1,1-Dichloroethene	7.43	61	1175171	19.16	ug/L	96
8) Methylene Chloride	7.64	84	794544	18.01	ug/L	99
9) trans-1,2-dichloroethene	8.56	61	1147705	18.77	ug/L	95
10) MTBE	8.72	73	2415186	20.22	ug/L	97
11) 1,1-dichloroethane	8.90	63	1445417	19.30	ug/L	98
15) Chloroform	9.97	83	1320096	21.19	ug/L	100
16) 1,2-dichloroethane	10.87	62	1111485	20.25	ug/L	100
17) 1,1,1,-TCA	11.02	97	1141857	21.41	ug/L	100
18) Carbon Tetrachloride	11.54	117	1069226	21.54	ug/L	99
19) Benzene	11.58	78	3009556	20.63	ug/L	99
20) 1,2-dichloropropane	12.43	63	883070	20.40	ug/L	99
21) Trichloroethylene	12.49	130	982643	21.14	ug/L	100
22) Bromodichloromethane	12.56	83	1040002	22.27	ug/L	99
23) cis-1,3-Dichloropropene	13.51	75	1314528	23.10	ug/L	99
24) trans-1,3-Dichloropropene	14.15	75	1237352	23.26	ug/L	100
25) 1,1,2-Trichloroethane	14.40	97	828854	21.39	ug/L	99
26) Toluene	14.69	91	3506425	20.56	ug/L	100
27) Dibromochloromethane	15.17	129	1021544	22.86	ug/L	99
28) Tetrachloroethylene	15.82	166	966703	20.99	ug/L	98
30) Chlorobenzene	16.89	112	2534417	22.61	ug/L	100
31) Ethylbenzene	17.21	91	3829408	22.15	ug/L	100
32) m&p-Xylene	17.53	91	6002619	44.58	ug/L	99
33) Bromoform	17.70	173	761259	26.95	ug/L	99
34) o-xylene	18.18	91	3172141	22.46	ug/L	100
35) 1,1,2,2-Tetrachloroethane	18.16	83	1171001	22.75	ug/L	99
37) 1,3,5-Trimethylbenzene	20.02	105	3104155	23.61	ug/L	100
38) 1,2,4-Trimethylbenzene	20.67	105	3121811	23.46	ug/L	99
39) 1,3-Dichlorobenzene	20.95	146	2016060	23.41	ug/L	100
40) 1,4-Dichlorobenzene	21.05	146	2041697	23.02	ug/L	100
41) 1,2-Dichlorobenzene	21.60	146	1896561	23.06	ug/L	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Gas Chromatogram – Volatile Organics



Gas Chromatogram – Volatile Organics



LIMITS, LIMITS, LIMITS!!!

- Permit Limits
- Reporting Limits (RL)
- Detection Limits (DL)
  - Sample Detection Limit (SDL)
  - Method Detection Limit (MDL)
  - Instrument Detection Limits (IDL)
- Quantitation Limit (QL)
  - Practical Quantitation Limit (PQL)

Permit Limits – discharge limitations indicated on Page 2 or 3 of the City of Phoenix Wastewater Discharge Permit, e.g., Mercury – 0.0023 mg/L

Reporting Limits (RL) – The client and/or end-user of test data request a RL for compliance purposes. RL must be **defensible** by the lab**.** The RL must be greater than or equal to the results of the MDL study by analyte and method. An RL below the MDL study results is unacceptable. RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision. The RL is a laboratory-specific number, which may change with time. When a sample has to be diluted before analysis, either because of matrix problems or to get the instrument response within the linear dynamic range, the RL is raised by a factor corresponding to the dilution factor.

Detection Limits (DL) Lowest concentration of a chemical that can reliably be distinguished from a zero concentration. DL is the smallest concentration we can measure with a particular technique.

Instrument Detection Limits (IDL) - Each instrument has a limitation on the amount of an analyte that it can detect. This limitation can be expressed as the IDL, which may be defined as the smallest amount of an analyte that can be reliably detected or differentiated from the background on an instrument. The IDL does not take sample preparation into consideration. IDLs are explicitly determined and generally defined as three times the standard deviation of the mean noise level.

Method Detection Limit (MDL) - MDL is the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero. The MDL is the lowest concentration that can be detected by an instrument with correction for the effects of sample matrix and method-specific parameters such as sample preparation. MDLs are explicitly determined as set forth in 40 CFR Part 136. They are defined as three times the standard deviation of replicate spiked analyses. Calculated MDL must be less than the spike concentration used to conduct the study and must be greater than 10% of the spiked concentration to be reasonable.

Sample Detection Limit (SDL) –SDL is the MDL adjusted to reflect sample-specific actions such as dilution or use of smaller aliquot sizes, or to report results on a dry-weight basis.

Quantitation Limit (QL) is the lowest amount of analyte in a sample that can quantitatively determined with a suitable precision and accuracy for an individual analytical procedure.

Practical Quantitation Limit (PQL) -This limit is usually higher than a detection limit, high enough where a quantitative value can be obtained. is a quantitation limit that represents a practical and routinely achievable quantitation limit with a high degree of certainty (>99.9% confidence) in the results.

DETECTION & REPORTING LIMITS

What limits do you need?

- Detection limits are dependent on the type of sample
- Different analytical methods give more or less information.
- The purpose for the analysis is generally to determine compliance with the Permit

1. Labs determine their detection limits using some type of laboratory pure water. Since your sample is not laboratory pure water, the detection limit will be different. Because of the wide variety of samples a lab receives, they have developed and report results using a Reporting Limit (RL), Method Reporting Limit (MRL), Practical Quantitation Limit (PQL), or something similar. These values are generally 5 to 10 times the lab's detection limit and the lab has confidence in values reported above this level.
2. Each method is capable of "seeing" a certain amount of the pollutant you are looking for. The lower you "see" the more involved (and more expensive) the analysis becomes. The level the method "sees" is the reporting limit.
3. A comparison of the Permit limit to the lab's detection or reporting limit should be made to select the test method to be used. The reporting limit must be at least as low as your Permit limit.
    - Compliance with a Permit limit of 0.010 mg/L copper can be shown by having the lab use the Furnace method of analysis, which should be able to detect as little as 0.005 mg/L of copper. If ICP analysis were requested, the best that the lab could likely achieve is a reporting level of 0.05 mg/L , not low enough to determine compliance the Permit limit.
    - For a Permit limit of 0.80 mg/L of copper, a lab's ICP reporting level of 0.050 mg/L is adequate.

IDL < MDL = SDL < QL = RL< Permit Limit

DETECTION & REPORTING LIMITS

Any choices in what you will $ pay?

- Depends upon methods & turnaround times needed.
- More labor to run a GC/MS than to run a GC
- ICP - several metals at a time
- AA and Furnace - only one parameter at a time.
- Higher fee likely for Furnace than by AA.
- Consider whether you need a single parameter or a group of parameters analyzed.
- **IMPORTANT!** *Cheaper often means higher detection limits.*

1. The more tests performed on a single instrument run, the lower the cost per test tends to be.
2. It takes more labor to run a Furnace than the AA; it takes more labor to run a GC/MS than to run a GC.
3. You may regularly monitor your discharge for a group of metals, but you may also have a requirement for more frequent monitoring of copper. You can save money by analyzing for only copper rather than the entire group of metals when you only need one metal parameter.
4. Benzene can be analyzed by several methods that are generally acceptable to show compliance with the Permit. If no other parameters than benzene are needed, you should consider asking your lab to analyze your sample be EPA Method 602 rather than the more comprehensive and expensive EPA Method 624.

How do I make sure I get the right reporting limits? It is important to specify what reporting limits you need for each chemical your analytical laboratory will test for you *before* you order your analyses. The best place for this is in your purchase order or contract with the analytical laboratory. It is not uncommon for a laboratory to test for a suite of similar chemical compounds and to use the same reporting limit for all the compounds in the suite. However, this may not be sufficient for your needs if you are concerned about very low regulatory limits for one of chemicals in this suite. If you specify what reporting limits you need, the laboratory may be able to pick a more appropriate analysis method to suit your needs.

REMEMBER

1st - What *reporting limit* do you need?

2nd - How much do you want to $ pay?

QC DOCUMENTATION

Documentation can be provided in “routine” and “custom” packages.

You may want to ask your lab for a “custom” or Level III or IV package:

- If you violate a Permit limit
- If something strikes you as unusual about the result.

QC DOCUMENTATION

- Laboratories add data qualifiers or notes to explain the results of analyses. This helps us understand the "usability" of the data.
  - *Please see Arizona Data Qualifiers Revision 4.0 dated 09/05/2012*

BREAK TIME!!

5 minutes please. Thank you!

QC DOCUMENTATION

Orange Coast Analytical, Inc.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (480) 736-0960 Fax (480) 736-0970

Laboratory Reference #: MMF AZ8086
Client Project ID: 1st 24hr Composite for the Month of March 2013

LABORATORY REPORT FORM

COMPANY A

METALS

Sample Description: Water

Sampled:		—	03/06/13
Received:		—	03/06/13
Reported:		03/27/13	03/27/13
Lab Sample #:		MBHT0326136	AZ8086-001
Client Sample ID:		—	1st 24hr Composite for the Month of March 2013
Dilution Factor		1	5
Data Qualifier:			D1
ANALYTE	***EPA METHOD***	***DATE TESTED***	***mg/L***	***mg/L***
Cadmium	200.8	03/27/13	<0.00050	<0.0025
Chromium	200.8	03/27/13	<0.0010	0.19
Copper	200.8	03/27/13	<0.0010	0.065
Nickel	200.8	03/27/13	<0.0010	0.064
Zinc	200.8	03/27/13	<0.010	2.0

D1 Sample required dilution due to matrix.

Parameter	Minimum Sampling Frequency	Sampling Method	Daily Minimum FINAL Limit	Daily Minimum Local Limit	Daily Maximum FINAL Limit	Daily Maximum PSNS Limit	Daily Maximum Local Limit	Monthly Average FINAL Limit	Monthly Average PSNS Limit
Arsenic	1 per 6-Months	Composite	-	-	0.13	-	0.13	-	-
Cadmium	1 per Quarter	Composite	-	-	0.047	0.11	0.047	0.07	0.07
Chromium	1 per Month	Composite	-	-	2.77	2.77	-	1.71	1.71
Copper	1 per Quarter	Composite	-	-	1.5	3.38	1.5	2.07	2.07
Cyanide	1 per Quarter	Grab	-	-	1.20	1.20	2.0	0.65	0.65
Lead	1 per Quarter	Composite	-	-	0.41	0.69	0.41	0.43	0.43
Mercury	1 per Quarter	Composite	-	-	0.0023	-	0.0023	-	-
Nickel	1 per Quarter	Composite	-	-	3.98	3.98	-	2.38	2.38
pH*	Twice Daily	Grab	5.0	5.0	10.5	-	10.5	-	-
Molybdenum	1 per 6-Months	Composite	-	-	-	-	-	-	-
Selenium	1 per 6-Months	Composite	-	-	0.10	-	0.10	-	-
Silver	1 per Quarter	Composite	-	-	0.43	0.43	1.2	0.24	0.24
TTO – 433*	1 per 6-Months	Composite	-	-	2.13	2.13	-	-	-
Zinc	1 per Quarter	Composite	-	-	2.61	2.61	3.5	1.48	1.48

PSNS – Pretreatment Standards for New Sources
* See Sampling and Analysis Notes for Additional Information

NOTES:

QC DOCUMENTATION

COMPANY A

QA/QC REPORT
for Metals
Reporting units: ppm

1. Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Laboratory Reference No.: MMF AZ8086

Analyte	Date Tested	QC Sample	R1	SP CONC	MS	MSD	%MS	%MSD	MS/MSD %RPD	ACP %REC	ACP RPD
Cadmium	03/27/13	AZ8086-001	0.0	0.100	0.0884	0.0891	88	89	1	70-130	20
Chromium	03/27/13	AZ8086-001	0.19	0.100	0.265	0.274	75	84	3	70-130	20
Copper	03/27/13	AZ8086-001	0.065	0.100	0.147	0.151	82	86	3	70-130	20
Nickel	03/27/13	AZ8086-001	0.064	0.100	0.144	0.146	80	82	1	70-130	20
Zinc	03/27/13	AZ8086-001 M2	2.0	0.100	1.990	2.07	10	70	4	70-130	20

Definition of Terms :

R1	Results Of Laboratory Sample Number
SP CONC	Spike Concentration Added to Sample
MS	Matrix Spike Results
MSD	Matrix Spike Duplicate Results
%MS	Percent Recovery of MS: {(MS-R1) / SP CONC} x100
%MSD	Percent Recovery of MSD: {(MSD-R1) / SP CONC} x 100
MS/MSD RPD	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2
ACP %REC	Acceptable Range of Percent Recovery
ACP RPD	Acceptable Relative Percent Difference
LCS	Laboratory Control Sample Results
LCSD	Laboratory Control Sample Duplicate Results
%LCS	Percent Recovery of LCS: {LCS / SP CONC} x100
%LCSD	Percent Recovery of LCSD: {LCSD / SP CONC} x 100
LCS/LCSD RPD	Relative Percent Difference: {(LCS-LCSD) / (LCS+LCSD)} x 100 x 2
M2	Matrix spike recovery was low;the associated blank spike recovery was acceptable.

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

Analyte	Date Tested	QC Sample	SP CONC	LCS	LCSD	%LCS	%LCSD	LCS/LCSD %RPD	ACP %REC	ACP RPD
Cadmium	03/27/13	HT0326136	0.100	0.109	0.108	109	108	1	85-115	20
Chromium	03/27/13	HT0326136	0.100	0.101	0.101	101	101	0	85-115	20
Copper	03/27/13	HT0326136	0.100	0.107	0.110	107	110	3	85-115	20
Nickel	03/27/13	HT0326136	0.100	0.102	0.102	102	102	0	85-115	20
Zinc	03/27/13	HT0326136	0.100	0.108	0.109	108	109	1	85-115	20

NOTES:

QC DOCUMENTATION

COMPANY B

- See Following Lab Report Handouts

NOTES: the back of the book has examples of different laboratory reports.

Laboratory B

31 August 2012

[redacted]
Valued Client
[redacted]
Phoenix, Arizona 85009

RE: General Pricing
Laboratory Work Order No.: 2081408

[redacted] is pleased to provide the enclosed analytical results for the aforementioned project. These results relate only to the items tested. This cover letter and the accompanying pages represent the full report for these analyses and should only be reproduced in full. Samples for this project were received by the laboratory on 08/16/12 15:36.

The samples were processed in accordance with the Chain of Custody document and the results presented relate only to the samples tested. The Chain of Custody is considered part of this report.

All samples will be retained by [redacted] for 30 days from the date of this report and then discarded unless other arrangements are made.

This entire report was reviewed and approved for release by the undersigned. If you have any questions concerning this report, please feel free to contact me.

Sincerely,
[redacted]

[redacted]
Client Services Representative
(602) 324-8100

This laboratory report is confidential and is intended for the sole use o[redacted]and it's client.

Page 1 of 11

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Type	Date Sampled	Date Received
WW (Discharge)	2081408-01	Wastewater	Composite	08/16/12 15:00	08/16/12 15:36
WW (Discharge)	2081408-02	Wastewater	Grab	08/16/12 14:30	08/16/12 15:36

Sample Condition Upon Receipt:

Temperature: 22.00 C

All samples were received in acceptable condition unless noted otherwise in the case

Case Narrative:

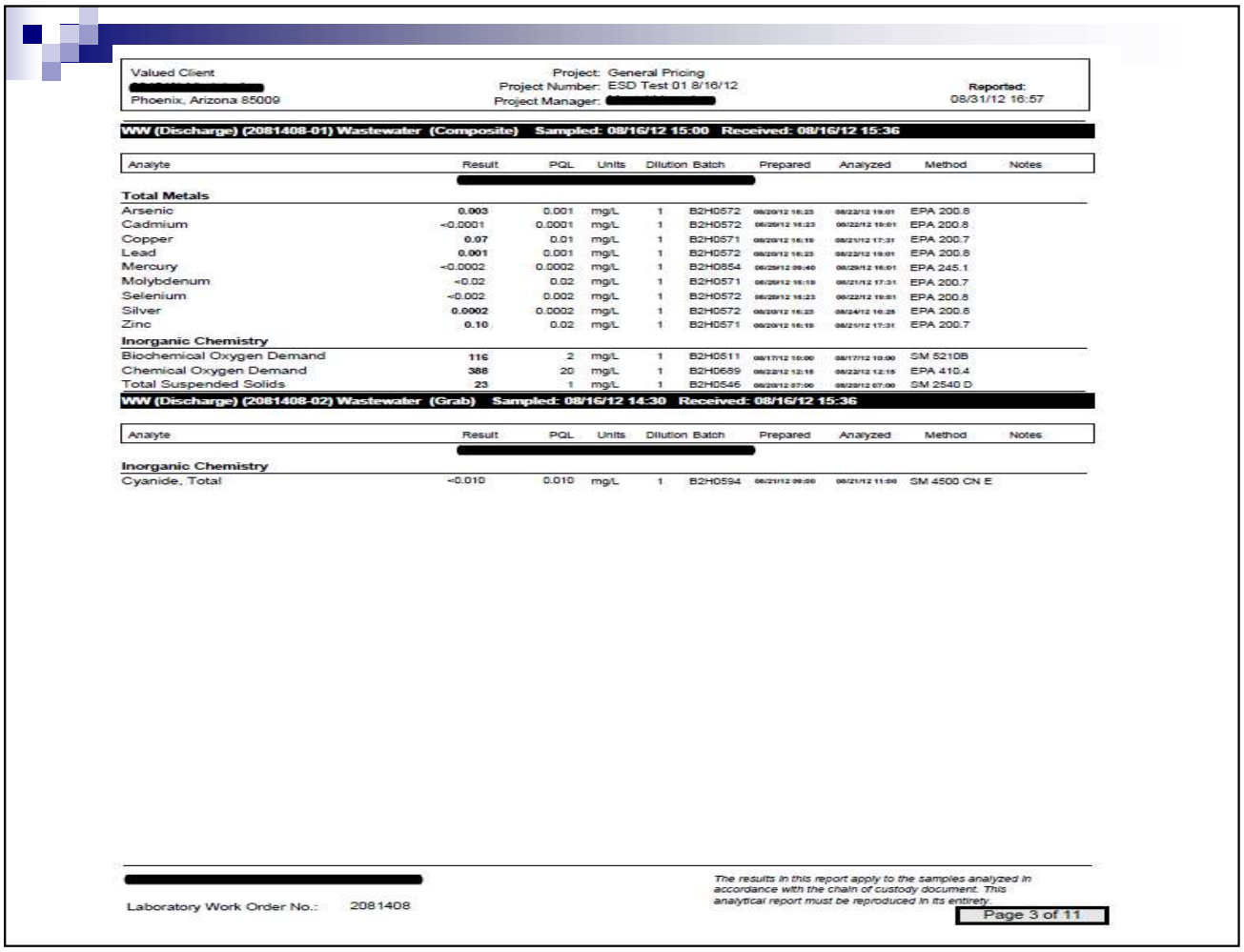
Holding Times: All holding times were met unless otherwise qualified.
QA/QC Criteria: All analyses met method requirements unless otherwise qualified.
Certifications: AZ(PHX)0004, AZ(TUC)OOO4, AIHA#102982, CDC ELITE Member.
Accreditation is applicable only to the test methods specified on each scope of accreditation held by LEGEND.
Comments: There were no problems encountered during the processing of the samples, unless otherwise noted.
All samples were analyzed on a "wet" basis unless designated as "dry weight".

Due to a laboratory oversight when assisting the client with completing the chain of custody on 8/16/12, Mercury was not analyzed. During final report review, the error was discovered and Mercury was analyzed. LP

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

WW (Discharge) (2081408-01) Wastewater (Composite) Sampled: 08/16/12 15:00 Received: 08/16/12 15:36

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
[redacted]									
Total Metals									
Arsenic	0.003	0.001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Cadmium	<0.0001	0.0001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Copper	0.07	0.01	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Lead	0.001	0.001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Mercury	<0.0002	0.0002	mg/L	1	B2H0854	08/29/12 09:40	08/29/12 16:01	EPA 245.1	
Molybdenum	<0.02	0.02	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Selenium	<0.002	0.002	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Silver	0.0002	0.0002	mg/L	1	B2H0572	08/20/12 16:23	08/24/12 16:28	EPA 200.8	
Zinc	0.10	0.02	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Inorganic Chemistry									
Biochemical Oxygen Demand	116	2	mg/L	1	B2H0511	08/17/12 10:00	08/17/12 10:00	SM 5210B	
Chemical Oxygen Demand	388	20	mg/L	1	B2H0689	08/22/12 12:15	08/22/12 12:15	EPA 410.4	
Total Suspended Solids	23	1	mg/L	1	B2H0546	08/20/12 07:00	08/20/12 07:00	SM 2540 D	

WW (Discharge) (2081408-02) Wastewater (Grab) Sampled: 08/16/12 14:30 Received: 08/16/12 15:36

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
[redacted]									
Inorganic Chemistry									
Cyanide, Total	<0.010	0.010	mg/L	1	B2H0594	08/21/12 09:00	08/21/12 11:00	SM 4500 CN E	

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Page 3 of 11

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0571 - EPA 200.7										
Blank (B2H0571-BLK1)				*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	<0.01	0.01	mg/L							
Molybdenum	<0.02	0.02	mg/L							
Zinc	<0.02	0.02	mg/L							
LCS (B2H0571-BS1)				*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	0.96	0.01	mg/L	1.00		96	85-115			
Molybdenum	0.19	0.02	mg/L	0.200		97	85-115			
Zinc	0.95	0.02	mg/L	1.00		95	85-115			
Matrix Spike (B2H0571-MS1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	1.00	0.01	mg/L	1.00	0.02	98	70-130			
Molybdenum	0.20	0.02	mg/L	0.200	<0.02	99	70-130			
Zinc	0.99	0.02	mg/L	1.00	0.04	95	70-130			
Matrix Spike Dup (B2H0571-MSD1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	1.00	0.01	mg/L	1.00	0.02	98	70-130	0.1	20	
Molybdenum	0.20	0.02	mg/L	0.200	<0.02	99	70-130	0.2	20	
Zinc	0.99	0.02	mg/L	1.00	0.04	95	70-130	0.1	20	
Batch B2H0572 - EPA 200.8										
Blank (B2H0572-BLK1)				*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	<0.001	0.001	mg/L							
Cadmium	<0.0001	0.0001	mg/L							
Lead	<0.001	0.001	mg/L							
Selenium	<0.002	0.002	mg/L							
Silver	<0.0002	0.0002	mg/L							

[redacted]

Laboratory Work Order No.: 2081408

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Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0572 - EPA 200.8										
LCS (B2H0572-BS1)				*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.024	0.001	mg/L	0.0250		97	85-115			
Cadmium	0.0239	0.0001	mg/L	0.0250		95	85-115			
Lead	0.022	0.001	mg/L	0.0250		90	85-115			
Selenium	0.024	0.002	mg/L	0.0250		97	85-115			
Silver	0.0272	0.0002	mg/L	0.0250		109	85-115			
Matrix Spike (B2H0572-MS1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.042	0.001	mg/L	0.0250	0.017	100	70-130			
Cadmium	0.0246	0.0001	mg/L	0.0250	0.0006	96	70-130			
Lead	0.029	0.001	mg/L	0.0250	0.007	89	70-130			
Selenium	0.024	0.002	mg/L	0.0250	0.0009	93	70-130			
Silver	0.0252	0.0002	mg/L	0.0250	0.00005	101	70-130			
Matrix Spike Dup (B2H0572-MSD1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.042	0.001	mg/L	0.0250	0.017	101	70-130	0.7	20	
Cadmium	0.0244	0.0001	mg/L	0.0250	0.0006	95	70-130	0.9	20	
Lead	0.029	0.001	mg/L	0.0250	0.007	90	70-130	0.9	20	
Selenium	0.024	0.002	mg/L	0.0250	0.0009	91	70-130	1	20	
Silver	0.0249	0.0002	mg/L	0.0250	0.00005	99	70-130	1	20	
Batch B2H0854 - EPA 245.1/245.2 Prep										
Blank (B2H0854-BLK1)				*Prepared & Analyzed: 08/29/12*						
Mercury	<0.0002	0.0002	mg/L							
LCS (B2H0854-BS1)				*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100		99	85-115			

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0854 - EPA 245.1/245.2 Prep										
Matrix Spike (B2H0854-MS1)		**Source: 2082159-01**		*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100	<0.0002	102	70-130			
Matrix Spike Dup (B2H0854-MSD1)		**Source: 2082159-01**		*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100	<0.0002	100	70-130	2	20	

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0511 - NO PREP										
Blank (B2H0511-BLK1)				*Prepared & Analyzed: 08/17/12*						
Biochemical Oxygen Demand	<2	2	mg/L							
LCS (B2H0511-BS1)				*Prepared & Analyzed: 08/17/12*						
Biochemical Oxygen Demand	202	2	mg/L	198		102	85-115			
Batch B2H0546 - NO PREP										
Blank (B2H0546-BLK1)				*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L							
Duplicate (B2H0546-DUP1)		**Source: 2081334-01**		*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L		0				5	
Duplicate (B2H0546-DUP2)		**Source: 2081420-01**		*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L		0				5	
Batch B2H0594 - NO PREP										
Blank (B2H0594-BLK1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	<0.010	0.010	mg/L							
Blank (B2H0594-BLK2)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	<0.010	0.010	mg/L							
LCS (B2H0594-BS1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.050	0.010	mg/L	0.0500		100	80-120			

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0594 - NO PREP										
LCS Dup (B2H0594-BSD1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.051	0.010	mg/L	0.0500		102	80-120	2	25	
Matrix Spike (B2H0594-MS1)		**Source: 2081169-03**		*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120			
Matrix Spike (B2H0594-MS2)		**Source: 2081387-01**		*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120			
Matrix Spike Dup (B2H0594-MSD1)		**Source: 2081169-03**		*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.049	0.010	mg/L	0.0500	<0.010	98	80-120	2	25	
Matrix Spike Dup (B2H0594-MSD2)		**Source: 2081387-01**		*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120	0	25	
Batch B2H0689 - NO PREP										
Blank (B2H0689-BLK1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	<20	20	mg/L							
LCS (B2H0689-BS1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	198	20	mg/L	200		99	90-110			
LCS Dup (B2H0689-BSD1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	197	20	mg/L	200		98	90-110	0.7	20	
Matrix Spike (B2H0689-MS1)		**Source: 2081333-01**		*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	215	20	mg/L	200	26	94	90-110			

[redacted]

Laboratory Work Order No.: 2081408

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Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0689 - NO PREP										
Matrix Spike (B2H0689-MS2)		**Source: 2081333-02**		*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	213	20	mg/L	200	18	98	90-110			
Matrix Spike Dup (B2H0689-MSD1)		**Source: 2081333-01**		*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	213	20	mg/L	200	26	93	90-110	0.7	20	
Matrix Spike Dup (B2H0689-MSD2)		**Source: 2081333-02**		*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	208	20	mg/L	200	18	95	90-110	3	20	

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Valued Client [redacted] Phoenix, Arizona 85009	Project: General Pricing Project Number: ESD Test 01 8/16/12 Project Manager: [redacted]	Reported: 08/31/12 16:57

Notes and Definitions

BLK	Method Blank
LCS/Dup	Laboratory Control Sample/Laboratory Fortified Blank/Duplicate
MS/Dup	Matrix Spike/Duplicate
Dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Valued Client
[redacted]
Phoenix, Arizona 85009

Project: General Pricing
Project Number: ESD Test 01 8/16/12
Project Manager: [redacted]

Reported:
08/31/12 16:57

2081408

CHAIN OF CUSTODY RECORD

Laboratory B

CLIENT INFORMATION

Phoenix AZ 85009

Project Name: ESD Test
Project Number: 01
P.O. #: N/A

SAMPLE TYPE CODES

TURN AROUND TIME
Laboratory Authorization Required for Rush
☐ Standard 10 - 15 Day
☐ Other

REQUESTED ANALYSES

Client's Sample Identification	Date	Time	Sample Location	Composite	Grab	Sample Type	Container	No. of Containers	pH (+ / - Lab Use Only)	Metals	Cyanide	LAB NO.
WW	8/16	1500	discharge	X		GRAB	X	4		X	X	01
WW	8/16	1430	discharge		X	GRAB	X	1			X	02

PAID $322.00
☐CASH ☐CHECK # 0668 ☐MC/ ☐VISA
EXP

TO ENSURE COMPLETION OF ANALYSIS, SAMPLES MUST BE RECEIVED AT LEAST 3 HOURS PRIOR TO THE HOLD TIME EXPIRATION

Comments / Special Instructions: Metals- As, Cd, Cu, Pb, Mo, Se, Ag, Zn $322.00

SAMPLE CONDITION UPON RECEIPT (Lab Use)		
No. of Containers	5	
Temperature	20.0°C	
Custody Seals	Y	N
Seals Intact	Y	N
Preserved		N

RELINQUISHED BY

	Signature	Date	Time	Printed Name
①	[redacted]	8/16/12	1536	
②				
③				

SAMPLES RECEIVED BY

Signature	Date	Time	Printed Name
	8-16-12	1536	

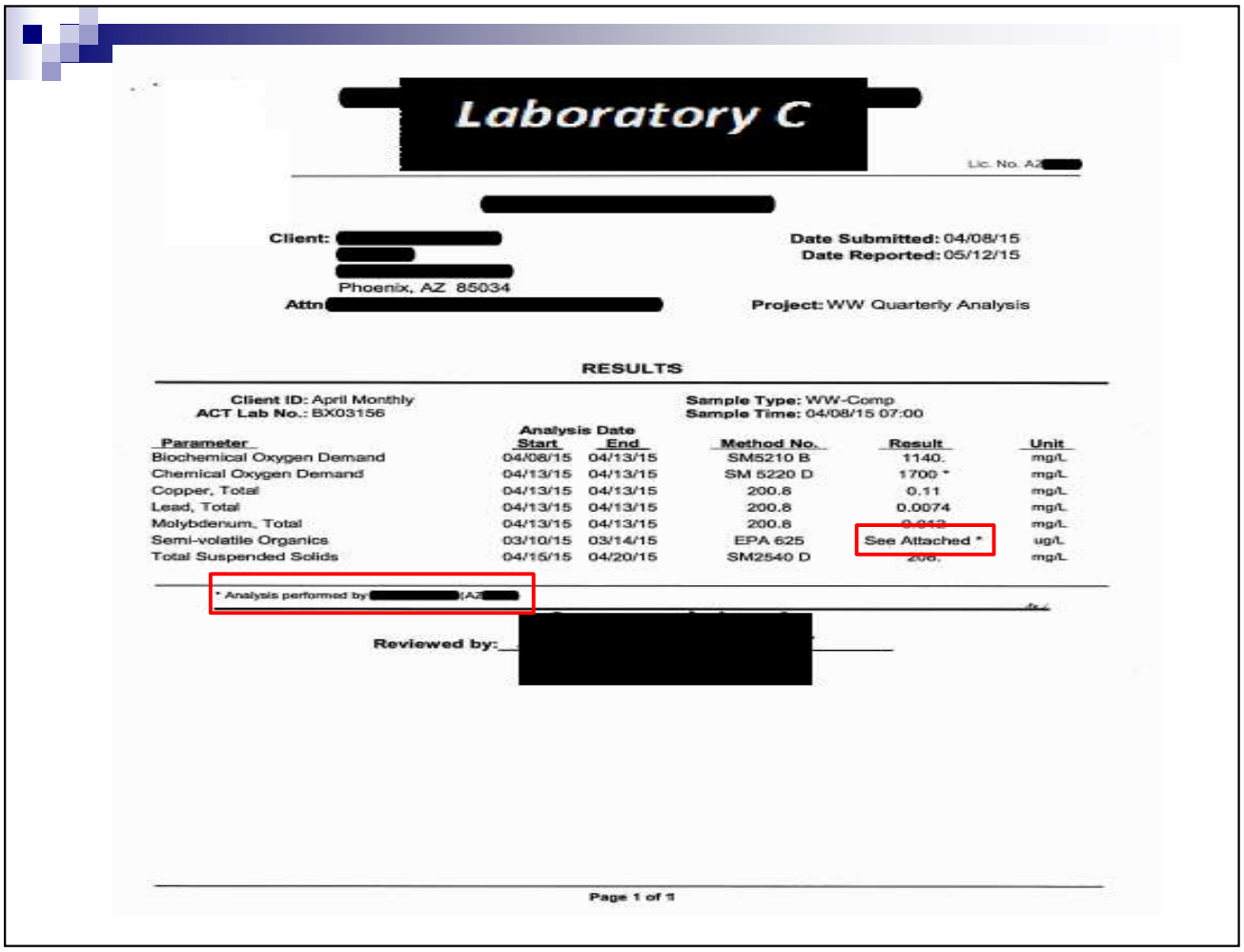
WHITE-LAB YELLOW-CLIENT

FORM GEN-170 (05/08)

[redacted]

Laboratory Work Order No.: 2081408

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Laboratory C

Lic. No. AZ[redacted]

[redacted]

Client: [redacted]
Phoenix, AZ 85034
Attn: [redacted]

Date Submitted: 04/08/15
Date Reported: 05/12/15

Project: WW Quarterly Analysis

RESULTS

Client ID: April Monthly
ACT Lab No.: BX03156

Sample Type: WW-Comp
Sample Time: 04/08/15 07:00

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Biochemical Oxygen Demand	04/08/15	04/13/15	SM5210 B	1140.	mg/L
Chemical Oxygen Demand	04/13/15	04/13/15	SM 5220 D	1700 *	mg/L
Copper, Total	04/13/15	04/13/15	200.8	0.11	mg/L
Lead, Total	04/13/15	04/13/15	200.8	0.0074	mg/L
Molybdenum, Total	04/13/15	04/13/15	200.8	[redacted]	mg/L
Semi-volatile Organics	03/10/15	03/14/15	EPA 625	See Attached *	ug/L
Total Suspended Solids	04/15/15	04/20/15	SM2540 D	206.	mg/L

* Analysis performed by [redacted] (AZ[redacted])

Reviewed by: [redacted]

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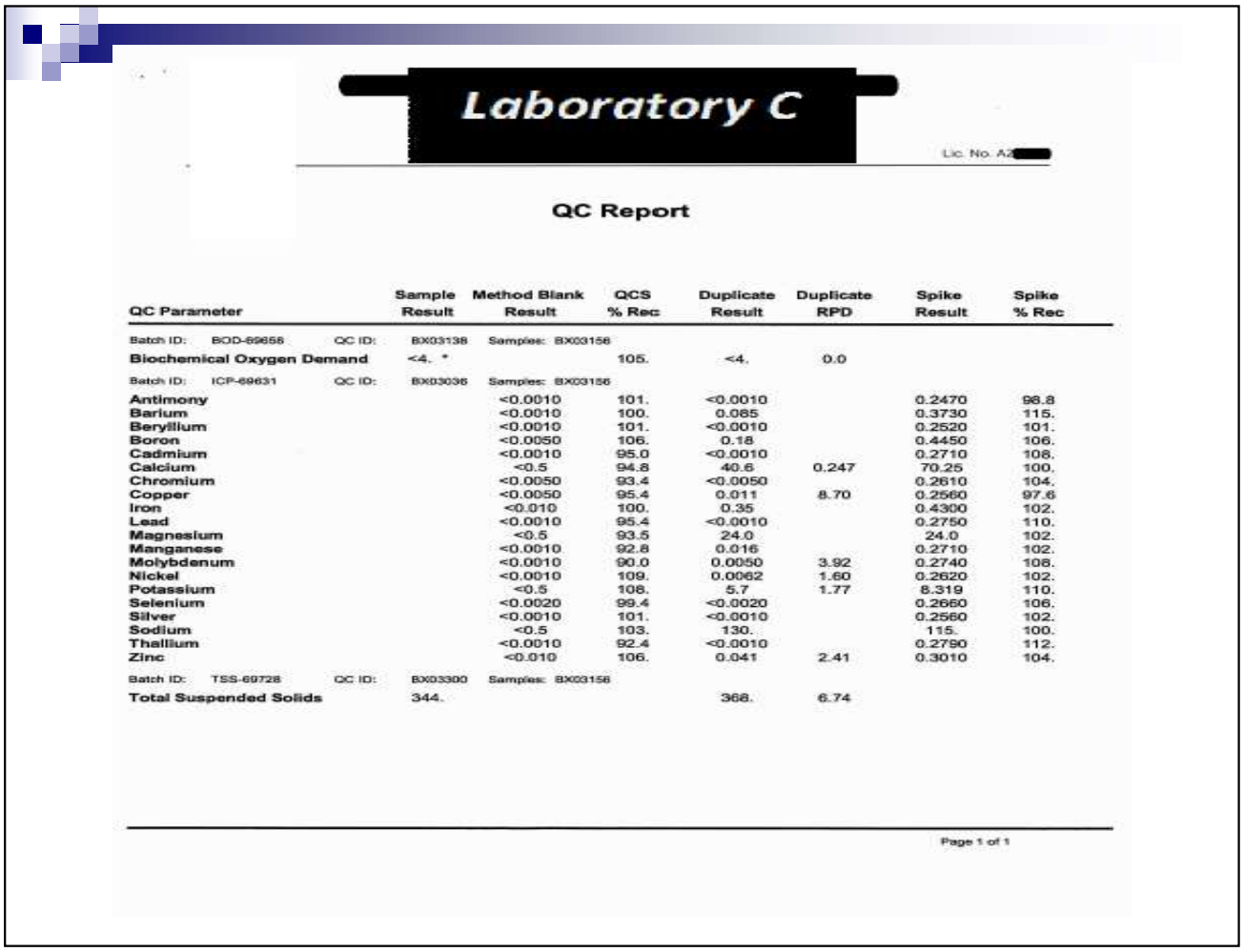

Laboratory C

Lic. No. AZ[redacted]

QC Report

QC Parameter	Sample Result	Method Blank Result	QCS % Rec	Duplicate Result	Duplicate RPD	Spike Result	Spike % Rec
Batch ID: BOD-69656 QC ID:	BX03138	Samples: BX03156					
Biochemical Oxygen Demand	<4. *		105.	<4.	0.0		
Batch ID: ICP-69631 QC ID:	BX03036	Samples: BX03156					
Antimony		<0.0010	101.	<0.0010		0.2470	98.8
Barium		<0.0010	100.	0.085		0.3730	115.
Beryllium		<0.0010	101.	<0.0010		0.2520	101.
Boron		<0.0050	106.	0.18		0.4450	106.
Cadmium		<0.0010	95.0	<0.0010		0.2710	108.
Calcium		<0.5	94.8	40.6	0.247	70.25	100.
Chromium		<0.0050	93.4	<0.0050		0.2610	104.
Copper		<0.0050	95.4	0.011	8.70	0.2560	97.6
Iron		<0.010	100.	0.35		0.4300	102.
Lead		<0.0010	95.4	<0.0010		0.2750	110.
Magnesium		<0.5	93.5	24.0		24.0	102.
Manganese		<0.0010	92.8	0.016		0.2710	102.
Molybdenum		<0.0010	90.0	0.0050	3.92	0.2740	108.
Nickel		<0.0010	109.	0.0062	1.60	0.2620	102.
Potassium		<0.5	108.	5.7	1.77	8.319	110.
Selenium		<0.0020	99.4	<0.0020		0.2660	106.
Silver		<0.0010	101.	<0.0010		0.2560	102.
Sodium		<0.5	103.	130.		115.	100.
Thallium		<0.0010	92.4	<0.0010		0.2790	112.
Zinc		<0.010	106.	0.041	2.41	0.3010	104.
Batch ID: TSS-69728 QC ID:	BX03300	Samples: BX03156					
Total Suspended Solids	344.			368.	6.74		

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CHAIN OF CUSTODY

PWS ID #____________ PAGE 1 OF 1

Client Name: [redacted]
Address: [redacted]
Street
Phx. Az. 85034
City State Zip
Phone: [redacted]
Fax:
Contact: [redacted]
Sampler Signature: [redacted]

PO#
Project
Remarks:

SAMPLE ID	SAMPLE Date	SAMPLE Time	SAMPLE TYPE	Chemistry: Metals (See Below)	TDS TSS TS SETT TVS VSS	O+G TPHC MBAS CN Sulfide	BOD COD New Source	Tot P O-PO4	Nitrate + Nitrite Nitrite	TKN Ammonia	THM's HAAS	Phenol 420 625 8270	8260 624 BTEX	Perchlorate Radio Asbestos	Biology: Total Coliform P/A Colilert MPN	E. Coli Fecal Strep	Fecal Coliform MPN MF	MICRO SCOPE ID	Plate Count BOLOG		Biomon: Acute Chronic	ARET (SWRO)			No. of Containers: $Na_2S_2O_3$	H_2SO_4	HNO_3	NONE	NaOH	NaOH/ZnAc	Laboratory Number
April Monthly	4-8-15	7:00 AM	WW	X	X		X					X														1	1	3			EX05156

Metals: ❑ Al ❑ Sb ❑ As ❑ Ba ❑ Be ❑ B ❑ Cd ❑ Ca ❑ Cr ❑ Co ☒ Cu ❑ Au ❑ Fe ☒ Pb ❑ Mg ❑ Mn ❑ Hg ☒ Mo ❑ Ni ❑ Se ❑ Ag ❑ Na
❑ Sr ❑ Tl ❑ Sn ❑ Ti ❑ V ❑ Zn

[ ] TOTAL [ ] DISSOLVED [ ] SDWA [ ] TCLP [ ] RCRA

Sample Types: DW, GW, SW, WW, AQ, Soil, Sludge or Solid

Sample Receiving: MLep Intact: X Yes __ No Temp: 2°C Auth Init: ___ Pres: 2 Yes/V 3 No/Lab Sterile: __ Yes X No Total # containers: 5	1. Relinquished By: [redacted] Date: 4-8-15 Time: 9:55 AM/PM 1. Received By: [redacted] Date: 4-8-15 Time: 07:55 AM/PM	2. Relinquished By: Date: Time: AM/PM 2. Received By: Date: Time: AM/PM	3. Relinquished By: Date: Time: AM/PM 3. Received By: Date: Time: AM/PM

Attn: Your signature on this document authorizes analysis regardless of sample condition at time of submittal

By signing this chain of custody, the designated client and agent agree to pay Aquatic Consulting & Testing, Inc. for all services rendered in conjunction with the submitted samples within 30 days of invoice. It is the client's responsibility to note purchase order numbers or other responsible parties on the form and failure to do so does not constitute justification for non-payment.

White-Laboratory Yellow-Report Pink-Client

Sample delivery group #: -108

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
T2	Cited ADHS licensed method does not contain this analyte as part of the method compound list.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
D1	Sample required dilution due to matrix.

GC/MS Semi VOA

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
L4	The associated blank spike recovery was below method acceptance limits.
R6	LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.

GC Semi VOA

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
C8	Sample RPD between the primary and confirmatory analysis exceeded 40% Per EPA Method 8000C, the lower value was reported as there was no evidence of chromatographic problems.
N1	See case narrative.

Metals

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.

General Chemistry

Qualifier	Qualifier Description
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
D2	Sample required dilution due to high concentration of analyte.
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
K1	The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Any reported result is an estimated value.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit

[redacted]

Case Narrative

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Job ID: 550-43961-2

Laboratory: [redacted]

Narrative

Job Narrative
550-43961-2

Comments
Revised report includes the addition of priority pollutant metals and results reported to the MDL per the client request on 5 August 2015.

Receipt
The samples were received on 4/29/2015 2:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.0° C and 3.7° C.

Receipt Exceptions

A trip blank was submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC). Contacted client per e-mail and confirmed to proceed with analysis on trip blank. Received e-mail 04/30/15. JfS 05/01/15.

GC/MS VOA
Method(s) 624, 8260B: The following sample was diluted due to the abundance of non-target analytes: [redacted]B213 (550-43961-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 625: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 440-252617 and analytical batch 440-253127. The laboratory control sample (LCS) was performed in duplicate to provide precision data for this batch.

Method(s) 625: The laboratory control sample and laboratory control sample duplicate (LCS/LCSD) were out of range low for 2-Chloronaphthalene. The laboratory control sample duplicate (LCSD) was out of range low for 3,3-Dichlorobenzidine. Sample may be biased low for these compounds.

(LCS 440-252617/2-A)

Method(s) 625: The percent recovery of 3,3'-dichlorobenzidine, 2-Chloronaphthalene, 3-Nitroaniline, 4-Chloroaniline, 4-Nitroaniline, Aniline and N-Nitrosodiphenylamine in the laboratory control sample duplicate (LCSD) of preparation batch 252617 failed below the lower acceptance limit. The recovery of these compounds has historically been problematic with this preparation method, 3520C. Samples were re-extracted past holding time with similar results for the QC. Original extraction within holding time was reported. (LCSD 440-252617/3-A) Samples may be biased low for these compounds.

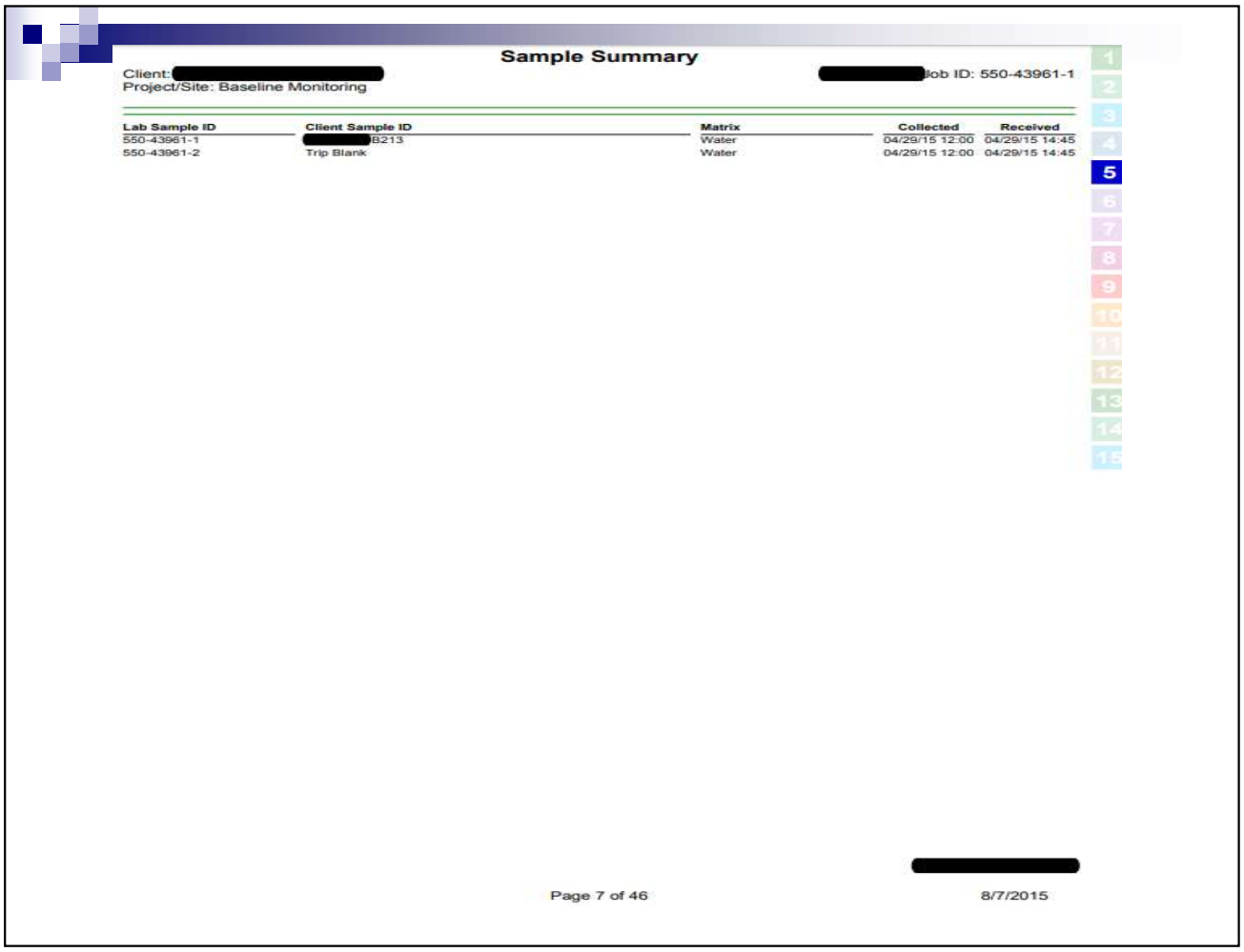
Method(s) 625: The %RPD of the laboratory control sample (LCS) and laboratory control standard duplicate (LCSD) for preparation batch 252617 recovered outside control limits for the following analytes: 3,3-Dichlorobenzidine, 3-Nitroaniline, 4-Chloroaniline, 4-Nitroaniline and Aniline.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) 608: The Heptachlor Epoxide was detected on column A in the sample 43961-1, but it cannot be confirmed on column B due to a peak which coelutes at the same RT on the alternate column. The RPD between the primary and confirmation column exceeded 40% for Heptachlor epoxide . The lower value has been reported , as matrix interference is evident on column B. The result has been flagged with C8 and N1 qualifier.

[redacted]B213 (550-43961-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Sample Summary

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-43961-1	[redacted]B213	Water	04/29/15 12:00	04/29/15 14:45
550-43961-2	Trip Blank	Water	04/29/15 12:00	04/29/15 14:45

[redacted]

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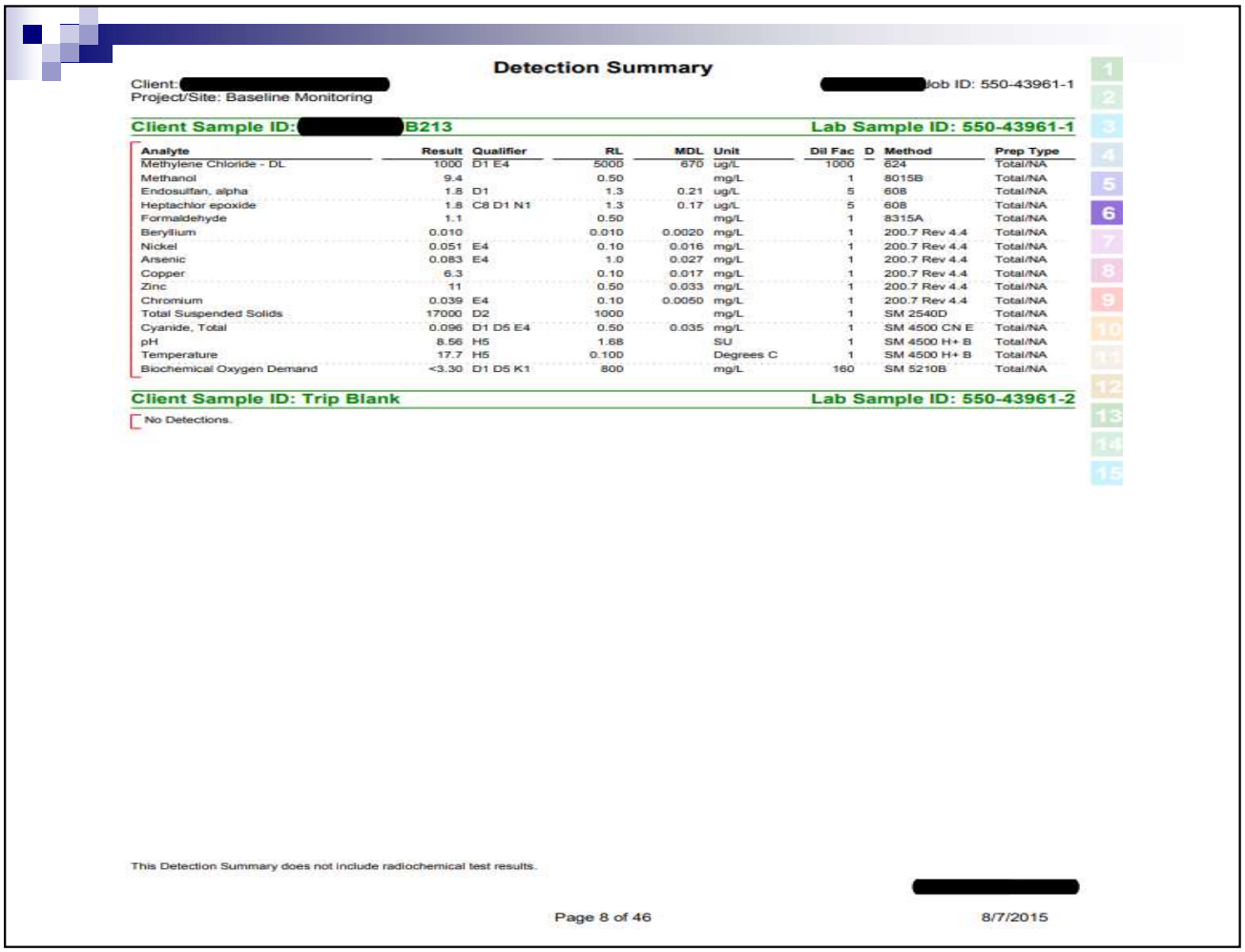

Detection Summary

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted]B213 Lab Sample ID: 550-43961-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride - DL	1000	D1 E4	5000	670	ug/L	1000		624	Total/NA
Methanol	9.4		0.50		mg/L	1		8015B	Total/NA
Endosulfan, alpha	1.8	D1	1.3	0.21	ug/L	5		608	Total/NA
Heptachlor epoxide	1.8	C8 D1 N1	1.3	0.17	ug/L	5		608	Total/NA
Formaldehyde	1.1		0.50		mg/L	1		8315A	Total/NA
Beryllium	0.010		0.010	0.0020	mg/L	1		200.7 Rev 4.4	Total/NA
Nickel	0.051	E4	0.10	0.016	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.083	E4	1.0	0.027	mg/L	1		200.7 Rev 4.4	Total/NA
Copper	6.3		0.10	0.017	mg/L	1		200.7 Rev 4.4	Total/NA
Zinc	11		0.50	0.033	mg/L	1		200.7 Rev 4.4	Total/NA
Chromium	0.039	E4	0.10	0.0050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Suspended Solids	17000	D2	1000		mg/L	1		SM 2540D	Total/NA
Cyanide, Total	0.096	D1 D5 E4	0.50	0.035	mg/L	1		SM 4500 CN E	Total/NA
pH	8.56	H5	1.68		SU	1		SM 4500 H+ B	Total/NA
Temperature	17.7	H5	0.100		Degrees C	1		SM 4500 H+ B	Total/NA
Biochemical Oxygen Demand	<3.30	D1 D5 K1	800		mg/L	160		SM 5210B	Total/NA

Client Sample ID: Trip Blank Lab Sample ID: 550-43961-2

No Detections.

This Detection Summary does not include radiochemical test results.

[redacted]

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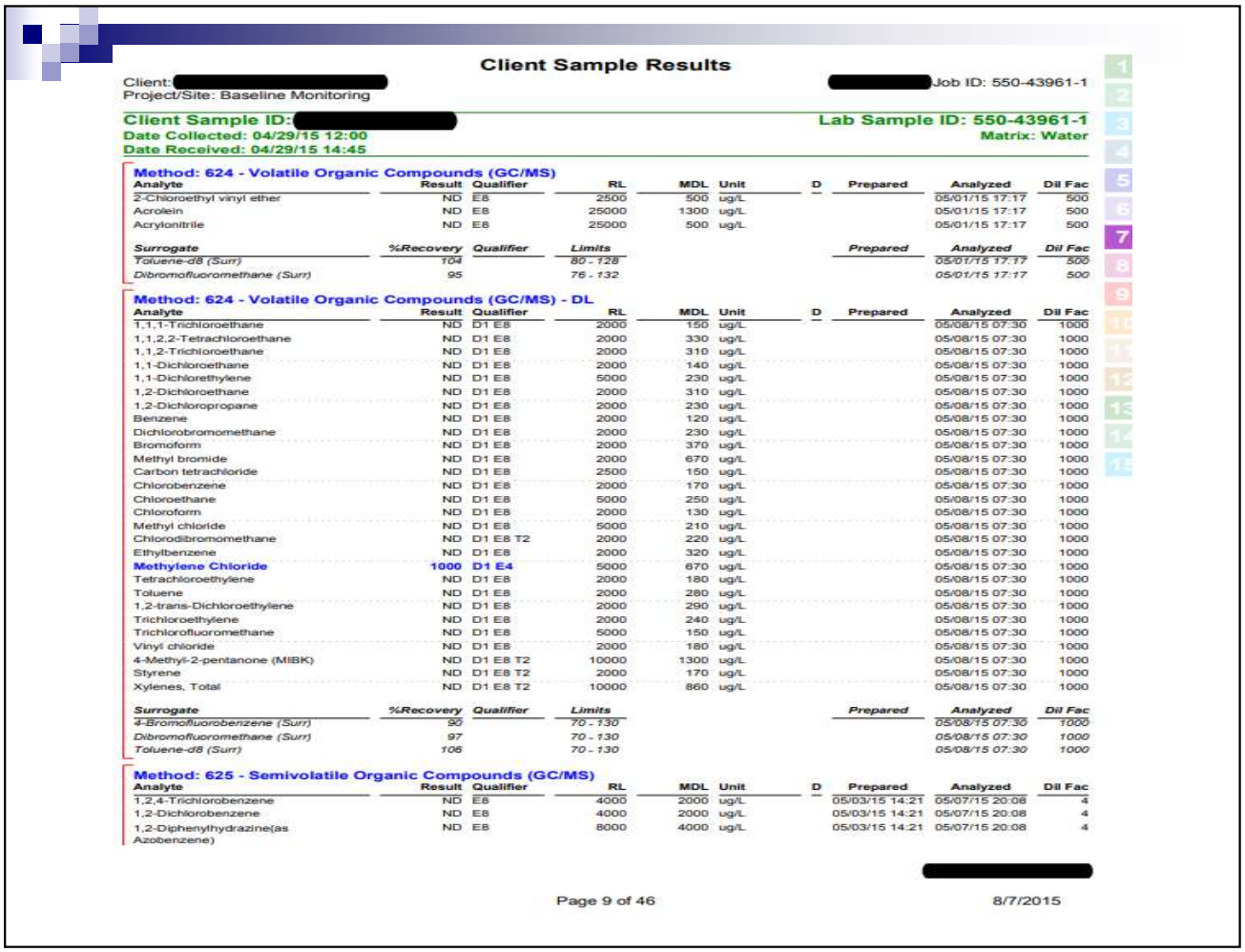
E4: Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL (Method Detection Limit).

D1: Sample required dilution due to matrix.



Client Sample Results

Client: [redacted]
Project/Site: Baseline Monitoring

[redacted] Job ID: 550-43961-1

Client Sample ID: [redacted]
Date Collected: 04/29/15 12:00
Date Received: 04/29/15 14:45

Lab Sample ID: 550-43961-1
Matrix: Water

Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloroethyl vinyl ether	ND	E8	2500	500	ug/L			05/01/15 17:17	500
Acrolein	ND	E8	25000	1300	ug/L			05/01/15 17:17	500
Acrylonitrile	ND	E8	25000	500	ug/L			05/01/15 17:17	500

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		80 - 128		05/01/15 17:17	500
Dibromofluoromethane (Surr)	95		76 - 132		05/01/15 17:17	500

Method: 624 - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	D1 E8	2000	150	ug/L			05/08/15 07:30	1000
1,1,2,2-Tetrachloroethane	ND	D1 E8	2000	330	ug/L			05/08/15 07:30	1000
1,1,2-Trichloroethane	ND	D1 E8	2000	310	ug/L			05/08/15 07:30	1000
1,1-Dichloroethane	ND	D1 E8	2000	140	ug/L			05/08/15 07:30	1000
1,1-Dichloroethylene	ND	D1 E8	5000	230	ug/L			05/08/15 07:30	1000
1,2-Dichloroethane	ND	D1 E8	2000	310	ug/L			05/08/15 07:30	1000
1,2-Dichloropropane	ND	D1 E8	2000	230	ug/L			05/08/15 07:30	1000
Benzene	ND	D1 E8	2000	120	ug/L			05/08/15 07:30	1000
Dichlorobromomethane	ND	D1 E8	2000	230	ug/L			05/08/15 07:30	1000
Bromoform	ND	D1 E8	2000	370	ug/L			05/08/15 07:30	1000
Methyl bromide	ND	D1 E8	2000	670	ug/L			05/08/15 07:30	1000
Carbon tetrachloride	ND	D1 E8	2500	150	ug/L			05/08/15 07:30	1000
Chlorobenzene	ND	D1 E8	2000	170	ug/L			05/08/15 07:30	1000
Chloroethane	ND	D1 E8	5000	250	ug/L			05/08/15 07:30	1000
Chloroform	ND	D1 E8	2000	130	ug/L			05/08/15 07:30	1000
Methyl chloride	ND	D1 E8	5000	210	ug/L			05/08/15 07:30	1000
Chlorodibromomethane	ND	D1 E8 T2	2000	220	ug/L			05/08/15 07:30	1000
Ethylbenzene	ND	D1 E8	2000	320	ug/L			05/08/15 07:30	1000
Methylene Chloride	**1000**	**D1 E4**	5000	670	ug/L			05/08/15 07:30	1000
Tetrachloroethylene	ND	D1 E8	2000	180	ug/L			05/08/15 07:30	1000
Toluene	ND	D1 E8	2000	280	ug/L			05/08/15 07:30	1000
1,2-trans-Dichloroethylene	ND	D1 E8	2000	290	ug/L			05/08/15 07:30	1000
Trichloroethylene	ND	D1 E8	2000	240	ug/L			05/08/15 07:30	1000
Trichlorofluoromethane	ND	D1 E8	5000	150	ug/L			05/08/15 07:30	1000
Vinyl chloride	ND	D1 E8	2000	180	ug/L			05/08/15 07:30	1000
4-Methyl-2-pentanone (MIBK)	ND	D1 E8 T2	10000	1300	ug/L			05/08/15 07:30	1000
Styrene	ND	D1 E8 T2	2000	170	ug/L			05/08/15 07:30	1000
Xylenes, Total	ND	D1 E8 T2	10000	860	ug/L			05/08/15 07:30	1000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		70 - 130		05/08/15 07:30	1000
Dibromofluoromethane (Surr)	97		70 - 130		05/08/15 07:30	1000
Toluene-d8 (Surr)	106		70 - 130		05/08/15 07:30	1000

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
1,2-Dichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
1,2-Diphenylhydrazine(as Azobenzene)	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4

[redacted]

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E8: Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

D1: Sample required dilution due to matrix.

Surrogate Summary

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Method: 624 - Volatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	TOL (80-128)	DBFM (76-132)
440-108054-E-5 MS	Matrix Spike	97	99
440-108054-E-5 MSD	Matrix Spike Duplicate	101	98
550-43961-1	[redacted]B213	104	95
550-43961-2	Trip Blank	103	99
LCS 440-252325/5	Lab Control Sample	96	97
LCSD 440-252325/6	Lab Control Sample Dup	98	99
MB 440-252325/4	Method Blank	102	99

Surrogate Legend
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 624 - Volatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	BFB (70-130)	DBFM (70-130)	TOL (70-130)
550-43844-C-1 MS	Matrix Spike	98	107	105
550-43844-C-1 MSD	Matrix Spike Duplicate	104	101	104
550-43961-1 - DL	[redacted]B213	90	97	106
550-43961-2	Trip Blank	92	102	103
LCS 550-62906/3	Lab Control Sample	90	96	99
LCSD 550-62906/4	Lab Control Sample Dup	97	106	105
MB 550-62906/5	Method Blank	91	87	103

Surrogate Legend
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	2FP (30-120)	NBZ (45-120)	TBP (40-120)	FBP (50-120)	TPH (10-150)	PHL (35-120)
550-43961-1	[redacted]B213	64	76	75	74	80	70
LCS 440-252617/2-A	Lab Control Sample	55	64	74	67	67	62
LCSD 440-252617/3-A	Lab Control Sample Dup	53	66	80	68	73	56
MB 440-252617/1-A	Method Blank	56	67	81	71	82	61

Surrogate Legend
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl
TPH = Terphenyl-d14
PHL = Phenol-d6

[redacted]

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-252325/4
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloroethyl vinyl ether	ND	E8	5.0	1.0	ug/L			05/01/15 08:35	1
Acrolein	ND	E8	50	2.5	ug/L			05/01/15 08:35	1
Acrylonitrile	ND	E8	50	1.0	ug/L			05/01/15 08:35	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 128		05/01/15 08:35	1
Dibromofluoromethane (Surr)	99		76 - 132		05/01/15 08:35	1

Lab Sample ID: LCS 440-252325/5
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloroethyl vinyl ether	25.0	23.7		ug/L		95	37 - 150
Acrolein	25.0	9.43	E4	ug/L		38	10 - 145
Acrylonitrile	250	263		ug/L		105	48 - 140

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	96		80 - 128
Dibromofluoromethane (Surr)	97		76 - 132

Lab Sample ID: LCSD 440-252325/6
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Chloroethyl vinyl ether	25.0	24.0		ug/L		96	37 - 150	1	25
Acrolein	25.0	8.66	E4	ug/L		35	10 - 145	9	30
Acrylonitrile	250	251		ug/L		100	48 - 140	5	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	98		80 - 128
Dibromofluoromethane (Surr)	99		76 - 132

Lab Sample ID: 440-108054-E-5 MS
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Chloroethyl vinyl ether	ND	E8	25.0	23.4		ug/L		94	10 - 140
Acrolein	ND	E8	25.0	9.76	E4	ug/L		39	10 - 147
Acrylonitrile	ND	E8	250	254		ug/L		102	38 - 144

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	97		80 - 128
Dibromofluoromethane (Surr)	99		76 - 132

[redacted]

Lab Chronicle

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted]B213 **Lab Sample ID: 550-43961-1**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		500	252325	05/01/15 17:17	RM	[redacted]
Total/NA	Analysis	624	DL	1000	62906	05/08/15 07:30	UT	[redacted]
Total/NA	Prep	625			252617	05/03/15 14:21	AK	[redacted]
Total/NA	Analysis	625		4	253529	05/07/15 20:08	AI	[redacted]
Total/NA	Analysis	8015B		1	252962	05/05/15 16:49	KS	[redacted]
Total/NA	Prep	608			62523	05/04/15 11:27	CPA	[redacted]
Total/NA	Analysis	608		5	62555	05/04/15 22:07	ANT	[redacted]
Total/NA	Prep	608			62523	05/04/15 11:27	CPA	[redacted]
Total/NA	Analysis	608		5	62556	05/04/15 22:07	ANT	[redacted]
Total/NA	Prep	8315_W_Prep			252177	04/30/15 13:35	JB	[redacted]
Total/NA	Analysis	8315A		1	252361	05/01/15 11:19	DD	[redacted]
Total/NA	Prep	200.7			62315	04/30/15 11:47	SGO	[redacted]
Total/NA	Analysis	200.7 Rev 4.4		1	62492	05/02/15 00:13	AJC	[redacted]
Total/NA	Prep	245.1			62704	05/06/15 09:21	JRC	[redacted]
Total/NA	Analysis	245.1		1	62795	05/06/15 15:14	JRC	[redacted]
Total/NA	Analysis	SM 2540D		1	62282		YAF	[redacted]
					(Start)	04/30/15 09:15		
					(End)	05/01/15 09:40		
Total/NA	Prep	SM 4500 CN C			62444	05/01/15 14:30	BCB	[redacted]
Total/NA	Analysis	SM 4500 CN E		1	62465	05/01/15 16:53	BCB	[redacted]
Total/NA	Analysis	SM 4500 H+ B		1	62258	04/29/15 18:15	CDC	[redacted]
Total/NA	Analysis	SM 5210B		160	62348		CDC	[redacted]
					(Start)	04/30/15 17:22		
					(End)	05/05/15 13:29		

Client Sample ID: Trip Blank **Lab Sample ID: 550-43961-2**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	252325	05/01/15 12:42	RM	TAL IRV
Total/NA	Analysis	624		1	62906	05/08/15 04:56	UT	TAL PHX

Laboratory References:
[redacted]

[redacted]

Certification Summary

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Laboratory: [redacted]
The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arizona	State Program	9	A[redacted]	06-09-16

Laboratory: [redacted]
All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA[redacted]	06-30-16
Arizona	State Program	9	A[redacted]	10-13-15
California	LA Cty Sanitation Districts	9	[redacted]	01-31-16 *
California	State Program	9	[redacted]	06-30-16
Guam	State Program	9	Cert. No. [redacted]	01-23-16
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA[redacted]	07-31-15
New Mexico	State Program	6	N/A	01-29-15 *
Northern Mariana Islands	State Program	9	MP[redacted]	01-29-15 *
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P[redacted]	06-06-15

* Certification renewal pending - certification considered valid.

[redacted]

Chain of Custody Record

8/7/2015

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Client Information	Sampler:	Lab PM:	Carrier Tracking No(s):	COC No: 550-16357-5061.1
Client Contact:		E-Mail:		Page: Page 1 of 1
Company:				Job #:
Address:	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Phoenix	TAT Requested (days): NORMAL			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: AZ, 85043	PO #: Pay by Credit Card			
Phone:	WO #:			
Email:	Project #: 55005422			Other:
Project Name: Baseline Monitoring	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	200.7_CNVA, 245.1	25400, SM9215B_Calc	608_PCB, 8082_Prep, 625	4500_CN_E - Cyanide, Total	8015B_DAI - Methanol	8315 - Local Method	624_15ml_UP_3D - Acrolein, Acrylonitrile and 2-Chloroethyl	SM4500h_H+ - pH and Temperature	624_PREC - (WOD) 624 List	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N	N	B	A	N	N	N	A		
[redacted] B2134	4/24/15	12:00	C	Water	N	N	X	X	X	X	X	X	X	X	X		
				Water													
				Water													
				Water													

550-43961 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	4/24/15 2:45PM	[redacted]			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	4/24/15 1445	[redacted]

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.0°C, 3.7°C

Login Sample Receipt Checklist

Client: [redacted]

Job Number: 550-43961-1

Login Number: 43961
List Number: 1
Creator: Shoemaker, Cory M

List Source: [redacted]

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

[redacted]

QUESTION

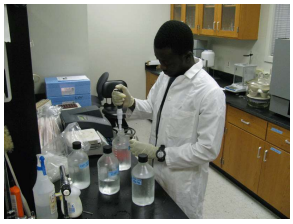
Who is responsible should the lab make mistakes or encounter any of these issues?

- Incorrect analysis method
- Failure to analyze
- Reporting limit for parameter is too high for permit compliance
- Preservation issues
- Matrix interferences

The Industrial User is responsible!

NOTES:

WHAT A LABORATORY MAY BE ABLE TO DO FOR YOU OTHER THAN ANALYSES



Provide Consultation Regarding:

- Sampling & Preservation
- Documenting Sample Collection
- Equipment Cleaning
- Discuss Services/Analyses
- Discuss Price $$$

Provide Containers

Provide Sample/Flow Collection

NOTE: Contact with Analyst is Rare

Laboratory consultation may include:

- Provide information about appropriate sampling & preservation methods
- Instructions for documenting your sampling efforts; (Chain-of-Custody, sampling logs, etc.)
- Information about sampling equipment cleaning
- Provide information about appropriate analysis methods that can be used to demonstrate compliance

The laboratory may:

- Provide sampling supplies and/or bottles (preserved and unpreserved)
- Perform sampling and flow measurements

The lab account or project manager will:

- Discuss with you the services/analysis you want
- Discuss the price you will pay for each service and/or analysis
- You will probably never talk to the actual analyst

TYPICAL LABORATORY COSTS

Parameter	Analytical Method	Range of Unit Cost		
		Eurofins	Legend	Aquatic
Metals	200.7, 200.8	$20-30 each	$15-25 each	$25 each
Mercury	245.1	$50	$44	$65
BOD_5	SM5210B	$55	$53	$50
TSS	SM2540D	$30	$19	$35
Fluoride	300.0	$30	$22	$30
Cyanide (T)	SM 4500 CN E	$50	$61	$70
NH_3, Ammonia	350.1	$40	$33	$30
HEM (O & G) or SGT-HEM	EPA 1664B	$75 or $140	$121	$140 or $175
Carbamates	531.2	N/A	$189	NL
VOCs	624.1	$100	$210 or $315	$225
SVOCs	625	$180	$390	*
Pests & PCBs	608	$200	$200	*

Note: Prices from the above are provided for information only and are not an endorsement or recommendation by the City. Metals list can include the full slew of elements or you can choose which ones for permit specific requirements; BOD_5 = Boiochemical/Biological Oxygen Demand; TSS = total suspended solids; VOCs = volatile organic compounds; SVOCs = semivolatile organic compounds; Pest & PCBs = pesticides and polychlorinated biphenyls
NL = Not Listed *Call for pricing

Notes: Recently updated 2023

Remember that these prices are going to vary by facility due to contract pricing, # of tests and frequency.

Metals often have packages that you can order with priority pollutants and more for a reduced cost – in some cases quite a bit less (half price)!

WHAT TO TELL THE LAB

- The **medium** or **matrix**, i.e., that your sample is **wastewater**
- The specific **parameters** to analyze
- The **method** and **reporting limit** required
- The **due date** for results
- **When** you plan to deliver the sample

WHAT TO TELL THE LAB

- Anything unusual or challenging about the sample
  - Extra preservative added
  - Extra ascorbic acid needed
  - Color
  - Odor
  - Possible Matrix interferences: Surfactants, Buffers, Chelating Agents, Chlorine, Strength or TDS, etc.

WHAT TO TELL THE LAB

- Tell the lab you need the following documentation in the lab report:
  - Sample Location or Location Code
  - Sample Collection & Analysis Dates
  - Analyst ID
  - Method Used
  - Numerical Result with Units
  - Reporting Limit (The "<" Number)
  - QC Data (Routine versus Custom)
  - Data Qualifiers

http://apps.azsos.gov/public_services/Title_09/9-14.pdf

TITLE 9. HEALTH SERVICES

CHAPTER 14. DEPARTMENT OF HEALTH SERVICES LABORATORIES

Supp. 06-4

ARTICLE 1. DIRECT ACCESS TESTS AND LABORATORY STANDING ORDERS

R9-14-617. Laboratory Records and Reports

A licensee or applicant shall ensure that:

8. The final report of compliance testing contains:

a. The name, address, and telephone number of the laboratory;

b. The license number assigned to the laboratory by the Department;

c. Actual scientifically valid and defensible results of compliance testing in appropriate units of measure, obtained in accordance with an approved method and quality assurance plan;

d. Qualified results of compliance testing not obtained in accordance with an approved method and quality assurance plan;

e. A list of each approved method used to obtain the reported results;

f. Sample information, including the following:

i. The unique sample identification assigned at the laboratory,

ii. The location or location code of sample collection,

iii. The sample collection date and time,

iv. The name of the individual who collected the sample,

v. The name of the client that submitted the sample to the laboratory, and

vi. The name of the individual who submitted the sample to the laboratory;

g. The date of analysis for each parameter reported;

h. The date of the final report; and

i. The laboratory director's or designee's signature.

http://www.azsos.gov/public_services/Title_09/9-14.htm

WHEN THE CITY DISAGREES

When we disagree with you about the validity of a result, we will evaluate:

- Sampling procedures & documentation
- Method used (sensitivity)
- QC documentation

If it is not documented, it did not happen.

When evaluating QC documentation some of the data looked at include the following:

- Initial and continuing equipment calibration data.
- Results of spike and duplicate samples.
- Results of trip and equipment blanks.

QUIZ

QUIZ

1. A lab can be licensed in Arizona to perform environmental analyses on:

   A. **Drinking water**
   B. **Wastewater**
   C. **Hazardous Waste**
   D. **Air**
   E. **All the above**

QUIZ

2. Cost is the most important factor to consider when choosing an analytical method.

True

or

False

QUIZ

3. Quality Assurance/Quality Control (QA/QC) documentation can be verbal.

True

or

False

QUIZ

4. Your Permit limit for Cadmium is 0.047 mg/L. Your lab can report data at 0.04 mg/L.

   Is this good enough for compliance?

Yes

or

No

QUIZ

5. Your Permit limit for Copper is 1.5 mg/L.
   Your lab can report data at 1.0 mg/L.

   Is this good enough for compliance?

Yes

or

No

QUIZ

6. What four things must you tell your lab?
   A. **What parameter to analyze**
   B. **That it is a wastewater sample**
   C. **What method and reporting limit you need**
   D. **Your birth date**
   E. **What documentation you want**

QUIZ

7. You must use a lab that:

   A. **Is licensed by ADHS**
   B. **Is located in Arizona**
   C. **Is licensed for your method**
   D. **Is licensed for your parameter**

QUIZ

8. If there is a question on any analytical result, what should you check?

A. **Sampling procedures**
B. **Visa card limit**
C. **Sampling location**
D. **Analytical method used**
E. **Sample ID number**
F. **QA/QC documentation**
G. **Holding time**

QUIZ

9. Sample dilution factors during lab analysis can affect:

   A. **Holding times**
   B. **Reporting limits**
   C. **Has no effect on the results**

QUIZ

10. There is no benefit to sampling early in the month or quarter.

True

or

False

REFERENCES

- **Acronyms & Glossary**
- **List of Pretreatment Point Source Categories**
- **40 CFR 136 Table IB – List of Approved Inorganic Test Procedures** http://www.gpoaccess.gov/ecfr/
- **40 CFR 136 Table II – Required Containers, Preservation Techniques, and Holding Times**
- **Arizona Data Qualifiers Revision 4.0 09/05/2012**
- **Periodic Table of Elements**

Questions or Comments

Please take the survey and tell us how we did!

ACRONYMS

LIST OF ACRONYMS

AA	Atomic Absorption Spectrophotometer
AAC	Arizona Administrative Code
AC (power)	Alternating current
AC	Acre
ACHIH	American Conference of Governmental Industrial Hygienists
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADRE	Average Daily Removal Efficiency
AHL	Allowable Headworks Loading
AIL	Allowable Industrial Loading
AMSA	Association of Municipal Sewage Authorities
ANSI	American National Standard Institute
APHA	American Public Health Association
APP	Aquifer Protection Permit
AS	Activated Sludge
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWQS	Aquifer Water Quality Standards
AWT	Advanced Wastewater Treatment
AWWA	American Water Works Association
AZPDES	Arizona Pollutant Discharge Elimination System
BL	Background Loading
BMPs	Best Management Practices
BNR	Biological Nutrient Removal
BOD_5	Biochemical Oxygen Demand
BPJ	Best Professional Judgment
BTU	British Thermal Unit
C	Celsius
CBOD	Carbonaceous Biochemical Oxygen Demand
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act.
CFR	Code of Federal Regulations
CBOD	Carbonaceous Biochemical Oxygen Demand

LIST OF ACRONYMS

CH4	Methane
CIU	Categorical Industrial User
CMOM	Capacity Management, Operations, and Maintenance
COD	Chemical Oxygen Demand
CSP	Confined Space Permit
CWA	Clean Water Act
CWT	Centralized Waste Treatment
D	Daily
DAF	Dissolved Air Flotation
DEHP	Di(2-ethylhexyl)phthalate
DF	Dilution Factor
DL	Detection Limit
DO	Dissolved Oxygen
DRO	Diesel Range Organics
EDW	Effluent Dominated Waters
EIS	Environmental Impact Statement
FDA	Food and Drug Administration
EMF	Electromotive Force or Voltage
F	Fahrenheit
FT	Fume Toxicity
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatograph / Mass Spectrophotometer
GFAA	Graphite Furnace Atomic Adsorption
GPD	Gallons per Day
GPM	Gallons per Minute
GRO	Gasoline Range Organics
HCP&ERP	Hazard Communications Program and Emergency Response Plan
HRT	Hydraulic Retention Time
HW	Hazardous Waste
H_2S	Hydrogen Sulfide
IC	Ion Chromatograph
ICP	Inductively Coupled Plasma (Atomic Emission Spectroscopy)
IDL	Instrument Detection Limit
IEEE	Institute of Electrical and Electronics Engineers
IU	Industrial User

LIST OF ACRONYMS

kg	Kilogram
L	Liter
Lb	Pound
lb/day	pounds per day
LEL	Lower Explosive Limit
LIMS	Laboratory Information Management System
M	Mole or Molar
MAG	Maricopa Association of Governments
MADL	Minimum Analytical Detection Limit
MAHL	Maximum Allowable Headworks Limit
MAV	Monthly Average
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MRL	Method Reporting Limit
mg	Milligram
mg/L	Milligrams per liter
MGD	Million Gallons per Day
mL	Milliliter
MLSS	Mixed Liquor Suspended Solids
MPN	Most Probable Number
MS	Mass Spectrometer
MSDS	Material Safety Data Sheet
MTBE	Methyl tetbutyl ether
ND	Non-Detected
NdeN	Nitrification/denitrification
NEPA	National Environmental Policy Act
NIOSH	National Institute of Occupational Safety & Health
NPDES	National Pollutant Discharge Elimination System
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standards
NTU	Nephelometric Turbidity Unit(s)
O&M	Operations and Maintenance
OMB	Office of Management and Budget
P	Pico, a metric prefix meaning on millionth of a millionth or one trillionth
PAC	Powdered Activated Carbon

LIST OF ACRONYMS

PCB	Polychlorinated Biphenyls
ESD	Environmental Services Division
PEL	Permissible exposure limit
PQL	Practical Quantitation Limit
POC	Pollutant of Concern
POTW	Publicly Owned Treatment Works
ppb	parts per billion
ppm	parts per million
PSES	Pretreatment Standards for Existing Sources
PSNS	Pretreatment Standards for New Sources
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RL	Reporting Limit
RO	Reverse Osmosis
SCADA	Supervisory Control and Data Acquisition
SCP	Spill Control Plan
SD	Standard Deviation
SDW	Safe Drinking Water
SGT-HEM	Silica Gel-Treated Hexane-Extractable Material
SIC	Standard Industrial Classification
SIU	Significant Industrial User
SOP(s)	Standard Operating Procedure(s)
SROG	Sub-regional Operating Group
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
SU	Standard Units
SVOCs	Semivolatile Organic Compounds
SWQS	Surface Water Quality Standards
TC	Total Carbon
TCE	Trichlorethylene
TDS	Total Dissolved Solids
TEC	Transportation Equipment Cleaning
TIC	Total Inorganic Carbon

LIST OF ACRONYMS

TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TOC	Total Organic Carbon
TOMP	Toxic Organic Management Plan
TPH	Total Petroleum Hydrocarbons
TS	Total Solids
TSDF	Treatment Storage and Disposal Facility
TSS	Total Suspended Solids
TTO	Total Toxic Organics
U	Micro, a metric prefix meaning one millionth
ug/L	microgram per liter
VOC(s)	Volatile Organic Chemical(s)
WW	Wastewater
WWTP	Waste Water Treatment Plant

GLOSSARY

GLOSSARY

Industrial wastewater pretreatment uses words and phrases that may not be readily understood by the general public. This section provides definitions for many of the terms frequently used by Compliance Academy Instructors.

Accuracy – Accuracy refers to the degree of difference between observed values and know or actual value in the analysis of wastewater.

Acid – A compound which liberates hydrogen ions, and has a pH below 7.

Act or "the Act" – The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 U.S.C. 1251 et.seq.

Acute Effects – When the effects of an exposure to a pollutant (*over a short period of time*) cause severe health effects to humans or other organisms, this condition is said to be acute (*as compared to chronic*).

Administrator – The Administrator of the U.S. Environmental Protection Agency.

Agency – The U.S. Environmental Protection Agency

Alkalinity – The measurement of a sample's capacity to neutralize acid.

Aliquot – A portion of the sample needed to run the analysis.

Analyte - Parameter

Annual Report – A consolidated report covering the pretreatment year beginning January 1st and ending December 31st that includes information required by EPA NPDES (EPA) Permits and the AZPDES (Arizona State)Permit.

Approval Authority – The Director in an NPDES state with an approved State Pretreatment Program and the Administrator of the EPA in a non-NPDES state or NPDES state without an approved State Pretreatment Program.

Approved Laboratory Procedures – The measurements, tests, and analyses for the characteristics of water and wastes in accordance with analytical procedures as established in 40 CFR part 136 as revised, that are performed by an environmental laboratory licensed by the State. Alternative procedures may be approved by the Director in accordance with applicable federal regulations.

Arizona Department of Environmental Quality or ADEQ - Established by the Arizona Legislature in 1986, ADEQ administers a variety of programs to ensure the quality of Arizona's air, land and water resources.

Atomic Weight – The sum of the number of protons and the number of neutrons in the nucleus of an atom. Atomic weights of elements are found on the periodic tables.

Authorized Representative of Industrial User 40 CFR 403.12(l) and (m) – An authorized representative of an industrial user may be: principal executive officer, of at least the level of vice-president, if the IU is a corporation; a general partner or proprietor if the IU is a partnership or proprietorship,

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respectively; a duly authorized representative of the individual if such a representative is responsible for the overall operation of the facilities from which the discharge originates.

Authorized Signatory/ Representative -The appropriate signatory or representative authorized to sign permit applications, self-monitoring reports, and any other reports addressing Permit noncompliance or required by any enforcement action by the Control Authority.

Average Daily Flow – The total quantity of liquid tributary to a point divided by the number of days of flow measurement.

Batch Discharger – Batch dischargers collect all process wastewaters until a certain volume is reached before treating and discharging to sewer (also batch discharge).

BAT – The best available technology economically achievable, applicable to effluent limitations to be achieved by July 1, 1984, for industrial discharges to surface waters, as defined by Sec.304(b)(2)(B) of the CWA.

Base – A compound which liberates hydroxide ions, and has a pH above 7.

Baseline Monitoring Report (BMR) – A report which provides information to the Control Authority to document an IUs initial compliance status with a Categorical Pretreatment Standard prior to the compliance deadline. (40 CFR 403.12). All new source industrial users subject to categorical standards must submit a BMR to the Control Authority (POTW, State or EPA), at least 90 days prior to the commencement of discharge. The purpose of the BMR is to provide initial information to the Control Authority including identifying information, description of existing environmental permits, description of operations, flow measurements (estimated), and the concentration of pollutants in the waste stream (estimated). Existing sources were required to submit BMRs within 180 days after the effective date of any applicable categorical standard.

BCT – The best conventional pollutant control technology, applicable to discharges of conventional pollutants from existing industrial point sources, as defined by Sec. 304(b)(4) of the CWA.

Best Management Practice(BMP) – BMPs are activities, pollution treatment practices, or devices, prohibition of practices, general good housekeeping practices, pollution prevention, waste minimization, educational practices, maintenance procedures, and other management practices or devices to prevent or reduce the amount of pollutants entering the sanitary sewer system, surface water, air, land or groundwater. BMPs may include a structural or managerial practice or device that can help to achieve compliance.

Biochemical Oxygen Demand (BOD) – The quantity of oxygen utilized in the bio-chemical oxidation of organic matter under standard laboratory procedure, five (5) days at 20^0 centigrade expressed in terms of weight and concentration as milligrams per liter (mg/l).

Biological Treatment – A waste treatment process by which bacteria and other microorganisms break down complex organic or inorganic (e.g. ammonia) materials into simple, nontoxic, more stable compounds.

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Blank (Field) – Is an aliquot of analyte-free water or solvent brought to the field in sealed containers and transported back to the laboratory with the sample containers and analyzed along with the field samples.

Blank (Method) – Is an aliquot of analyte-free water prepared in the laboratory and analyzed by the analytical method used for field samples. Method blanks are used to test for the cleanliness of reagents, instruments, and the laboratory environment.

Blank (Sample Preservation) – Is an aliquot of analyte-free water (*usually distilled water*) to which a known quantity of preservative is added. This type of sample is a means of determining the level of contamination of acid and chemical preservatives after a period of use in the field.

Blowdown - The discharge of water with high concentrations of accumulated solids from boilers to prevent plugging of the boiler tubes and/or steam lines. In cooling towers, blowdown is discharged to reduce the concentration of dissolved salts in the recirculation cooling water. Clean "make-up" water is added to dilute the dissolved salts in the system. Blowdown also includes the discharge of condensate.

BPT – The best practical control technology currently available, applicable to effluent limitations to be achieved by July 1, 1977, for industrial discharges to surface waters, as defined by 304(b)(1) of the CWA.

Bypass – The intentional diversion of wastes from any portion of a treatment facility.

Categorical Industrial Users (CIUs) – A Categorical Industrial User is a facility that performs activities regulated under 40 CFR Parts 401-424 and 425-471.

Categorical Standards – Those standards promulgated by the EPA under authority of section 307 U.S. Code section 1317) which apply to a specific category of industrial user and which are published in 40 CFR chapter I, subchapter N (parts 405-471).

Centralized Waste Treatment Facility – A public or private facility which treats hazardous and other wastes. These facilities are designed to handle the treatment of specific hazardous wastes from industry. The waste waters containing the hazardous substances are transported to the facility for proper storage, treatment and disposal.

Chain of Custody – Written documentation, such as receipt and log book entries to show the history of possession of a sample from the time it was collected through the time it was analyzed.

Chemical Oxygen Demand – A measure of the oxygen-consuming capacity of inorganic and organic matter present in water or wastewater. It is expressed as the amount of oxygen consumed by a chemical oxidant during a specific test. It does not differentiate stable organic matter and thus does not necessarily correlate with biochemical oxygen demand.

Chemical Treatment Process – A waste treatment process which involves the addition of chemicals to achieve a desired level of effluent quality.

Chronic Effects – When the effect of a single or repeated exposure(s) to a pollutant causes health effects over a long period of time in humans or other organisms this is said to be a chronic condition (*as compared to acute*).

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Chronic Violations – Recurring effluent violations where the limit *(daily or monthly maximum*) is exceeded by any amount.

Chronic SNC (CSNC)- For SNC purposes, Chronic Violations are defined as sixty-six (66) percent or more of all the measurements taken during a six-month period meet or exceed the daily limit or the monthly average for the same pollutant parameter.

City – The City of Phoenix

Civil Action – A suit filed by the City against alleged violators of applicable pretreatment standards seeking injunctive relief, compliance, civil penalties and/or damages.

Civil Penalty – Monetary penalties assessed against an IU. Penalty calculations are formula based on the extent and type of noncompliance. Civil penalties recover the economic benefit of IU noncompliance and are set large enough to deter future noncompliance (*maximum $25,000 per day for each violation*).

Clarification – Any process or combination of processes, the primary purpose of which is to reduce the concentration of suspended matter in a liquid by coagulation and settling.

Clean Water Act (CWA) – The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1251 et seq.), as amended by the Clean Water Act of 1977 (Pub. L. 95-217), and the Water Quality Act of 1987 (Pub. L. 100-4).

Code of Federal Regulations – A publication of the United States government which contains all of the finalized federal regulations. Federal environmental regulations are found in volume 40 of the CFR and the General Pretreatment Regulations are found at 40 CFR Part 403.

Combined Wastestream (40 CFR 403.6(e)1 - When process effluent is mixed prior to treatment with wastewaters other than those generated by the regulated process, fixed alternative discharge limits may be derived using the Combined Wastesteam Formula.These alternative limits shall be applied to the mixed effluent by calculating both an alternative daily maximum value using the daily maximum values specified in the appropriate categorical pretreatment standards and an alternative consecutive sampling day average value using the monthly average values specified in the appropriate categorical pretreatment standards.

Commercial User – Any nonresidential user which provides a service or one connected with commerce and which is not classified as an industrial user.

Compatible Pollutants – Pollutants that are capable of being processed (a) by a biological wastewater treatment plant under normal loading conditions, and (b) in concentrations that are normally present in wastewater, without any detrimental effect on the plant's performance.

Compliance – When an industrial discharger has committed no pretreatment violations during the reporting year.

Compliance Schedule – A timetable established by an IU for completing those actions necessary to achieve compliance with a standard.

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Compliance Sampling Point – An opening in the sewer line that provides access for City and IU compliance sampling. Each point (location) is specific to the IU and identified in the discharge Permit. Compliance sampling points can be a valve, flume, weir or tank.

Concentration Based Limit – A limit based on the relative strength of a pollutant in a wastestream, usually expressed in mg/l or lb/gal.

Confined Space – A space which, by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants (*or create an atmosphere of oxygen deprivation*),and which is not intended for continuous employee occupation. A permit may be required under OSHA to enter a confined space.

Conservative Pollutant – A pollutant found in wastewater that is not metabolized while passing through the treatment processes in a conventional wastewater treatment plant. Therefore a mass balance can be constructed to account for the distribution of the conservative pollutant. For example, a conservative pollutant may be removed by the treatment process and retained in the plant's sludge or it may leave the plant in the effluent. Although the pollutant may be chemically changed in the process, it can still be detected. Heavy metals such as cadmium and lead are conservative pollutants.

Control Authority (403.12(a) – The term "control authority" shall refer to a City which has an approved Pretreatment Program under provision of 40 CFR 403.11.

Conventional Pollutants – Those materials for which municipal wastewater treatment plants have been designed, including biodegradable organics, measured as BOD and suspended solids.

Cooling Water – The clean wastewater discharged from any heat transfer system such as condensation, air conditioning, cooling or refrigeration.

Custody – Custody refers to the process whereby an individual gains and controls possession of a sample. A sample is in custody if: 1) it is in the actual possession, control, and presence of the inspector; or 2) it is in the individual's view; or 3) it is not in the individual's presence, but is in a place of storage where only the individual has access; or 4) it is not in the individual's physical presence, but is in a place of storage and only the individual and identified other have access.

Daily Maximum – Is the average value of all grab samples taken during any given calendar day. If only one grab sample has been taken, that grab sample becomes the daily maximum (*as well as the instantaneous maximum*). If more than one grab sample is taken in a giver day, the daily maximum is the average of all the individual grab samples. A composite sample, by definition, becomes the daily maximum for the calendar day in which it is collected.

Daily Discharge – The discharge of a pollutant measured during any calendar day or any 24-hour period that reasonably represents a calendar day.

Density – The relationship between weight and volume, e.g., grams per cubic centimeter, or pounds per gallon.

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Detention Times – The residence time of wastewater undergoing treatment in a treatment unit such as a clarifier or tank. Minimum detention times are required for settling, chemical treatment and biological treatment.

Digestion – A procedure to solubilize suspended material and to destroy possible organic-metal complexes.

Direct Discharge – The discharge of treated or untreated wastewater directly to the waters of the State of Arizona.

Director – The Water Services Director of the Water Services Department or his authorized deputy, agent, or representative.

Domestic Waste – A typical residential-type waste which requires no pretreatment before discharging into the sewer system excluding all commercial, manufacturing and industrial wastes.

Doppler Flow Meter – An ultrasonic flow meter that measures the velocity of liquid in a pipe flowing full.

Duplicate Recovery – The percent of a spike recovered during analysis.

Duplicate Sample (Field)– Is a precision check on sampling equipment and sampling technique. At selected stations on a random time frame duplicate samples are collected from two sets of field equipment installed at the site, or duplicate grab samples are collected from a single piece of equipment at the site.

Duplicate Sample (Laboratory)– A sample which is received by the laboratory and divided (*by the laboratory*) into two or more portions. Each portion is separately and identically prepared and analyzed. The results from laboratory duplicate samples check the laboratory precision.

Effluent – Wastewater or other liquid raw, untreated, partially or completely treated flowing from an IU to a reservoir, basin, treatment process or treatment plant.

Electroplating – The process for applying a thin metal coating to the surface of a metal (substrate) by electrodeposition of dissolved metal in a plating solution.

Environmental Protection Agency, or EPA – The U.S. Environmental Protection Agency.

Enforcement Response Plan (ERP) – The Enforcement Response Plan for the City of Phoenix contains detailed procedures identifying how the Environmental Services Division will investigate and respond to instances of IU noncompliance.

Equipment Blank – Is a volume of analyte-free water that is taken into the field and opened on site. The contents of the blank are poured or pumped appropriately over or through the sample collection device.

Facility – All contiguous property owned, operated, leased or under the control of the same person or entity.

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Existing Source – Any source of discharge, the construction or operation of which commenced prior to the publication by the EPA of proposed categorical pretreatment standards, which will be applicable to such source if the standard is thereafter promulgated in accordance with Section 307 of the Act.

Federal Categorical Pretreatment Standard – Any regulation containing pollutant discharge limits promulgated by the EPA in accordance with Section 307(b) of the Act (33 U.S.C. 1347) which applies to a specific category of IUs. These standards are derived on the basis of best available treatment technology economically achievable and vary by industry category.

Flow Equalization – Temporary storage of wastewater flow to provide more uniform flow or waste characteristics for treatment or discharge.

Flow Meter - Flow meters measure the depth of a liquid at a designated point behind a hydraulic structure (a weir or flume) using various means (bubblers, ultrasonic, float, and differential pressure are common methods). This depth is converted to a flow rate according to a theoretical formula of the form $Q=KH^X$ where Q is the flow rate, K is a constant, H is the water level and X is an exponent which varies with the device used, or it is converted according to empirically derived level/flow data points (a 'flow curve'). The flow rate can then integrated over time into volumetric flow. Flow can also be calculated using velocity. Velocity times the cross-sectional area yields a flow rate which can be integrated to volumetric flow.

Flow-Proportional Composite Sample – A mixed sample composed of single samples whose volumes are proportional to the wastewater flow at the time of sampling.

Flow Systems– Closed Channel flow is flow in completely filled pressure conduits (pipes) and usually measured by some type of device inserted into the line. Open Channel flow is flow in any channel in which the liquid flows with a free surface (ditches, canals, flumes) and usually measured by inserting a hydraulic structure (flume, weir etc.).

Flume – An open conduit of wood, masonry, plastic or metal specially shaped to increase velocity and change the level of the liquid flowing through the flume (*Parshall, Palmer-Bowlus, Trapezoidal etc.*).

Free Access – The ability of City personnel to enter user facilities under safe and non-hazardous conditions with a minimum of delay to inspect any and all parts of the user's facility.

Generator – A person who generates septage.

Grab Sample – A single sample taken from a waste stream without regard to the flow in the wastestream and over a period of time not to exceed 15 minutes.

Hand Composite Sample – A series of time proportional grab samples collected at equal intervals and equal volumes that are composited by hand.

Hazardous Substances (Materials) – Any substances or combination of substances that present or pose potential dangers to human health and safety or to living organisms in the environment. The dangers may be short term or cumulative.

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Hazardous Waste – For a waste to be considered a hazardous waste it must first be designated a solid waste. Virtually all forms of wastes are considered to be solid wastes (including solids, liquids, semi-solids, and contained gaseous materials) except those expressly excluded under the regulatory definition, e.g., industrial effluent which is mixed with sanitary wastes in the sewer. For a solid waste to be considered hazardous it must meet on of the two criteria: 1) it has one of the following four characteristics – ignitibility, corrosivity, reactivity, or toxicity (*according to the Toxicity Characteristic Leaching Procedure*). or 2) it must be a listed hazardous waste in 40 CFR 261.31-261.33. Any waste, including wastewater, defined as hazardous under RCRA, TSCA, or any state law.

Head Loss – (1) The decrease in energy head between two points resulting from friction, bends, obstructions, expansion, or other causes. (2) the difference between the total heads at two points in a hydraulic system.

Holding Tank Waste – Any waste from holding tanks such as vessel, chemical toilets, campers, trailers, septic tanks, and vacuum-pump tank trucks.

Holding Time – The maximum time allowed between when a sample is taken and when it must analyzed in the laboratory in accordance with standard preservation, storage and analytical procedures.

Hydrogen Sulfide (H_2S) – Dissolved Sulfide is produced by the biological reduction of sulfate and organic matter under anaerobic (oxygen free) conditions. Dissolved sulfide can combine with hydrogen to form hydrogen sulfide gas. H_2S gas is potentially hazardous to sewer maintenance workers.

Incompatible Pollutants – See: Noncompatible Pollutants

In-Compliance – The concentrations of pollutants in an industrial user's discharges to a POTW are within pretreatment standards and all pretreatment requirements are being met over the long term.

Industrial Wastewater – Any non-domestic wastewater (excluding storm water).

Inflow – Water other than wastewater that enters a sewerage system from sources such as roof leaders, cellar drains, foundation drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, catchbasins, cooling towers, storm waters, surface runoff, street wash water or drainage.

Influent – Wastewater or other liquid raw (untreated), partially or completely treated flowing into a reservoir, basin, treatment process or treatment plant.

Indicator Organism – An organism that is used to indicate the possible presence of pathogenic organisms and fecal pollution.

Indirect Discharge – The discharge or the introduction of nondomestic pollutants from any source regulated under Section 307(b) or (c) of the Act, (33 U.S.C. 1317), into the POTW (including holding tank waste discharge into the system). Also Non-Point Discharge

Industrial Discharge – Any introduction into the POTW of a nondomestic pollutant which is produced by a source that is subject to any categorical standards or

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pretreatment requirements and which contains any substance or pollutant for which a discharge limitation or prohibition has been established by any categorical standard or pretreatment requirement.

Industrial User – Any nonresidential user of the sewer system which discharges more than the equivalent of 25,000 gallons per day of domestic wastes, or which is subject to any categorical standard or pretreatment requirement.

Industrial Waste – The liquid waste from any industrial or manufacturing process, as distinct from domestic or sanitary waste.

Inspection – A visual observation/evaluation of IU equipment, operations, sampling activities and accuracy of IU performance and compliance records

Instantaneous Effluent Limitation – The maximum allowable concentration in the discharge at any time as measured in a grab sample.

Interference – The inhibition or disruption of the POTW treatment processes or operations which contributes to a violation of any requirement of the City's NPDES Permit. The term includes prevention of sewage sludge use or disposal by the POTW in accordance with 405 of the Act (33 U.S.C. 1345) or any criteria, guidelines, or regulations developed pursuant to the Solid Waste Disposal Act (SWDA), the Clean Air Act, the Toxic Substances Control Act, or more stringent state criteria (including those contained in any State sludge management plan prepared pursuant to Title IV of SWDA) applicable to the method of disposal or use employed by the POTW.

Instrument Detection Limit (IDL) – The smallest signal above a background noise that an instrument can detect reliably.

Limit Violation – Pollutant concentration is above the allowable limit as defined in the pretreatment standards for a particular IU.

Long Term Average (LTA) – For purposes of the effluent guidelines, average pollutant levels achieved over a period of time by a facility, subcategory, or technology option.

Magnetic Flow Meter – A flow meter that creates a magnetic field across a pipe flowing full, in which the liquid acts as a conductor, to measure the velocity and flow in the pipe.

Maintenance – Keeping pretreatment equipment in a state of repair, including expenditures necessary to maintain capacity.

Mass Based Limit – A limitation based on the actual quantity of a pollutant in a wastestream, usually expressed in mg/square meter of operation (*lb/square foot of operation*).

Mass Emission Rate- The rate of discharge of the dry weight of a pollutant in wastewater or air, expressed in pounds per day (lb/day), or kilograms per day (kg/day.

Material Safety Data Sheets – Provide information about manufactured chemicals as required by the Hazard Communications Rule.

Metal Bearing Wastes – Wastes and/or materials that contain significant quantities of metal pollutants, but not significant quantities of oil and grease (generally less than 100

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mg/l), from manufacturing or processing facilities or other commercial operations. These wastes include, but are not limited to, spent electroplating baths and sludges, metal finishing rinse water and sludges, chromate wastes, air pollution control blow down water and sludges, spent anodizing solutions, incineration air pollution control wastewaters, waste liquid mercury, cyanide containing wastes greater than 136 mg/l, and waste acids and bases with or, in the case of acids and bases only, without metals.

Minimal Level – The lowest level at which the entire analytical system must give a recognizable signal and an acceptable calibration point for the analyte.

Molarity – Moles per liter, a measure of concentration.

Molecular Weight – The sum of the atomic weights of all atoms making up a molecule.

Monitoring – The practice of investigating, surveying, and sampling wastewater sources in an effort to obtain information on the quality and quantity of the wastewater flow.

Monthly Average – The monthly average is the arithmetic average value of all samples taken in a calendar month for an individual pollutant parameter. The monthly average may be the average of all grab samples taken in a given calendar month, or the average of all composite samples taken in a given calendar month.

National Pollutant Discharge Elimination System (NPDES) – A system of permits to discharge wastewaters to navigable waters developed under the authority of Section 402 of the Act (33 U.S.C. 1342).

National Prohibited Discharges – Prohibitions applicable to all nondomestic dischargers regarding the introduction of pollutants into POTWs set forth at 40 CFR 403.5.

Neutralization – Addition of an acid or alkali (base) to a liquid to cause the pH of the liquid to move toward a neutral pH of 7.0.

New Sources – Any source, the construction of which is commenced after the publication of proposed regulations prescribing a Section 307 (33 U.S.C. 1317) Categorical Pretreatment Standard which will be applicable to such source, if such standard is thereafter promulgated within 120 days of proposal in the Federal Register. Where the standard is promulgated later than 120 days after proposal, a new source means any source, the construction of which is commenced after the date of promulgation of the standard.

Normality – Equivalents per liter. A measure of concentration.

NSPS – New Sources Performance Standards, applicable to industrial facilities whose construction is begun after the publication of the proposed regulations, as defined by Sec 306 of the CWA.

90 Day Compliance – A report submitted by categorical industrial users within 90 days following the date for final compliance with the standards. This report must contain flow measurement (or regulated process streams and other streams) measurement of pollutants, and a certification as to whether the categorical standards are being met.

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Nominal Quantitation Limit – The smallest quantity of an analyte that can be measured reliably with a particular analytical method.

Noncompatible Pollutants – Parameters that are not able to be handled under normal loading conditions in biological waste treatment plants and may in fact be detrimental to the biota of these plants.

Noncontact Cooling Water – Water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

Non-conventional Pollutants – Pollutants that are neither conventional pollutants nor priority pollutants listed at 40 CFR Section 401.

Non-detect Value – The analyte is below the level of detection that can be reliably measured by the analytical method. This is also known, in statistical terms, as left-censoring.

Notice of Violation (NOV) – A written enforcement action notification issued to an IU for violations of pretreatment standards or requirements.

Notice to Show Cause – A meeting between the City (ESD) and an IU generally held when more aggressive enforcement action is required. The IU must "show cause" as to why the City should not initiate additional enforcement actions or progress to discontinuation of sewer service.

NPDES Permit – A National Pollutant Discharge Elimination System permit is the regulatory document issued by either the EPA or approved State agency. The permit is designed to control the discharge of pollutants from point sources into waters of the U.S.

Oil and Grease – The measure of oil and grease content of a sample as determined by EPA Method 1664A or other equivalent test method approved by the Director.

Oily Wastes – Wastes and/or used materials that contain oil and grease (generally at or in excess 100 mg/l) from manufacturing or processing facilities or other commercial operations. These wastes include, but are not limited to used oils, oil-water emulsions or mixtures, lubricants, coolants, contaminated groundwater clean-up from petroleum sources, used petroleum products, oil spill clean-up, bilge water, rinse/wash waters from petroleum sources, interceptor wastes, off-specification fuels, underground storage remediation waste, and tank clean out from petroleum or oily sources.

Open-channel Flow – Flow of a fluid with its surface exposed to the atmosphere. The conduit may be an open channel or a closed conduit flow by gravity.

Organic Bearing Wastes – Wastes and/or used materials that contain organic pollutants, but not a significant quantity of oil and grease (generally less than 100 mg/l), from manufacturing or processing facilities or other commercial operations. These wastes included, but are not limited to, landfill leachate, contaminated groundwater clean-up from non-petroleum sources, solvent-bearing wastes, off-specification organic product, still bottoms, waste byproduct glycols, wastewater from paint washes, wastewater from adhesives and/or epoxies formulation, wastewater from chemical product operations, and tank clean-out from organic, non-petroleum sources.

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Organic Matter – Any substance composed of chemical compounds which consist primarily of carbon.

Oxidation-Reduction – Reactions involving the transfer of electrons, with oxidation being loss of electrons. ORP or oxidation-reduction potential, is the qualitative measure of the state of oxidation in metal waste treatment systems. ORP is used to control the chemical addition to optimize the oxidation of compounds such as cyanide or reduction of metals such as hexavalent chromium.

Parameter Violation – A pre-established limit for a particular pollutant has been exceeded, resulting in an unlawful wastewater discharge to the sanitary sewer.

Parshall Flume – A calibrated device developed by Ralph L. Parshall for measuring the flow of liquid in an open conduit. It consists essentially of a contracting length, a throat, and an expanding length. At the throat is a sill over which the flow passes at critical depth.

Pass Through (40 CFR 403.3(n)1 – A discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW NPDES permit (including an increase in the magnitude or duration of a violation) or which causes or contributes to a violation of an applicable numeric or narrative water quality standard.

Periodic Compliance Report (403.12(e)1 – A report submitted at least twice annually by each significant industrial user regulated under the local pretreatment program which indicates the nature and concentration of pollutants in the effluent which are limited by applicable pretreatment standards. In addition, the periodic report must indicate a record of measured or estimated average maximum daily flows for the reporting period.

Permit – A written (control) enforcement mechanism for controlling industrial wastewater discharges . Permits contain effluent limitations, monitoring and reporting requirements, compliance schedules and standard conditions relating to facility operations & ownership.

Permittee – Any person firm, association, corporation, or trust which owns, operates, processes or controls an establishment or plant being operated under a valid permit to discharge wastewater into the City sewer system.

pH – pH is an expression of the concentration of hydrogen ions in solution. The measurement indicates an acid solution when the pH is <7 and an alkaline solution when the pH is > 7. pH meters typically measure the pH in the range of 0 to 14. The concentration is the weight of hydrogen ions, in grams per liter of solution. Neutral water, for example, has a pH value of 7 and hydrogen ion concentration of 10^{-7}. pH reflects the negative logarithm of the hydrogen ion concentration of the aqueous solution..

pH Continuous – Unattended pH (a conventional pollutant) monitoring at the compliance point using an electrometric pH sensor mounted at and immersed in the discharge wastestream.

Physical Waste Treatment Process – Physical wastewater treatment processes include racks, screens, comminutors, clarifiers, (sedimentation & flotation), and filtration, which through physical actions remove pollutants from the wastewater.

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Pickle – An acid or other chemical solution in which metal objects are dipped to remove oxide scale or other adhering substances.

Point Source – Any facility having a connection to the public sewer.

Pipeline – "Pipeline" means an open or closed conduit used for the conveyance of material. A pipeline includes a channel, pipe, tube, trench, ditch or fixed delivery system.

Pollutant – Any dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat wrecked or discharged equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Pollutants of Concern (POC) – Compounds in wastewater that pose a potential threat to the POTW or its ability to comply with environmental standards.

Pollution Prevention – Source reduction and other practices that reduce or eliminate the creation of pollutants.

(POTW) Publicly Owned Treatment Works– A treatment works as defined by Section 212 of the Act, (33 U.S.C. 1292) which is owned, in this instance, by the City. This definition includes any sewers that convey wastewater to the POTW treatment plant, but does not include pipes, sewers or other conveyances not connected to a facility providing treatment. For the City of Phoenix , "POTW" also includes any sewers that convey wastewaters to the POTW from persons outside the City who are, by contract or agreement with the City, users of the City's POTW.

Precipitation – The phenomenon that occurs when a substance (solute) held in solution in a liquid passes out of solution into solid form, usually precipitated by the addition of another substance that chemically transforms the solute into an insoluble form that can be removed by filtration or settling during a treatment process.

Precision – Precision refers to the reproducibility of the laboratory analytical results.

Pretreatment Standard – Any regulation promulgated by the EPA in accordance with Section 307(b) and (c) of the Clean Water Act which applies to a specific category of industrial users and provides limitations on the introduction of pollutants into POTWs. This term includes the prohibited discharge standards under 40 CFR 403.5, including [40 CFR 403.3 (j)].

Primary Measuring Device – A hydraulic structure to measure flow in an open channel there are two types, weirs and flumes.

Printed Circuit Board – A circuit for electronic apparatus made by depositing conductive material, usually copper, on an insulating surface.

Priority Pollutant – One hundred twenty-six compounds that are a subset of the 65 toxic pollutants and classes of pollutants outlined in Section 307 of the CWA. The priority pollutants are specified in the NRDC settlement agreement (National Resources Defense Council et al v. Train, 8 E.R.C. 2120 [D.D.C. 1976], modified 12 E.R.C. 1833 [D.D.C. 1979]).

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Pretreatment or Treatment – The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater to a less harmful state prior to or in lieu of discharging or otherwise introduction of such pollutants into a POTW. The reduction or alteration can be obtained by physical, chemical, or biological processes, process changes, or other means, except as prohibited by 40 CFR Section 403.6(d).

Pretreatment Facility – Industrial wastewater treatment system consisting of one or more treatment devices designed to remove sufficient pollutants from waste streams to allow an industry to comply with effluent limits (i.e. categorical standards, local limits, and federal prohibitive standards).

Pretreatment Standard – Any industrial discharge pollutant limitation imposed on an industrial user by local ordinance or by EPA.

Pretreatment Year – A pretreatment year begins January 1st and ends December 31st

Priority Pollutants (Priority Toxic Pollutants) (40 CFR 423 Appendix A1) – A list of specific compounds, originally identified by EPA in Section 307(a) of the Act for initial development of categorical pretreatment. There are 65 classes of pollutants and 126 individual pollutants currently identified.

Process Inhibition – The concentration of a pollutant that will interfere with a biological treatment process in the POTW.

Process Wastewater (40 CFR X22.21) – Is any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Prohibited Materials – Any materials that are barred from being discharged into a POTW by local ordinance.

PSNS – Pretreatment standards for new sources of indirect discharges, under Sec. 307(b) of the CWA.

Quality Assurance / Quality Control (QA/QC) – Quality Assurance is the program function specified to assure the quality of measurement data, while Quality Control is the process carrying out those procedures stated in the Quality Assurance program.

RCRA – The Resource Conservation and Recovery Act of 1976 (RCRA) (42 U.S.C. Section 6901et.seq.), which regulates the generation, treatment, storage, disposal, or recycling of solid and hazardous wastes. The Federal Resource Conservation and Recovery Act (PL 94-580). RCRA was enacted to define a federal role in solid waste and resource management and recovery. RCRA's primary goals are; 1) to protect human health and the environment from hazardous and other solid wastes; and 2) to protect and preserve natural resources through programs of resource conservation and recovery. Its principal regulatory focus is on the control of hazardous waste through a comprehensive system of identification, tracking, treatment, storage, and ultimate disposal.

Receiving Water – A water course, lake, or ocean into which treated water is discharged.

GLOSSARY

Rectangular Weir – Weir having a notch that is rectangular in shape.

Regulated Process – An industrial process for which federal categorical standards are established for the wastewater discharges resulting from the industrial process.

Removal Credits – A term used to describe the allowance of a publicly owned treatment works to revise federal categorical pretreatment standards to reflect removal of a pollutant through the system. Authorization to grant such removal credits depends on compliance with a number of conditions, as set forth in Section 403.7 of 40 CFR, Part 403, published on January 28, 1981, in 46 FR 9443.

Recycling – A material is recycled if it is used, reused, or reclaimed.

Representative Sample – A composite sample obtained by flow proportional sample techniques where feasible. When the Director determines that flow-proportional composite sampling is infeasible, the Director may allow or conduct time-composite techniques or by the compositing or averaging of one or more grab samples.

Reporting Violation – Failure of an industrial user to submit the required report to the Approval Authority or Control Authority.

Review Meeting – A compliance status meeting between ESD staff and an IU to review violations and allow the IU to describe the means to prevent future violations.

Receiving Water – A stream, lake, river, ocean, or other surface or groundwater into which treated or untreated wastewater is discharged.

Rolling Six Month Evaluation – A rolling six month evaluation uses sample data based on calendar quarters to calculate SNC during a rolling six month window. Under this procedure each SIU is evaluated for SNC four times during a fifteen month window. Of the eight criteria that must be evaluated for SNC only Chronic SNC and Technical Review Criteria SNC are evaluated based on a six month rolling window. All other criteria are strictly on a calendar quarter.

Sampler – A device used with or without flow measurement to obtain a sample portion of water or waste for analytical purposes. May be designed for taking a single (grab) sample, time composite sample, or flow-proportional composite sample.

Sampling – The practice of collecting samples of wastewater discharges for analysis of wastewater characteristics.

Sample-specific Quantitation Limit – The smallest quantity in the experimental calibration range that may be measured reliably in any given sample.

Sanitary Sewer – A sewer that carries liquid and water-borne wastes from residences, commercial buildings, industrial plants, and institutions, together with minor quantities of ground, storm, and surface waters that may be admitted unintentionally.

Septage – Aerobic wastewater originating from a domestic source, be it from a residential, commercial, or industrial facility, that is not hazardous waste and is compatible with the biological wastewater treatment plant process.

GLOSSARY

Settling – Treatment process by which settleable or floatable solids are removed from wastewater by gravity separation in a tank or other vessel.

Sewage – A combination of water-carried wastes from residences, business buildings, institutions, and industrial establishments, together with such ground waters, surface waters, and storm waters as may be present.

Sewer – A pipe or conduit for carrying sewage.

Sewer Tap – The wye, saddle or other device placed on a public sewer to receive a building connection.

Sewer Use Ordinance – A sewer use ordinance is a legal instrument implemented by a local government entity which sets out all the requirements for the discharge of pollutants into a publicly owned treatment works.

Significant Noncompliance (SNC) – One or more serious violations or a pattern of minor violations. An IU may be considered in SNC when violations are Chronic Violations (CSNC) or Technical Review Criteria Violations (TRCSNC) or late reporting.

Significant Violation – A major discharge of pollutants to the POTW system that is determined to be grossly over the limits of pretreatment standards for that industry.

Significant Industrial User - (1) An IU subject to Categorical Pretreatment Standards 40 CFR 403.6 and 40 CFR, Chapter I subchapter N. Any industry that falls under these categories is considered a SIU whether it has process discharge to the sewer or not.
(2) Any industry which discharges an average of 25,000 gallons per day or more of process wastewater to the sewer system (excluding sanitary, noncontact cooling water and boiler blowdown wastewater).
(3) Any industry designated as such on the basis that the IU has a reasonable potential for adversely affecting the POTW.

Sludge – The settleable solids intentionally separated from liquid waste streams during treatment typically under quiescent conditions, and the unintentional accumulation of solids in tanks and reservoirs associated with production and manufacturing processes.

Slug Discharge (40 CFR 403.8(f)(2)(v)1 – Any pollutant discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge. Any discharge at a flow rate or concentration which would cause a violation of the prohibited discharge standards in the General Pretreatment Regulations.

Sludge Control Plan (40 CFR 403.8(f)(2)(v)1 – A plan designed to prevent the uncontrolled discharge of raw pollutants (*or materials, e.g., a dairy spill of milk may disrupt a small POTW and would have to be reported even though milk Is not a "pollutant"*) into the POTW. Every Significant Industrial User is required to be evaluated at least every two years, for the necessity of instituting such a control plan.

Sludge Quality Standard – Allowable concentration or mass of a pollutant in POTW sludge, or biosolids, used for land application.

Source Reduction – Any practice which reduces the amount of any pollutant or contaminant entering any waste stream or otherwise released into the environment or

reduces hazards to public health and the environment associated with the release of such substances, pollutants or contaminants.

Specific Gravity - (1) Weight of a particle, substance, or chemical solution in relation to the weight of an equal volume of water. Water has a specific gravity of 1.000 at 4^0 C (39^o F). (2) Weight of a particular gas in relation to an equal volume of air at the same temperature and pressure (air has a specific gravity of 1.0). Chlorine has a specific gravity of 2.5 as a gas.

Spiked Sample (Field) – A sample of a known amount of a particular pollutant constituent prepared in the field by adding a known amount of the analyte in question during sampling. This technique identifies potential sample matrix interference and/or problems with inadequate sample preservation.

Spiked Sample (Laboratory)– A sample of a known amount of a particular pollutant constituent prepared in the laboratory by adding a known amount of the analyte in question at a concentration where the accuracy of the test method is satisfactory. Spiked samples check on the accuracy of the analytical procedure.

Split Samples – A sample which is collected and divided in the field into the necessary of portions (e.g., 2, 3, etc.) for analysis. Equally representative samples must be obtained in the process. The split samples are then analyzed by separate laboratories (*or the same laboratory*), preferably using the same analytical techniques.

SROG – Sub-regional Operating Group formed in 1979 pursuant to a joint exercise of powers agreement between the cities of Glendale, Mesa, Phoenix, Scottsdale, and Tempe, and the Town of Gilbert to jointly own and operate the 23rd and 91st Avenue Wastewater Treatment Plants and their interceptor systems. Intergovernmental agreements exist between SROG members and non-SROG jurisdictions which allow third parties to discharge to the SROG system.

Standard Industrial Classification (SIC) – A classification pursuant to the Standard Industrial Classification Manual issued by the Executive Office of the President, Office of Management and Budget, 1972. Codes used to categorize and uniquely identify business and economic activities.

Standard Methods – The procedure as described in the most current edition of Standard Methods for the Examination of Water and Wastewater published by American Health Association, or the most current edition of Manual of Methods for Chemical Analysis for Water and Wastes published by the EPA.

Stilling Well – A pipe, chamber, or compartment with comparatively small inlets, or with inlets communicating with a main body of water. Its purpose is to dampen waves or surges while permitting water level within the well to rise or fall with the major fluctuation of the main body of water. It is used with water measuring devices to improve accuracy of measurement.

Storm Water – Any flow occurring during or following any form of natural precipitation and resulting there from.

Storm Sewer / Storm Drain – A sewer which carries storm and surface waters and drainage, but excludes sewage and polluted industrial wastes.

GLOSSARY

Suspended Solids – The total suspended matter that floats on the surface of, or is suspended in, water, wastewater or other liquids, and which is removable by laboratory filtering.

Subchapter N – Refers to Subchapter N of Chapter I of Title 40 of the Federal Regulations. This includes, but is not limited to, the industrial categorical standards included in 40 CFR Parts 405 through 471.

Technical Review Criteria Violations (TRC) (TRCSNC) – (1) Technical Review Criteria Violations are recurring effluent violations where the limit is exceeded by a certain statistically developed percentage so as to account for the degree of variance from the pretreatment standards. (2) For Technical Review Criteria Significant Noncompliance (TRCSNC), thirty-three (33) percent or more of all of the measurements taken during a six-month period equal or exceed the product of the daily limit or the monthly average limit multiplied by the applicable TRC (1.4 for BOD, TSS, fats, oil & grease and 1.2 for all other pollutants except pH).

Technology Based Standards – Discharge limits for specific industrial categories established by the Federal EPA based on the use of the Best Available Technology economically achievable (BAT), the Best Practicable Control Technology available (BPT), or the Best Conventional Technology available (BCT). Such standards are based on the cost and/or availability of technology to treat the specific wastestream under consideration.

Termination of Service – An administrative action implemented by the City to halt any actual or threatened discharge to the sewer from an IU that has failed to adequately respond to previous enforcement actions.

Time Composite Sample – A mixed sample composed of single equal-volume samples collected at selected regular intervals over a specified period of time.

Total Organic Carbon (TOC) – The total of all organic compounds expressed in milligrams per liter as determined by the combustion-infrared method prescribed by approved laboratory procedures.

Total Suspend Solids (TSS) – Residue that is removed from a wastewater sample by a standard laboratory filtration procedure, expressed as mg/L.

Total Toxic Organics (TTO) – The summation of all quantifiable values of toxic organics greater than 0.01 mg/l contained in the Federal Categorical Pretreatment Standards.

Toxic Pollutant (40 CFR 122 Appendix D) – Any pollutant or combination of pollutants listed as toxic in regulations promulgated by the Administrator of the Environmental Protection Agency under the provision of CWA 307(a) or other Acts. Those pollutants, or combination of pollutants, including disease-causing agents which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism either directly from the environment or indirectly by ingestion through the food chain, will on the basis of information available to the Administrator of the EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, (including malfunctions in reproduction) or physical deformation

GLOSSARY

Treatment – Any method, technique, or process designed to change the physical, chemical or biological character or composition of any metal-bearing, oily, or organic waste so as to recover metal, oil, or organic content from wastes.

Trip Blank – Is a volume of analyte-free water brought to the field in sealed containers and transported back to the lab with the actual sample containers.

Turbine Meter – A positive displacement meter with an internal turbine turned by the water flow. Flow is proportional to turbine rotation speed.

User – Any person who contributes, causes or permits the contribution of wastewater into the City's POTW.

Variability Factor – Used in calculating a limitation (or standard) to allow for reasonable variation in pollutant concentrations when processed through extensive and well designed treatment systems. Variability factors assure that normal fluctuations in a facility's treatment are accounted for in the limitations.

Violation – Whenever a user exceeds an applicable effluent limit; fails to meet the deadlines and conditions for reporting, monitoring or treatment; or does not comply with other Federal or City requirements.

V-notch Weir – A triangular sharp-crested weir for measurement of liquid discharge in open channels.

Volatile Solids – The quantity of solids in water, wastewater, or other liquids, lost on ignition of the dry solids at 600^0.

Waste – Includes aqueous, non-aqueous, and solid waste, wastewater, and/or used material.

Wastewater – The liquid and water-carried industrial or domestic wastes from dwellings, commercial buildings, industrial facilities, and institutions, whether treated or untreated, which is introduced into the POTW.

Water Quality Standards – Water quality standards are provisions of state or federal law which consist of a designated use or uses for a given water body and associated water quality criteria which must be met in the stream to achieve these uses. Water quality standards are effluent standards imposed on point sources. These standards are designed to achieve the water quality criteria established for a given water body. These standards are designed to improve and/or maintain the quality of the receiving water, regardless of the cost or availability of treatment technology.

Weir – (1) A diversion dam. (2) A device that has a crest and some side containment of known geometric shape and is used to measure flow of a liquid. The liquid surface is exposed to the atmosphere. Flow is related to: upstream height of water above the crest, position of crest with respect to downstream water surface, and geometry of the weir opening. Most common types are rectangular weirs, trapezoidal (Cipolletti) weirs and triangular (V-notch) weirs.

Worker Right to Know Laws – Employee "Right-to-Know" legislation requires employers to inform employees (e.g., treatment plant operators) of the possible health effects resulting from contact with hazardous substances. At location where this

GLOSSARY

legislation is in force, employers must provide employees with information regarding any hazardous substances which they might be exposed to under normal working conditions or reasonably foreseeable emergency conditions resulting from workplace conditions. OSHA's "Hazard Communication Standard (HCS)" (Title 29 CFR Part 1910.1200) is the federal regulation and state statutes are called "Right to Know Laws."

Zero Process Discharge – This term applies to those users that only discharge domestic wastes or have no discharge, but have significant quantities of hazardous materials or high strength waste which, if discharged, would be regulated by this ordinance. Such facilities may be regulated by requiring them to have zero discharge of process wastes, thus allowing only domestic wastes to be discharged. No discharge of pollutants to waters of the United States or to a POTW. Also included in this definition are disposal of pollutants by way of evaporation, deep-well injection, off-site transfer, and land application.

ADHS Laboratory License

ARIZONA DEPARTMENT
OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY LICENSE

Issued to:

Laboratory Director: **Britney Dempster**

Owner/Representative: **Mr. Jim Swanson**

City of Phoenix Water Services Laboratory
AZ0088

is in compliance with Environmental Laboratory's applicable standards for the State of Arizona and maintains on file a List of Parameters for which the laboratory is certified to perform analysis.

PERIOD OF LICENSURE FROM: 05/05/2024 TO: 05/04/2025

GREAT SEAL OF THE STATE OF ARIZONA
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1912

Mary Graham

Mary Graham, Chief
Office of Laboratory Licensure & Certification
Bureau of State Laboratory Services

Arizona Department Of Health Services

Office of Laboratory Licensure and Certification

250 N.17th Avenue, Phoenix, Arizona 85007-3246

SDW

Parameter	EPA Method	Certified On
ALKALINITY	SM 2320B (2011)	7/23/1996 12:00:00 AM
ALUMINUM	EPA 200.7 (4.4)	5/26/1994 12:00:00 AM
ANTIMONY	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
ARSENIC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
BARIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
BARIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
BERYLLIUM	EPA 200.7 (4.4)	4/16/1998 12:00:00 AM
BERYLLIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CADMIUM	EPA 200.7 (4.4)	4/16/1998 12:00:00 AM
CADMIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CALCIUM	EPA 200.7 (4.4)	6/18/1993 12:00:00 AM
CARBAMATES BY HPLC/POST COLUMN	EPA 531.2 (1.0)	12/28/2010 12:00:00 AM
CARBAMATES BY HPLC/POST COLUMN - ADDITIONAL	EPA 531.2 (1.0)	12/28/2010 12:00:00 AM
CARBON, TOTAL ORGANIC	SM 5310C (2011)	4/12/2007 12:00:00 AM
CHLORATE	EPA 300.1 (1.0)	1/28/2013 12:00:00 AM
CHLORIDE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
CHLORITE	EPA 300.1 (1.0)	12/26/2007 12:00:00 AM
CHROMIUM TOTAL	EPA 200.7 (4.4)	4/16/1998 12:00:00 AM
CHROMIUM TOTAL	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
COLIFORMS, TOTAL AND E.COLI, BY COLILERT (ONPG-MUG)	SM 9223B (2004) AND IDEXX	3/30/2001 12:00:00 AM
COPPER	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
COPPER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CORROSIVITY	SM 2330B (2010)	3/9/1992 12:00:00 AM
CYANIDE	EPA 335.4 (1.0)	7/12/2010 12:00:00 AM
DETERMINATION OF PER - AND PFAS (ESPE / LCMS)	EPA 533	5/26/2022 7:10:21 PM
DETERMINATION OF SELECTED PERFLUORINATED ALKYL ACIDS (LC/MS/MS)	EPA 537.1	5/26/2022 7:10:22 PM
FLUORIDE	EPA 300.0 (2.1)	4/28/2009 12:00:00 AM

SDW

Parameter	EPA Method	Certified On
GERMANIUM (ICP/MS)	EPA 200.8 (REV 5.4)	1/12/2018 12:56:48 PM
GIARDIA AND CRYPTOSPORIDIUM	EPA 1623	12/18/2014 12:00:00 AM
GLYPHOSATE	EPA 547 (7/90)	11/13/2000 12:00:00 AM
HALOACETIC ACIDS & DALAPON	EPA 552.3 (1.0)	9/12/2017 9:10:21 AM
HARDNESS	SM 2340 B (2011), CA AND MG	7/23/1996 12:00:00 AM
HETEROTROPHIC PLATE COUNT	SIMPLATE	6/16/2005 12:00:00 AM
IRON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
LEAD	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
LITHIUM	EPA 200.7 (4.4)	3/30/2022 10:43:15 AM
MAGNESIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MERCURY	EPA 245.1 (3.0)	4/16/1998 12:00:00 AM
MOLYBDENUM	EPA 200.8 (5.4)	4/24/2013 12:00:00 AM
NICKEL	EPA 200.7 (4.4)	5/15/2000 12:00:00 AM
NICKEL	EPA 200.8 (5.4)	1/12/2000 12:00:00 AM
NITRATE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
NITRITE	EPA 300.0 (2.1)	4/19/1995 12:00:00 AM
ORGANICS BY GC/MS	EPA 525.2 (2.0)	10/29/2007 12:00:00 AM
RESIDUE, FILTERABLE (TDS)	SM 2540 C (2011)	7/23/1996 12:00:00 AM
SELENIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SILICA	EPA 200.7 (4.4)	4/25/2001 12:00:00 AM
SILVER	EPA 200.7 (4.4)	4/16/1998 12:00:00 AM
SILVER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SODIUM	EPA 200.7 (4.4)	9/27/2001 12:00:00 AM
SULFATE	EPA 300.0(2.1)	3/9/1992 12:00:00 AM
THALLIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
VANADIUM	EPA 200.8 (5.4)	4/24/2013 12:00:00 AM
VOCS BY GC/MS	EPA 524.2 (4.1)	1/15/2003 12:00:00 AM
VOCS BY GC/MS-ADDITIONAL	EPA 524.2 (4.1)	12/5/2006 12:00:00 AM
ZINC	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM

SDW

Parameter	EPA Method	Certified On
ZINC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM

Total Count: 59

SW

Parameter	EPA Method	Certified On
ALUMINIUM	6010D	10/21/2016 2:12:55 PM
ANTIMONY	EPA 6020A	8/11/2011 12:00:00 AM
ARSENIC	EPA 6020A	8/11/2011 12:00:00 AM
BARIUM	EPA 6020A	8/11/2011 12:00:00 AM
BARIUM	6010D	10/21/2016 2:12:57 PM
BERYLLIUM	EPA 6020A	8/11/2011 12:00:00 AM
BERYLLIUM	6010D	10/21/2016 2:12:57 PM
CADMIUM	EPA 6020A	8/11/2011 12:00:00 AM
CADMIUM	6010D	10/21/2016 2:12:58 PM
CALCIUM	6010D	10/21/2016 2:12:59 PM
CHROMIUM, TOTAL	EPA 6020A	8/11/2011 12:00:00 AM
CHROMIUM, TOTAL	6010D	10/21/2016 2:13:00 PM
COBALT	EPA 6020A	8/11/2011 12:00:00 AM
COPPER	EPA 6020A	8/11/2011 12:00:00 AM
COPPER	6010D	10/21/2016 2:13:00 PM
IRON	6010D	10/21/2016 2:13:01 PM
LEAD	EPA 6020A	8/11/2011 12:00:00 AM
LEAD	6010D	10/21/2016 2:13:02 PM
MANGANESE	6010D	10/21/2016 2:13:03 PM
MERCURY	EPA 7473	4/25/2018 4:52:28 PM
MOLYBDENUM	6010D	10/21/2016 2:13:04 PM
NICKEL	EPA 6020A	8/11/2011 12:00:00 AM
NICKEL	6010D	10/21/2016 2:13:04 PM
SEDIMENTS, SLUDGES AND SOILS	EPA 3050B	4/20/2001 12:00:00 AM
SELENIUM	EPA 6020A	8/11/2011 12:00:00 AM
SELENIUM	6010D	10/21/2016 2:13:05 PM
SILVER	6010D	10/21/2016 2:13:06 PM
SODIUM	6010D	10/21/2016 2:13:06 PM

SW

Parameter	EPA Method	Certified On
THALLIUM	EPA 6020A	8/11/2011 12:00:00 AM
THALLIUM	6010D	10/21/2016 2:13:07 PM
VANADIUM	EPA 6020A	8/11/2011 12:00:00 AM
ZINC	6010D	10/21/2016 2:13:08 PM

Total Count: 32

WW

Parameter	EPA Method	Certified On
ESCHERICHIA COLI BY COLILERT MPN, IN CONJUNCTION WITH SM 9221B AND 9221C	SM 9223B (2004)	2/11/2002 12:00:00 AM
ALKALINITY, TOTAL	SM 2320B (2011)	7/23/2006 12:00:00 AM
ALUMINUM	EPA 200.7 (4.4)	5/17/1994 12:00:00 AM
AMMONIA	EPA 350.1 (2.0)	10/22/2018 4:15:33 PM
ANTIMONY	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
ANTIMONY	EPA 200.7 (4.4)	1/9/2004 12:00:00 AM
ARSENIC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
BARIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
BARIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
BASE/NEUTRALS AND ACIDS BY GC/MS (12/2016)	625.1	11/18/2019 2:33:25 PM
BERYLLIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
BERYLLIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
BIOCHEMICAL OXYGEN DEMAND/CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND	SM 5210B (2011)	2/10/2017 9:00:54 AM
BORON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CADMIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CADMIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CALCIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CARBON, TOTAL ORGANIC (TOC)	SM 5310 C (2011)	4/12/2007 12:00:00 AM
CHEMICAL OXYGEN DEMAND	HACH 8000	7/23/1996 12:00:00 AM
CHLORIDE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
CHROMIUM TOTAL	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
CHROMIUM TOTAL	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
COBALT	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM

WW

Parameter	EPA Method	Certified On
COBALT	EPA 200.7 (4.4)	1/9/2004 12:00:00 AM
COLIFORMS, FECAL, BY MTF (MAY BE USED FOR SEWAGE SLUDGE), NUMBER PER 100 ML BY MPN	SM 9221C, E (2006)	8/8/2003 12:00:00 AM
COPPER	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
COPPER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
CYANIDE, TOTAL	EPA 335.4 (1.0)	7/12/2010 12:00:00 AM
FECAL COLIFORMS BY COLILERT 18 (APP AND REUSE ONLY)	SM 9020B (2005)/9223B (2004)	4/13/2017 4:15:37 PM
FLUORIDE	SM 4500-F C (2011)	7/23/1996 12:00:00 AM
FLUORIDE	EPA 300.0 (2.1)	4/28/2009 12:00:00 AM
HARDNESS	SM 2340B (2011)	4/17/2095 12:00:00 AM
IRON	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
KJELDAHL, TOTAL NITROGEN	EPA 351.2 (2.0)	5/31/2018 2:10:43 PM
LEAD	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
LEAD	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MAGNESIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MANGANESE	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
MERCURY	EPA 245.1 (3.0)	3/6/1992 12:00:00 AM
MERCURY	EPA 1631E	3/6/2003 12:00:00 AM
MOLYBDENUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
MOLYBDENUM	EPA 200.8 (5.4)	1/12/2000 12:00:00 AM
NICKEL	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
NICKEL	EPA 200.8 (5.4)	1/12/2000 12:00:00 AM
NITRATE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
NITRITE (AS N)	EPA 300.0 (2.1)	7/8/1993 12:00:00 AM
ORGANOCHLORINE PESTICIDES AND PCBs BY GC/HSD (12/2016)	608.3	2/3/2020 8:34:03 AM
ORGANOPHOSPHORUS PESTICIDES	EPA 1657	7/12/2010 12:00:00 AM
POTASSIUM	EPA 200.7 (4.4)	12/18/1998 12:00:00 AM
PURGABLE BY GC/MS (12/2016)	EPA 624.1	11/18/2019 2:33:24 PM
RESIDUE NONFILTERABLE (TSS)	SM 2540D (2011)	1/3/2006 12:00:00 AM
RESIDUE, FILTERABLE	SM 2540C (2011)	2/28/2003 12:00:00 AM

WW

Parameter	EPA Method	Certified On
SELENIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SILICA, DISSOLVED	EPA 200.7 (4.4)	4/25/2001 12:00:00 AM
SILVER	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
SILVER	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
SODIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
SULFATE	EPA 300.0 (2.1)	3/9/1992 12:00:00 AM
SULFIDE	SM 4500-S2- D (2011)	10/16/1995 12:00:00 AM
THALLIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
TIN	EPA 200.7 (4.4)	1/9/2004 12:00:00 AM
TITANIUM	EPA 200.7 (4.4)	3/5/2008 12:00:00 AM
TOTAL, FIXED AND VOLATILE SOLIDS IN SLUDGE	SM 2540G (2011)	3/10/2005 12:00:00 AM
URANIUM	EPA 200.8	11/3/2014 12:00:00 AM
VANADIUM	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
VANADIUM	EPA 200.7 (4.4)	2/25/2005 12:00:00 AM
VOLATILE ORGANICS FOR PHARMACUTICALS	EPA 524.2 (4.1)	12/28/2006 12:00:00 AM
ZINC	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
ZINC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM

Total Count: 70

Instrument

Instrument	Instrument Code	Quantity	Certified On
TOTAL ORGANIC ANALYZER	TOX	1	3/21/2024 12:29:37 PM
MERCURY ANALYZER	MA	1	3/9/2020 3:20:59 PM
AUTOMATED AUTOANALYZER	AUTOANALYZER	4	4/25/2012 12:00:00 AM
MERCURY ANALYZER	MA	2	4/5/2006 12:00:00 AM
INDUCTIVELY COUPLED PLASMA SPECTROMETER	ICP	1	3/17/2092 12:00:00 AM
ION CHROMATOGRAPH	IC	4	4/25/2012 12:00:00 AM
HIGH PERFORMANCE LIQUID CHROMATOGRAPH	HPLC	2	4/25/2012 12:00:00 AM
LIQUID CHROMATOGRAPH/MASS SPEC	LC/MS/MS	1	3/24/2023 3:52:27 PM

Instrument

Instrument	Instrument Code	Quantity	Certified On
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	ICP/MS	2	4/16/1999 12:00:00 AM
GAS CHROMATOGRAPH	GC	5	4/25/2012 12:00:00 AM
AUTOMATED AUTOANALYZER	AUTOANALYZER	1	3/22/2019 1:37:29 PM
INDUCTIVELY COUPLED PLASMA SPECTROMETER	ICP	1	3/11/2021 11:42:43 AM
GAS CHROMATOGRAPH/MASS SPECTROMETER	GC/MS	7	3/22/2023 1:41:36 PM
AUTOMATED AUTOANALYZER	AUTOANALYZER	1	3/23/2023 10:53:08 AM

Total Count: 14

Software

Software Code	Certified On
OTHER - AUTOMATED AUTOANALYZER	4/25/2012 12:00:00 AM
BROOKS RAND MERK - MA	3/27/2014 12:00:00 AM
HP CHEMSTATION-HPLC	9/18/2001 12:00:00 AM
PERKIN ELMER - ICP	4/21/2003 12:00:00 AM
ENVIROQUANT - GC	4/21/2003 12:00:00 AM
AGILENT MASS HUNTER - ICP/MS	4/19/2004 12:00:00 AM
PERKIN ELMER - MA	4/19/2004 12:00:00 AM
CHROMELEON - IC	4/5/2006 12:00:00 AM
ENVIROQUANT/CHEMSTATION - GC	4/7/2008 12:00:00 AM
CHROMELEON - IC	4/26/2012 12:00:00 AM
ENVIROQUANT/CHEMSTATION - GC/MS	4/13/2017 4:15:38 PM
Waters - Mass Lynx	4/25/2018 4:52:28 PM
MassLynx - LC/MS/MS	4/4/2023 3:38:00 PM
AGILENT - GC/MS	4/4/2023 3:38:00 PM
Agilent Mass Hunter (for GCMS & GC)	4/4/2023 3:38:00 PM
Mettler Toledo LabX	4/4/2023 3:38:00 PM
OMNION (LACHAT) - AUTO ANALYZER	4/9/2019 1:57:54 PM
AGILENT - ICP	3/30/2021 10:42:59 AM
Milestone for Hg	5/6/2020 11:55:33 AM
Aurora 1030	4/1/2024 3:56:41 PM

Total Count: 20

ADHS DATA QUALIFIERS

Arizona Data Qualifiers
Revision 4.0
9/5/12

ADEQ Arizona Department of Environmental Quality **Memorandum**

Date: October 10, 2012
To: Prabha Acharya – Manager, Technical Resources – ADHS Lab Licensure
From: Julie Hoskin – QA/QC and Laboratory Services Manager (acting)- ADEQ
Subject: Arizona Data Qualifiers Revision 4.0

Arizona Department of Environmental Quality concurs with Revision 4.0 Arizona Data Qualifiers as amended by subcommittee of Environmental Laboratory Advisory Committee (ELAC).

Any qualified data submitted to ADEQ after January 1, 2001 must be designated using the Arizona Data Qualifiers as developed by the ELAC technical subcommittee. Because the data qualifiers are specific, there may be multiple qualifiers assigned to each analytical result. Any events that cannot be described by the data qualifiers must be documented in a case narrative which must be included with the final report. Using the Arizona Data Qualifiers does not automatically qualify the data as acceptable to the Agency.

Arizona Data Qualifiers Revision 4.0 will be placed on both ADHS Lab Licensure and ADEQ's websites.

Arizona Data Qualifiers
Revision 4.0
9/5/12

Developed by the Sub-committee of the Arizona Environmental Laboratory Advisory Committee
This is an updated list of the Rev. 3.0 Arizona Data Qualifiers dated 9/20/2007, with some new qualifiers added, some obsolete ones deleted and some modified. The new qualifiers are designated in red font. If there was a minor modification to the existing qualifier, it has been highlighted in blue.

Using the following Arizona Data Qualifiers does not automatically denote acceptability to the Regulatory Agency. Arizona Department of Environmental Quality expects that data reported utilizing the following qualifiers, unless stated otherwise, is useable, scientifically valid and defensible. In the laboratory's judgment if the data should not be used for compliance, the T6 qualifier must be used. Other general guidelines for use and application of the following data qualifiers can be found as an attachment to this document (ATTACHMENT A).

Note: Please note that as of 10/28/08, AZ Drinking Water Data Qualifiers have been discontinued, please use Arizona Data Qualifiers Revision 4.0 dated 9/5/12.

Microbiology:

A1 = Too numerous to count.
A2 = Sample incubation period exceeded method requirement.
A3 = Sample incubation period was shorter than method requirement.
A4 = Target organism detected in associated method blank.
A5 = Incubator/water bath temperature was outside method requirements.
A6 = Target organism not detected in associated positive control.
A7 = Micro sample received without adequate headspace.
A8 = Plate count was outside the method's reporting range. Reported value is estimated.

Method/calibration/Trip blank:

B1 = Target analyte detected in method blank at or above the method reporting limit.
B2 = Non-target analyte detected in method blank and sample, producing interference.
B3 = Target analyte detected in calibration blank at or above the method reporting limit.
B4 = Target analyte detected in blank at or above method acceptance criteria.
B5 = Target analyte detected in method blank at or above the method reporting limit, but below trigger level or MCL.
B6 = Target analyte detected in calibration blank at or above the method reporting limit, but below trigger level or MCL.
B7 = Target analyte detected in method blank at or above method reporting limit.

Concentration found in the sample was 10 times above the concentration found in the method blank.
B8 = Analyte found in both the travel blank and sample.

Confirmation:

C1 = Confirmatory analysis not performed as required by the method.
C2 = deleted
C3 = Qualitative confirmation performed.
C4 = Confirmatory analysis was past holding time.
C5 = Confirmatory analysis was past holding time. Original result not confirmed.
C6 = deleted
C7 = deleted
C8 = Sample RPD between the primary and confirmatory analysis exceeded 40%. Per EPA Method 8000C, the lower value was reported as there was no evidence of chromatographic problems.

Dilution:

D1 = Sample required dilution due to matrix.
D2 = Sample required dilution due to high concentration of target analyte.
D3 = deleted.
D4 = Minimum Reporting Limit (MRL) adjusted to reflect sample amount received and analyzed.
D5 = Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was nondetect in the sample.
D6 = Minimum Reporting Limit (MRL) adjusted due to an automatic 10X dilution performed on this sample for the purpose of reporting traditional drinking water analytes for wastewater requirements.
D7= Minimum Reporting Limit adjusted to reflect sample dilution.

Estimated concentration:

E1 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not possible due to insufficient sample.
E2 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to sample matrix.
E3 = Concentration estimated. Analyte exceeded calibration range. Reanalysis not performed due to holding time requirements.
E4 = Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL) but above MDL.
E5 = Concentration estimated. Analyte was detected below laboratory minimum reporting limit (MRL), but not confirmed by alternate analysis.
E6 = Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.

E7 = Concentration estimated. Internal standard recoveries did not meet laboratory acceptance criteria.
E8 = Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Hold time:

H1 = Sample analysis performed past holding time.
H2 = Initial analysis within holding time. Reanalysis for the required dilution was past holding time.
H3 = Sample was received and/ or analysis requested past holding time.
H4 = Sample was extracted past required extraction holding time, but analyzed within analysis holding time.
H5 = This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
H6 = The filtration was not done within the required 15 minutes of sampling, the sample was filtered in the laboratory.

BOD/CBOD:

K1 = The sample dilutions set-up for the BOD/CBOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Any reported result is an estimated value.
K2 = The sample dilutions set up for the BOD/CBOD analysis did not meet the criteria of a residual dissolved oxygen of at least 1 mg/L. Any reported result is an estimated value.
K3 = deleted.
K4 = deleted.
K5 = The dilution water D.O. depletion was > 0.2 mg/L.
K6 = Glucose/glutamic acid BOD/CBOD was below method acceptance criteria.
K7 = A discrepancy between the BOD and COD results has been verified by reanalysis of the sample for COD.
K8 = Glucose/glutamic acid BOD/CBOD was above method acceptance levels.
K9=Test replicates show more than 30% difference between high and low values.
K10=Seed control samples do not deplete at least 2.0 mg/L, with a retention of at least 1.0 mg/L DO criteria in all samples.
K11=Minimum DO is less than 1.0 mg/L in all dilutions.

Laboratory fortified blank/blank spike:

L1 = The associated blank spike recovery was above laboratory acceptance limits
L2 = The associated blank spike recovery was below laboratory acceptance limits.
L3 = The associated blank spike recovery was above method acceptance limits.
L4 = The associated blank spike recovery was below method acceptance limits.
L5 = The associated blank spike recovery was above laboratory/method acceptance limits. This analyte was not detected in the sample.

Matrix spike:

M1 = Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2 = Matrix spike recovery was low; the associated blank spike recovery was acceptable.
M3 = The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated blank spike recovery was acceptable.
M4 = The analysis of the spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The associated blank spike recovery was acceptable.
M5 = Analyte concentration was determined by the method of standard addition (MSA).
M6 = Matrix spike recovery was high. Data reported per ADEQ policy 0154.000. Matrix Interference was confirmed.
M7 = Matrix spike recovery was low. Data reported per ADEQ policy 0154.000. Matrix Interference was confirmed.

General:

N1 = See case narrative.
N2 = See corrective action report.
N3 = deleted.
N4 = The Minimum Reporting Limit (MRL) verification check did not meet the laboratory acceptance limit.
N5 = The Minimum Reporting Limit (MRL) verification check did not meet the method acceptance limit.
N6 = Data suspect due to quality control failure, reported per data user's request.
N7= Additional analysis was not performed based on the "Total" result which was below the requested analyte's MCL/Action level/Trigger level.

Sample quality:

Q1 = Sample integrity was not maintained. See case narrative.
Q2 = Sample received with head space.
Q3 = Sample received with improper chemical preservation.
Q4 = Sample received and analyzed without chemical preservation.
Q5 = Sample received with inadequate chemical preservation, but preserved by the laboratory.
Q6 = Sample was received above recommended temperature.
Q7 = Sample inadequately dechlorinated.
Q8 = Insufficient sample received to meet method QC requirements. Batch QC requirements satisfy ADEQ policy 0154.000.
Q9 = Insufficient sample received to meet method QC requirements.
Q10 = Sample received in inappropriate sample container.
Q11 = Sample is heterogeneous. Sample homogeneity could not be readily achieved using routine laboratory practices.

Duplicates:

R1 = RPD/RSD exceeded the method acceptance limit. See case narrative.
R2 = RPD/RSD exceeded the laboratory acceptance limit. See case narrative.
R3 = deleted.
R4 = MS/MSD RPD exceeded the method acceptance limit. Recovery met acceptance criteria.
R5 = MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R6 = LFB/LFBD RPD exceeded the method acceptance limit. Recovery met acceptance criteria.
R7 = LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R8 = Sample RPD exceeded the method acceptance limit.
R9 = Sample RPD exceeded the laboratory acceptance limit.
R10 = deleted.
R11 = The RPD calculation for MS/MSD does not provide useful information due to the varying sample weights when Encore samplers/methanol field preserved samples are used.
R12 - RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.
R13 = MS/MSD RPD exceeded method acceptance limit. Matrix spike recovery was outside acceptance criteria. Batch precision and accuracy were demonstrated.

Surrogate:

S1 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits.
S2 = deleted.
S3 = Surrogate recovery was above laboratory acceptance limits, but within method acceptance limits. No target analytes were detected in the sample.
S4 = Surrogate recovery was above laboratory and method acceptance limits. No target analytes were detected in the sample.
S5 = Surrogate recovery was below laboratory acceptance limits, but within method acceptance limits.
S6 = Surrogate recovery was below laboratory and method acceptance limits. Reextraction and/or reanalysis confirms low recovery caused by matrix effect.
S7 = Surrogate recovery was below laboratory and method acceptance limits. Unable to confirm matrix effect.
S8 = The analysis of the sample required a dilution such that the surrogate recovery calculation does not provide useful information. The associated blank spike recovery was acceptable.
S9 = deleted.
S10 = Surrogate recovery was above laboratory and method acceptance limits. See case narrative.
S11 = Surrogate recovery was high. Data reported per ADEQ policy 0154.000.
S12 = Surrogate recovery was low. Data reported per ADEQ policy 0154.000.

Method/analyte discrepancies:

T1 = Method approved by EPA, but not yet licensed by ADHS.
T2 = Cited ADHS licensed method does not contain this analyte as part of method compound list.
T3 = Method not promulgated either by EPA or ADHS.
T4 = Tentatively identified compound. Concentration is estimated and based on the closest internal standard.
T5 = Laboratory not licensed for this parameter.
T6 = The reported result cannot be used for compliance purposes.
T7 = Incubator/Oven temperatures were not monitored as required during all days of use.
T8= Method used not listed in 40 CFR 136; alternate method chosen as acceptable per permit.
T9 = Less than the prescribed sample amount was available to perform the leachate extraction. The volume of extraction fluid was adjusted proportionately based on the method prescribed ratio of extraction fluid to sample weight.

Calibration verification:

V1 = CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.
V2 = CCV recovery was above method acceptance limits. This target analyte was detected in the sample. The sample could not be reanalyzed due to insufficient sample.
V3 = CCV recovery was above method acceptance limits. This target analyte was detected in the sample, but the sample was not reanalyzed. See case narrative.
V4 = deleted.
V5 = CCV recovery after a group of samples was above acceptance limits. This target analyte was not detected in the sample; acceptable per EPA Method 8000C.
V6 = Data reported from one-point calibration criteria.
V7 = deleted.
V8 = deleted.
V9 = CCV recovery was below method acceptance limits.

Calibration:

W1= deleted.
W2= deleted.

ATTACHMENT A
"Guidance on the Usage of Data Qualifiers"

These standardized data qualifiers are for use in qualifying analytical results for compliance samples in Arizona to represent events that occurred during analysis.
The technical subcommittee has endeavored to develop qualifiers that are succinct and narrow in scope to eliminate broad or multiple interpretations when assessing the impact on data. It must also be noted that due to the specialized nature of the individual qualifiers, it is likely that more than one qualifier may be needed in order to accurately represent the data.

Note: 1. Using the Arizona Data Qualifiers does not automatically denote acceptability to the Regulatory Agency.
2. As specified in the Arizona Adopted Rules, R9-14-615.C.9, *for each parameter tested at the laboratory for which quality control acceptance criteria are not specified in the approved method or by EPA or ADEQ,:*
a. Use default limits provided in Exhibit II; or
b. Statistically develop limits from historical data

The laboratory has an option of using ADHS Default Limits which can be accessed at http://www.azdhs.gov/lab/license/tech/altdefaultlimit.pdf

Microbiology:

None.

Method/calibration blank:

Apply appropriate qualifier to affected analyte in the blank if target analyte is not detected at $\geq$ RL in the samples. If analytes are detected, then all corresponding analytes for the associated samples should also be qualified.

Confirmation:

For methods that require qualitative confirmation. C3 applies to methods that require quantitative confirmation.

Dilution:

If all analytes are reported from the diluted sample, apply qualifier to the entire sample. Otherwise apply qualifier to each analyte that required dilution.

Estimated concentration:

Appropriate qualifier must be used for any analyte result reported outside the calibration range. Affects data reported outside the calibration range or down to the MDL. E8 is only required if additional clarification is necessary.

Hold time:

Qualify samples appropriately when method extraction and/ or analysis holding time have been exceeded.

BOD/CBOD:

Qualifiers K5, K6, & K8 indicate situations that may impact all results in an analytical run and should be used to qualify all affected samples as well as any affected quality control samples when reported. K3 was deleted because if the seed depletion was out, then the situation must be explained in the case narrative. Criteria for qualifiers K9, K10, K11 taken from Standard Methods 5210 B, 2001 Revision.

Laboratory fortified blank/blank spike:

Appropriate qualifier must be applied to the affected analytes in the Laboratory fortified blank/blank spike and to all corresponding analytes in the associated samples.

Matrix spike:

Appropriate qualifier must be applied to the affected analytes in the matrix spike and should also be added to all corresponding analytes in the associated spiked sample. If a batch spike recovery is outside of the acceptable range, it is permissible to only flag the sample that was spiked and not the other samples in the batch. As required in the Arizona Adopted Rules A.A.C. R9-14-617.8.d, clients must always be informed if the batch QC result is unacceptable whether one of their samples was spiked or not. The laboratory can choose how the unacceptable QC is reported to the client (e.g., cover letter or flag).

The ADEQ policy 0154.000 can be accessed at
http://www.azdeq.gov/function/programs/download/spike8.pdf

General:

For example, qualifier N7 refers to total cyanide vs. free or amendable cyanide, total nitrate/nitrite vs. nitrite, total metals vs. TCLP metals, total PCB's vs. individual aroclors, and total chromium vs. hexavalent chromium.

Sample quality:

Flag samples with appropriate qualifier when sample quality may be potentially impacted or when method requirements were not met.
The ADEQ policy 0154.000 can be accessed at
http://www.azdeq.gov/function/programs/download/spike8.pdf

Duplicates:

For use with sample, matrix spike, LFB and LFB/blank spike duplicates. Qualify all affected analytes. For MS/MSD or sample duplicates qualify only the original source sample.

Surrogate:

Qualify surrogates appropriately when they do not meet criteria. Surrogate failures in quality control samples will most likely require additional narration. S11 & S12 are used to qualify sample surrogates and only in cases where the Laboratory Fortified Blank/ blank spike has acceptable surrogate recoveries.

Method/analyte discrepancies:

For use with methods or analytes that are not currently approved under the Environmental Laboratory Licensure Rules or for which the lab is not licensed.

Calibration verification:

Appropriate qualifier must be applied to all affected analytes in any samples associated with the calibration verification.

Calibration:

None.

Laboratory Report Examples

Laboratory B

31 August 2012

[redacted]
Valued Client
[redacted]
Phoenix, Arizona 85009

RE: General Pricing

Laboratory Work Order No.: 2081408

[redacted] is pleased to provide the enclosed analytical results for the aforementioned project. These results relate only to the items tested. This cover letter and the accompanying pages represent the full report for these analyses and should only be reproduced in full. Samples for this project were received by the laboratory on 08/16/12 15:36.

The samples were processed in accordance with the Chain of Custody document and the results presented relate only to the samples tested. The Chain of Custody is considered part of this report.

All samples will be retained by [redacted] for 30 days from the date of this report and then discarded unless other arrangements are made.

This entire report was reviewed and approved for release by the undersigned. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

[redacted]

[redacted]
Client Services Representative
(602) 324-6100

This laboratory report is confidential and is intended for the sole use of [redacted] and it's client.

Page 1 of 11

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Type	Date Sampled	Date Received
WW (Discharge)	2081408-01	Wastewater	Composite	08/16/12 15:00	08/16/12 15:36
WW (Discharge)	2081408-02	Wastewater	Grab	08/16/12 14:30	08/16/12 15:36

Sample Condition Upon Receipt:

Temperature: 22.00 C

All samples were received in acceptable condition unless noted otherwise in the case

Case Narrative:

Holding Times: All holding times were met unless otherwise qualified.

QA/QC Criteria: All analyses met method requirements unless otherwise qualified.

Certifications: AZ(PHX)0004, AZ(TUC)OOO4, AIHA#102982, CDC ELITE Member.

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

Comments: There were no problems encountered during the processing of the samples, unless otherwise noted. All samples were analyzed on a "wet" basis unless designated as "dry weight".

Due to a laboratory oversight when assisting the client with completing the chain of custody on 8/16/12, Mercury was not analyzed. During final report review, the error was discovered and Mercury was analyzed. LP

WW (Discharge) (2081408-01) Wastewater (Composite) Sampled: 08/16/12 15:00 Received: 08/16/12 15:36

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
[redacted]									
Total Metals									
Arsenic	**0.003**	0.001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Cadmium	<0.0001	0.0001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Copper	**0.07**	0.01	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Lead	**0.001**	0.001	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Mercury	<0.0002	0.0002	mg/L	1	B2H0854	08/29/12 09:40	08/29/12 16:01	EPA 245.1	
Molybdenum	<0.02	0.02	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Selenium	<0.002	0.002	mg/L	1	B2H0572	08/20/12 16:23	08/22/12 19:01	EPA 200.8	
Silver	**0.0002**	0.0002	mg/L	1	B2H0572	08/20/12 16:23	08/24/12 16:25	EPA 200.8	
Zinc	**0.10**	0.02	mg/L	1	B2H0571	08/20/12 16:19	08/21/12 17:31	EPA 200.7	
Inorganic Chemistry									
Biochemical Oxygen Demand	**116**	2	mg/L	1	B2H0511	08/17/12 10:00	08/17/12 10:00	SM 5210B	
Chemical Oxygen Demand	**388**	20	mg/L	1	B2H0689	08/22/12 12:15	08/22/12 12:15	EPA 410.4	
Total Suspended Solids	**23**	1	mg/L	1	B2H0546	08/20/12 07:00	08/20/12 07:00	SM 2540 D	

WW (Discharge) (2081408-02) Wastewater (Grab) Sampled: 08/16/12 14:30 Received: 08/16/12 15:36

Analyte	Result	PQL	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
[redacted]									
Inorganic Chemistry									
Cyanide, Total	<0.010	0.010	mg/L	1	B2H0594	08/21/12 09:00	08/21/12 11:00	SM 4500 CN E	

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0571 - EPA 200.7										
Blank (B2H0571-BLK1)				*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	<0.01	0.01	mg/L							
Molybdenum	<0.02	0.02	mg/L							
Zinc	<0.02	0.02	mg/L							
LCS (B2H0571-BS1)				*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	0.96	0.01	mg/L	1.00		96	85-115			
Molybdenum	0.19	0.02	mg/L	0.200		97	85-115			
Zinc	0.95	0.02	mg/L	1.00		95	85-115			
Matrix Spike (B2H0571-MS1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	1.00	0.01	mg/L	1.00	0.02	98	70-130			
Molybdenum	0.20	0.02	mg/L	0.200	<0.02	99	70-130			
Zinc	0.99	0.02	mg/L	1.00	0.04	95	70-130			
Matrix Spike Dup (B2H0571-MSD1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/21/12*						
Copper	1.00	0.01	mg/L	1.00	0.02	98	70-130	0.1	20	
Molybdenum	0.20	0.02	mg/L	0.200	<0.02	99	70-130	0.2	20	
Zinc	0.99	0.02	mg/L	1.00	0.04	95	70-130	0.1	20	
Batch B2H0572 - EPA 200.8										
Blank (B2H0572-BLK1)				*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	<0.001	0.001	mg/L							
Cadmium	<0.0001	0.0001	mg/L							
Lead	<0.001	0.001	mg/L							
Selenium	<0.002	0.002	mg/L							
Silver	<0.0002	0.0002	mg/L							

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0572 - EPA 200.8										
LCS (B2H0572-BS1)				*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.024	0.001	mg/L	0.0250		97	85-115			
Cadmium	0.0239	0.0001	mg/L	0.0250		95	85-115			
Lead	0.022	0.001	mg/L	0.0250		90	85-115			
Selenium	0.024	0.002	mg/L	0.0250		97	85-115			
Silver	0.0272	0.0002	mg/L	0.0250		109	85-115			
Matrix Spike (B2H0572-MS1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.042	0.001	mg/L	0.0250	0.017	100	70-130			
Cadmium	0.0246	0.0001	mg/L	0.0250	0.0006	96	70-130			
Lead	0.029	0.001	mg/L	0.0250	0.007	89	70-130			
Selenium	0.024	0.002	mg/L	0.0250	0.0009	93	70-130			
Silver	0.0252	0.0002	mg/L	0.0250	0.00005	101	70-130			
Matrix Spike Dup (B2H0572-MSD1)		**Source: 2081403-01**		*Prepared: 08/20/12 Analyzed: 08/22/12*						
Arsenic	0.042	0.001	mg/L	0.0250	0.017	101	70-130	0.7	20	
Cadmium	0.0244	0.0001	mg/L	0.0250	0.0006	95	70-130	0.9	20	
Lead	0.029	0.001	mg/L	0.0250	0.007	90	70-130	0.9	20	
Selenium	0.024	0.002	mg/L	0.0250	0.0009	91	70-130	1	20	
Silver	0.0249	0.0002	mg/L	0.0250	0.00005	99	70-130	1	20	
Batch B2H0854 - EPA 245.1/245.2 Prep										
Blank (B2H0854-BLK1)				*Prepared & Analyzed: 08/29/12*						
Mercury	<0.0002	0.0002	mg/L							
LCS (B2H0854-BS1)				*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100		99	85-115			

Total Metals - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0854 - EPA 245.1/245.2 Prep										
Matrix Spike (B2H0854-MS1)		**Source: 2082159-01**		*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100	<0.0002	102	70-130			
Matrix Spike Dup (B2H0854-MSD1)		**Source: 2082159-01**		*Prepared & Analyzed: 08/29/12*						
Mercury	0.0010	0.0002	mg/L	0.00100	<0.0002	100	70-130	2	20	

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0511 - NO PREP										
Blank (B2H0511-BLK1)				*Prepared & Analyzed: 08/17/12*						
Biochemical Oxygen Demand	<2	2	mg/L							
LCS (B2H0511-BS1)				*Prepared & Analyzed: 08/17/12*						
Biochemical Oxygen Demand	202	2	mg/L	198		102	85-115			
Batch B2H0546 - NO PREP										
Blank (B2H0546-BLK1)				*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L							
Duplicate (B2H0546-DUP1)	**Source: 2081334-01**			*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L		0				5	
Duplicate (B2H0546-DUP2)	**Source: 2081420-01**			*Prepared & Analyzed: 08/20/12*						
Total Suspended Solids	<1	1	mg/L		0				5	
Batch B2H0594 - NO PREP										
Blank (B2H0594-BLK1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	<0.010	0.010	mg/L							
Blank (B2H0594-BLK2)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	<0.010	0.010	mg/L							
LCS (B2H0594-BS1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.050	0.010	mg/L	0.0500		100	80-120			

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0594 - NO PREP										
LCS Dup (B2H0594-BSD1)				*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.051	0.010	mg/L	0.0500		102	80-120	2	25	
Matrix Spike (B2H0594-MS1)	**Source: 2081169-03**			*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120			
Matrix Spike (B2H0594-MS2)	**Source: 2081387-01**			*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120			
Matrix Spike Dup (B2H0594-MSD1)	**Source: 2081169-03**			*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.049	0.010	mg/L	0.0500	<0.010	98	80-120	2	25	
Matrix Spike Dup (B2H0594-MSD2)	**Source: 2081387-01**			*Prepared & Analyzed: 08/21/12*						
Cyanide, Total	0.048	0.010	mg/L	0.0500	<0.010	96	80-120	0	25	
Batch B2H0689 - NO PREP										
Blank (B2H0689-BLK1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	<20	20	mg/L							
LCS (B2H0689-BS1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	198	20	mg/L	200		99	90-110			
LCS Dup (B2H0689-BSD1)				*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	197	20	mg/L	200		98	90-110	0.7	20	
Matrix Spike (B2H0689-MS1)	**Source: 2081333-01**			*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	215	20	mg/L	200	26	94	90-110			

Inorganic Chemistry - Quality Control

[redacted]

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B2H0689 - NO PREP										
Matrix Spike (B2H0689-MS2)	**Source: 2081333-02**			*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	213	20	mg/L	200	18	98	90-110			
Matrix Spike Dup (B2H0689-MSD1)	**Source: 2081333-01**			*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	213	20	mg/L	200	26	93	90-110	0.7	20	
Matrix Spike Dup (B2H0689-MSD2)	**Source: 2081333-02**			*Prepared & Analyzed: 08/22/12*						
Chemical Oxygen Demand	208	20	mg/L	200	18	95	90-110	3	20	

Notes and Definitions

BLK	Method Blank
LCS/Dup	Laboratory Control Sample/Laboratory Fortified Blank/Duplicate
MS/Dup	Matrix Spike/Duplicate
Dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Laboratory Sample ID: 2081408

CHAIN OF CUSTODY RECORD

Laboratory B

)518 Page 1 of 1

Please Print Clearly

CLIENT INFORMATION

Client Name	Address	City	State	Zip	Phone	Fax Number or Email Address
[redacted]		Phoenix	AZ	85009	[redacted]	

Project Name	Project Number	Contact	P.O. No.	
ESD Test	01		N/A	Fax Results ~~X~~ 8/16 QC Report ☐ EDD ☐ CC Email Results X Special Detection Limits ☐

SAMPLE TYPE CODES

DW=Drinking Water; WW=Wastewater; SW=Surface Water; G=Groundwater; O=Other _____
S=Soil/Solid; T=Travel Blank; F=Food; G=Sludge/Biosolids

TURN AROUND TIME

Laboratory Authorization Required for Rush

☐ Standard 10 - 15 Day
☐ Other _____

REQUESTED ANALYSES

Client's Sample Identification	Date	Time	Sample Location	Composite	Grab	Sample Type	Compliance	No. of Containers	pH ✓ (Lab Use Only)	Metals*	Boron	COD	TSS	Cyanide	LAB NO.
WW	8/16	1500	discharge	X		WW	X	4	✓	X	X	X	X		01
WW	8/16	1430	discharge		X	WW	X	1	✓					X	02

PAID $372.00
☐CASH ☐CHECK # 10558 ☐MC/ ☐VISA
____-____-____-____ EXP ___/___

TO ENSURE COMPLETION OF ANALYSIS, SAMPLES MUST BE RECEIVED AT LEAST 3 HOURS PRIOR TO THE HOLD TIME EXPIRATION

Comments / Special Instructions: *Metals = As, Cd, Cu, Pb, Mo, Se, Ag, Zn $372.00

SAMPLE CONDITION UPON RECEIPT (Lab Use)		
No. of Containers	3	
Temperature	22.0°C	
Custody Seals	Y	N
Seals Intact	Y	N
Preserved	Y	N

	RELINQUISHED BY			SAMPLES RECEIVED BY	
①	Sampler Signature [redacted]	Date	8/16	Signature	Date 8-16-12
	Sampler Printed Name	Time	1536	Printed Name	Time 1536
②	Sampler Signature	Date		Signature	Date
	Sampler Printed Name	Time		Printed Name	Time
③	Sampler Signature	Date		Signature	Date
	Sampler Printed Name	Time		Printed Name	Time

WHITE-LAB YELLOW-CLIENT

FORM GEN-170 (05/06)

[redacted] Laboratory C

Lic. No. AZ[redacted]

[redacted]

Client: [redacted]
[redacted]
[redacted]
Phoenix, AZ 85034
Attn [redacted]

Date Submitted: 04/08/15
Date Reported: 05/12/15

Project: WW Quarterly Analysis

RESULTS

Client ID: April Monthly
ACT Lab No.: BX03156

Sample Type: WW-Comp
Sample Time: 04/08/15 07:00

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Biochemical Oxygen Demand	04/08/15	04/13/15	SM5210 B	1140.	mg/L
Chemical Oxygen Demand	04/13/15	04/13/15	SM 5220 D	1700 *	mg/L
Copper, Total	04/13/15	04/13/15	200.8	0.11	mg/L
Lead, Total	04/13/15	04/13/15	200.8	0.0074	mg/L
Molybdenum, Total	04/13/15	04/13/15	200.8	0.012	mg/L
Semi-volatile Organics	03/10/15	03/14/15	EPA 625	See Attached *	ug/L
Total Suspended Solids	04/15/15	04/20/15	SM2540 D	208.	mg/L

* Analysis performed by [redacted] (AZ[redacted])

Reviewed by: [redacted]

QC Report

QC Parameter	Sample Result	Method Blank Result	QCS % Rec	Duplicate Result	Duplicate RPD	Spike Result	Spike % Rec
Batch ID: BOD-69658 QC ID:	BX03138	Samples: BX03156					
Biochemical Oxygen Demand	<4. *		105.	<4.	0.0		
Batch ID: ICP-69631 QC ID:	BX03036	Samples: BX03156					
Antimony		<0.0010	101.	<0.0010		0.2470	98.8
Barium		<0.0010	100.	0.085		0.3730	115.
Beryllium		<0.0010	101.	<0.0010		0.2520	101.
Boron		<0.0050	106.	0.18		0.4450	106.
Cadmium		<0.0010	95.0	<0.0010		0.2710	108.
Calcium		<0.5	94.8	40.6	0.247	70.25	100.
Chromium		<0.0050	93.4	<0.0050		0.2610	104.
Copper		<0.0050	95.4	0.011	8.70	0.2560	97.6
Iron		<0.010	100.	0.35		0.4300	102.
Lead		<0.0010	95.4	<0.0010		0.2750	110.
Magnesium		<0.5	93.5	24.0		24.0	102.
Manganese		<0.0010	92.8	0.016		0.2710	102.
Molybdenum		<0.0010	90.0	0.0050	3.92	0.2740	108.
Nickel		<0.0010	109.	0.0062	1.60	0.2620	102.
Potassium		<0.5	108.	5.7	1.77	8.319	110.
Selenium		<0.0020	99.4	<0.0020		0.2660	106.
Silver		<0.0010	101.	<0.0010		0.2560	102.
Sodium		<0.5	103.	130.		115.	100.
Thallium		<0.0010	92.4	<0.0010		0.2790	112.
Zinc		<0.010	106.	0.041	2.41	0.3010	104.
Batch ID: TSS-69728 QC ID:	BX03300	Samples: BX03156					
Total Suspended Solids	344.			368.	6.74		

CHAIN OF CUSTODY

PWS ID #: ______

PAGE 1 OF 1

Client Name: [redacted]
Address: [redacted]
Street
Phx. Az. 85034
City, State, Zip
Phone: [redacted]
Fax:
Contact: [redacted]
Sampler Signature: [redacted]

PO#:
Project:
Remarks:

SAMPLE ID	SAMPLE Date	SAMPLE Time		SAMPLE TYPE	Chemistry: Metals (See Below)	☐ TDS ☒ TSS ☐ TS ☐ SETT ☐ TVS ☐ VSS	☐ O+G ☐ TPHC ☐ MBAS ☐ CN ☐ Sulfide	☒ BOD ☒ COD ☐ New Source	☐ Tot.P ☐ O-PO4	☐ Nitrate + Nitrite ☐ Nitrite	☐ TKN ☐ Ammonia	☐ THM's ☐ HAAS	☐ Phenol ☐ 420.1 ☒ 625 ☐ 8270	☐ 8260 ☐ 624 ☐ BTEX	☐ Perchlorate ☐ Radio ☐ Asbestos	Biology: Total Coliform ☐ P/A ☐ Colilert ☐ MPN	☐ E. Coli ☐ Fecal Strep	Fecal Coliform ☐ MPN ☐ MF	☐ MICRO SCOPE ID	☐ Plate Count ☐ BIOLOG		Biomon: ☐ Acute ☐ Chronic	☐ AWET (SWRO)			No. of Containers: $Na_2S_2O_3$	H_2SO_4	HNO_3	NONE	NaOH	NaOH/ZnAc	Laboratory Number
April Monthly	4-8-15	7:00	AM (circled) / PM	w.w.c	X	X		X					X														1	1	3			BX03156
			AM / PM																													
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Metals: ☐ Al ☐ Sb ☐ As ☐ Ba ☐ Be ☐ B ☐ Cd ☐ Ca ☐ Cr ☐ Co ☒ Cu ☐ Au ☐ Fe ☒ Pb ☐ Mg ☐ Mn ☐ Hg ☒ Mo ☐ Ni ☐ Se ☐ Ag ☐ Na ☐ Sr ☐ Tl ☐ Sn ☐ Ti ☐ V ☐ Zn

[X] TOTAL [ ] DISSOLVED [ ] SDWA [ ] TCLP [ ] RCRA

Sample Types: DW, GW, SW, WW, AQ, Soil, Sludge or Solid

Sample Receiving: MLC
Intact: X Yes ____ No
Temp: 2°C Auth Init: ____
Pres: 2 Yes/V 3 No/Lab
Sterile: ____ Yes X No
Total # containers: 5

1. Relinquished By: [redacted]		2. Relinquished By:		3. Relinquished By:	
Date: 4-8-15	Time: 9:55 AM (circled) / PM	Date:	Time: AM / PM	Date:	Time: AM / PM
1. Received By: [redacted]		2. Received By:		3. Received By:	
Date: 4-8-15	Time: 09:55 AM / PM	Date:	Time: AM / PM	Date:	Time: AM / PM

Attn: Your signature on this document authorizes analysis regardless of sample condition at time of submittal

By signing this chain of custody, the designated client and agent agree to pay Aquatic Consulting & Testing, Inc. for all services rendered in conjunction with the submitted samples within 30 days of invoice. It is the client's responsibility to note purchase order numbers or other responsible parties on the form and failure to do so does not constitute justification for non-payment.

White-Laboratory Yellow-Report Pink-Client

Sample delivery group #: -008

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
T2	Cited ADHS licensed method does not contain this analyte as part of the method compound list.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
D1	Sample required dilution due to matrix.

GC/MS Semi VOA

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
L4	The associated blank spike recovery was below method acceptance limits.
R6	LFB/LFBD RPD exceeded method control limit. Recovery met acceptance criteria.

GC Semi VOA

Qualifier	Qualifier Description
D1	Sample required dilution due to matrix.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
C8	Sample RPD between the primary and confirmatory analysis exceeded 40% Per EPA Method 8000C, the lower value was reported as there was no evidence of chromatographic problems.
N1	See case narrative.

Metals

Qualifier	Qualifier Description
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.

General Chemistry

Qualifier	Qualifier Description
H5	This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.
D2	Sample required dilution due to high concentration of analyte.
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
K1	The sample dilutions set-up for the BOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Any reported result is an estimated value.
M2	Matrix spike recovery was low, the associated blank spike recovery was acceptable.
D1	Sample required dilution due to matrix.
D5	Minimum Reporting Limit (MRL) adjusted due to sample dilution; analyte was non-detect in the sample.
E4	Concentration estimated. Analyte was detected below laboratory minimum reporting level (MRL) but above MDL.
E8	Analyte reported to MDL per project specification. Target analyte was not detected in the sample.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit

[redacted]

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Job ID: 550-43961-2

Laboratory: [redacted]

Narrative

Job Narrative
550-43961-2

Comments
Revised report includes the addition of priority pollutant metals and results reported to the MDL per the client request on 5 August 2015.

Receipt
The samples were received on 4/29/2015 2:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.0º C and 3.7º C.

Receipt Exceptions

A trip blank was submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC). Contacted client per e-mail and confirmed to proceed with analysis on trip blank. Received e-mail 04/30/15. JfS 05/01/15.

GC/MS VOA
Method(s) 624, 8260B: The following sample was diluted due to the abundance of non-target analytes: [redacted]B213 (550-43961-1). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method(s) 625: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 440-252617 and analytical batch 440-253127. The laboratory control sample (LCS) was performed in duplicate to provide precision data for this batch.

Method(s) 625: The laboratory control sample and laboratory control sample duplicate (LCS/LCSD) were out of range low for 2-Chloronaphthalene. The laboratory control sample duplicate (LCSD) was out of range low for 3,3-Dichlorobenzidine. Sample may be biased low for these compounds.

(LCS 440-252617/2-A)

Method(s) 625: The percent recovery of 3,3'-dichlorobenzidine, 2-Chloronaphthalene, 3-Nitroaniline, 4-Chloroaniline, 4-Nitroaniline, Aniline and N-Nitrosodiphenylamine in the laboratory control sample duplicate (LCSD) of preparation batch 252617 failed below the lower acceptance limit. The recovery of these compounds has historically been problematic with this preparation method, 3520C. Samples were re-extracted past holding time with similar results for the QC. Original extraction within holding time was reported. (LCSD 440-252617/3-A) Samples may be biased low for these compounds.

Method(s) 625: The %RPD of the laboratory control sample (LCS) and laboratory control standard duplicate (LCSD) for preparation batch 252617 recovered outside control limits for the following analytes: 3,3-Dichlorobenzidine, 3-Nitroaniline, 4-Chloroaniline, 4-Nitroaniline and Aniline.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method(s) 608: The Heptachlor Epoxide was detected on column A in the sample 43961-1, but it cannot be confirmed on column B due to a peak which coelutes at the same RT on the alternate column. The RPD between the primary and confirmation column exceeded 40% for Heptachlor epoxide . The lower value has been reported , as matrix interference is evident on column B. The result has been flagged with C8 and N1 qualifier.

[redacted]B213 (550-43961-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 550-43961-2 (Continued)

Laboratory [redacted] (Continued)

Metals

Method(s) 200.7: The pH in sample [redacted] B213 (550-43961-1) could not be verified due to matrix interference.

Method(s) 200.7: The following sample was diluted due to the nature of the sample matrix [redacted] B213 (550-43961-1). Elevated reporting limits (RLs) are provided.

Method(s) 200.7 Rev 4.4: The initial calibration verification (ICV) result for batch 62492 was above the upper control limit for thallium. Sample results were non-detects, and have been reported as qualified data.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method(s) SM 4500 CN C: The following sample was diluted due to the nature of the sample matrix [redacted] B213 (550-43961-1). Elevated reporting limits (RLs) are provided. The analyte was not detected in the sample and data is qualified with D1 and D5 flags.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 608: Due to the matrix (milky, viscous, cloudy), the initial volumes used for the following samples deviated from the standard procedure [redacted] B213 (550-43961-1) and (550-43961-E-1 MS). The reporting limits (RLs) have been adjusted proportionately.

Method(s) 608: Due to the matrix (cloudy, milky, thick), the initial volume(s) used for the following sample(s) deviated from the standard procedure: 43961-1. The reporting limits (RLs) have been adjusted proportionately.

Method(s) 3510C, 608: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with batch 62523

Method(s) 625: The following sample was diluted due to the nature of the sample matrix [redacted] B213 (550-43961-1). Elevated reporting limits (RLs) are provided.

Batch 252617
440-108363-7, 550-43961-1

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: [redacted] [redacted]Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-43961-1	[redacted]B213	Water	04/29/15 12:00	04/29/15 14:45
550-43961-2	Trip Blank	Water	04/29/15 12:00	04/29/15 14:45

[redacted]

Detection Summary

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted]B213 Lab Sample ID: 550-43961-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride - DL	1000	D1 E4	5000	670	ug/L	1000		624	Total/NA
Methanol	9.4		0.50		mg/L	1		8015B	Total/NA
Endosulfan, alpha	1.8	D1	1.3	0.21	ug/L	5		608	Total/NA
Heptachlor epoxide	1.8	C8 D1 N1	1.3	0.17	ug/L	5		608	Total/NA
Formaldehyde	1.1		0.50		mg/L	1		8315A	Total/NA
Beryllium	0.010		0.010	0.0020	mg/L	1		200.7 Rev 4.4	Total/NA
Nickel	0.051	E4	0.10	0.016	mg/L	1		200.7 Rev 4.4	Total/NA
Arsenic	0.083	E4	1.0	0.027	mg/L	1		200.7 Rev 4.4	Total/NA
Copper	6.3		0.10	0.017	mg/L	1		200.7 Rev 4.4	Total/NA
Zinc	11		0.50	0.033	mg/L	1		200.7 Rev 4.4	Total/NA
Chromium	0.039	E4	0.10	0.0050	mg/L	1		200.7 Rev 4.4	Total/NA
Total Suspended Solids	17000	D2	1000		mg/L	1		SM 2540D	Total/NA
Cyanide, Total	0.096	D1 D5 E4	0.50	0.035	mg/L	1		SM 4500 CN E	Total/NA
pH	8.56	H5	1.68		SU	1		SM 4500 H+ B	Total/NA
Temperature	17.7	H5	0.100		Degrees C	1		SM 4500 H+ B	Total/NA
Biochemical Oxygen Demand	<3.30	D1 D5 K1	800		mg/L	160		SM 5210B	Total/NA

Client Sample ID: Trip Blank Lab Sample ID: 550-43961-2

No Detections.

This Detection Summary does not include radiochemical test results.

[redacted]

Client Sample Results

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted] **Lab Sample ID: 550-43961-1**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloroethyl vinyl ether	ND	E8	2500	500	ug/L			05/01/15 17:17	500
Acrolein	ND	E8	25000	1300	ug/L			05/01/15 17:17	500
Acrylonitrile	ND	E8	25000	500	ug/L			05/01/15 17:17	500

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 128*		*05/01/15 17:17*	*500*
Dibromofluoromethane (Surr)	*95*		*76 - 132*		*05/01/15 17:17*	*500*

Method: 624 - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	D1 E8	2000	150	ug/L			05/08/15 07:30	1000
1,1,2,2-Tetrachloroethane	ND	D1 E8	2000	330	ug/L			05/08/15 07:30	1000
1,1,2-Trichloroethane	ND	D1 E8	2000	310	ug/L			05/08/15 07:30	1000
1,1-Dichloroethane	ND	D1 E8	2000	140	ug/L			05/08/15 07:30	1000
1,1-Dichlorethylene	ND	D1 E8	5000	230	ug/L			05/08/15 07:30	1000
1,2-Dichloroethane	ND	D1 E8	2000	310	ug/L			05/08/15 07:30	1000
1,2-Dichloropropane	ND	D1 E8	2000	230	ug/L			05/08/15 07:30	1000
Benzene	ND	D1 E8	2000	120	ug/L			05/08/15 07:30	1000
Dichlorobromomethane	ND	D1 E8	2000	230	ug/L			05/08/15 07:30	1000
Bromoform	ND	D1 E8	2000	370	ug/L			05/08/15 07:30	1000
Methyl bromide	ND	D1 E8	2000	670	ug/L			05/08/15 07:30	1000
Carbon tetrachloride	ND	D1 E8	2500	150	ug/L			05/08/15 07:30	1000
Chlorobenzene	ND	D1 E8	2000	170	ug/L			05/08/15 07:30	1000
Chloroethane	ND	D1 E8	5000	250	ug/L			05/08/15 07:30	1000
Chloroform	ND	D1 E8	2000	130	ug/L			05/08/15 07:30	1000
Methyl chloride	ND	D1 E8	5000	210	ug/L			05/08/15 07:30	1000
Chlorodibromomethane	ND	D1 E8 T2	2000	220	ug/L			05/08/15 07:30	1000
Ethylbenzene	ND	D1 E8	2000	320	ug/L			05/08/15 07:30	1000
Methylene Chloride	**1000**	**D1 E4**	5000	670	ug/L			05/08/15 07:30	1000
Tetrachloroethylene	ND	D1 E8	2000	180	ug/L			05/08/15 07:30	1000
Toluene	ND	D1 E8	2000	280	ug/L			05/08/15 07:30	1000
1,2-trans-Dichloroethylene	ND	D1 E8	2000	290	ug/L			05/08/15 07:30	1000
Trichloroethylene	ND	D1 E8	2000	240	ug/L			05/08/15 07:30	1000
Trichlorofluoromethane	ND	D1 E8	5000	150	ug/L			05/08/15 07:30	1000
Vinyl chloride	ND	D1 E8	2000	180	ug/L			05/08/15 07:30	1000
4-Methyl-2-pentanone (MIBK)	ND	D1 E8 T2	10000	1300	ug/L			05/08/15 07:30	1000
Styrene	ND	D1 E8 T2	2000	170	ug/L			05/08/15 07:30	1000
Xylenes, Total	ND	D1 E8 T2	10000	860	ug/L			05/08/15 07:30	1000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*90*		*70 - 130*		*05/08/15 07:30*	*1000*
Dibromofluoromethane (Surr)	*97*		*70 - 130*		*05/08/15 07:30*	*1000*
Toluene-d8 (Surr)	*106*		*70 - 130*		*05/08/15 07:30*	*1000*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
1,2-Dichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
1,2-Diphenylhydrazine(as Azobenzene)	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4

[redacted]

Client Sample Results

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted] **Lab Sample ID: 550-43961-1**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
1,4-Dichlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,4,6-Trichlorophenol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,4-Dichlorophenol	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,4-Dimethylphenol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,4-Dinitrophenol	ND	E8	16000	8000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,4-Dinitrotoluene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2,6-Dinitrotoluene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2-Chloronaphthalene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2-Chlorophenol	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
2-Nitrophenol	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
3,3'-Dichlorobenzidine	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
4,6-Dinitro-o-cresol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
4-Bromophenyl phenyl ether	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
p-Chloro-m-cresol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
4-Chlorophenyl phenyl ether	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
4-Nitrophenol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Acenaphthene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Acenaphthylene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Anthracene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzo[a]anthracene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzidine	ND	E8	16000	8000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzo[a]pyrene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzo[b]fluoranthene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzo[g,h,i]perylene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Benzo[k]fluoranthene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Bis(2-chloroethoxy)methane	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Bis(2-chloroethyl)ether	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
bis (2-chloroisopropyl) ether	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Bis(2-ethylhexyl) phthalate	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Butyl benzyl phthalate	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Chrysene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Dibenz(a,h)anthracene	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Diethyl phthalate	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Dimethyl phthalate	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Di-n-butyl phthalate	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Di-n-octyl phthalate	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Fluoranthene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Fluorene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Hexachlorobenzene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Hexachlorobutadiene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Hexachlorocyclopentadiene	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Hexachloroethane	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Indeno[1,2,3-cd]pyrene	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Isophorone	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Naphthalene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Nitrobenzene	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
N-Nitrosodimethylamine	ND	E8	8000	1000	ug/L		05/03/15 14:21	05/07/15 20:08	4
N-Nitrosodiphenylamine	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4

[redacted]

Client Sample Results

Client Sample ID: [redacted] **Lab Sample ID: 550-43961-1**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	ND	E8	8000	4000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Phenanthrene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Phenol	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4
Pyrene	ND	E8	4000	2000	ug/L		05/03/15 14:21	05/07/15 20:08	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorophenol (Surr)	*64*		*30 - 120*	*05/03/15 14:21*	*05/07/15 20:08*	*4*
Nitrobenzene-d5 (Surr)	*76*		*45 - 120*	*05/03/15 14:21*	*05/07/15 20:08*	*4*
2,4,6-Tribromophenol (Surr)	*75*		*40 - 120*	*05/03/15 14:21*	*05/07/15 20:08*	*4*
2-Fluorobiphenyl	*74*		*50 - 120*	*05/03/15 14:21*	*05/07/15 20:08*	*4*
Terphenyl-d14	*80*		*10 - 150*	*05/03/15 14:21*	*05/07/15 20:08*	*4*
Phenol-d6	*70*		*35 - 120*	*05/03/15 14:21*	*05/07/15 20:08*	*4*

Method: 8015B - Nonhalogenated Organic Compounds - Direct Injection (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	**9.4**		0.50		mg/L			05/05/15 16:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1-Pentanol	*105*		*70 - 130*		*05/05/15 16:49*	*1*

Method: 608 - Organochlorine Pesticides in Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	D1 E8	1.3	0.31	ug/L		05/04/15 11:27	05/04/15 22:07	5
4,4'-DDE	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
4,4'-DDT	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
Aldrin	ND	D1 E8	1.3	0.18	ug/L		05/04/15 11:27	05/04/15 22:07	5
alpha-BHC	ND	D1 E8	1.3	0.28	ug/L		05/04/15 11:27	05/04/15 22:07	5
beta-BHC	ND	D1 E8	1.3	0.19	ug/L		05/04/15 11:27	05/04/15 22:07	5
Chlordane (technical)	ND	D1 E8	13	2.0	ug/L		05/04/15 11:27	05/04/15 22:07	5
delta-BHC	ND	D1 E8	1.3	0.23	ug/L		05/04/15 11:27	05/04/15 22:07	5
Dieldrin	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
Endosulfan, alpha	**1.8**	**D1**	1.3	0.21	ug/L		05/04/15 11:27	05/04/15 22:07	5
Endosulfan, beta	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
Endosulfan sulfate	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
Endrin	ND	D1 E8	1.3	0.18	ug/L		05/04/15 11:27	05/04/15 22:07	5
Endrin aldehyde	ND	D1 E8	1.3	0.22	ug/L		05/04/15 11:27	05/04/15 22:07	5
gamma-BHC (Lindane)	ND	D1 E8	1.3	0.16	ug/L		05/04/15 11:27	05/04/15 22:07	5
Heptachlor	ND	D1 E8	1.3	0.36	ug/L		05/04/15 11:27	05/04/15 22:07	5
Heptachlor epoxide	**1.8**	**C8 D1 N1**	1.3	0.17	ug/L		05/04/15 11:27	05/04/15 22:07	5
Toxaphene	ND	D1 E8	25	13	ug/L		05/04/15 11:27	05/04/15 22:07	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*23*		*10 - 103*	*05/04/15 11:27*	*05/04/15 22:07*	*5*
Tetrachloro-m-xylene	*11*		*10 - 132*	*05/04/15 11:27*	*05/04/15 22:07*	*5*

Method: 608 - Polychlorinated Biphenyls (PCBs) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	D1 E8	25	4.2	ug/L		05/04/15 11:27	05/04/15 22:07	5
PCB-1221	ND	D1 E8	25	5.0	ug/L		05/04/15 11:27	05/04/15 22:07	5
PCB-1232	ND	D1 E8	25	8.5	ug/L		05/04/15 11:27	05/04/15 22:07	5
PCB-1242	ND	D1 E8	25	11	ug/L		05/04/15 11:27	05/04/15 22:07	5

[redacted]

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted] **Lab Sample ID: 550-43961-1**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 608 - Polychlorinated Biphenyls (PCBs) (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1248	ND	D1 E8	25	4.4	ug/L		05/04/15 11:27	05/04/15 22:07	5
PCB-1254	ND	D1 E8	25	7.0	ug/L		05/04/15 11:27	05/04/15 22:07	5
PCB-1260	ND	D1 E8	25	3.6	ug/L		05/04/15 11:27	05/04/15 22:07	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*23*		*10 - 103*	*05/04/15 11:27*	*05/04/15 22:07*	*5*
Tetrachloro-m-xylene (Surr)	*11*		*10 - 132*	*05/04/15 11:27*	*05/04/15 22:07*	*5*

Method: 8315A - Carbonyl Compounds (HPLC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	**1.1**		0.50		mg/L		04/30/15 13:35	05/01/15 11:19	1

Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.010**		0.010	0.0020	mg/L		04/30/15 11:47	05/02/15 00:13	1
Cadmium	ND	E8	0.010	0.0080	mg/L		04/30/15 11:47	05/02/15 00:13	1
Antimony	ND	E8	0.40	0.066	mg/L		04/30/15 11:47	05/02/15 00:13	1
Thallium	ND	E8	1.0	0.043	mg/L		04/30/15 11:47	05/02/15 00:13	1
Nickel	**0.051**	**E4**	0.10	0.016	mg/L		04/30/15 11:47	05/02/15 00:13	1
Silver	ND	E8	0.10	0.0070	mg/L		04/30/15 11:47	05/02/15 00:13	1
Arsenic	**0.083**	**E4**	1.0	0.027	mg/L		04/30/15 11:47	05/02/15 00:13	1
Copper	**6.3**		0.10	0.017	mg/L		04/30/15 11:47	05/02/15 00:13	1
Lead	ND	E8	0.15	0.030	mg/L		04/30/15 11:47	05/02/15 00:13	1
Zinc	**11**		0.50	0.033	mg/L		04/30/15 11:47	05/02/15 00:13	1
Selenium	ND	E8	1.0	0.086	mg/L		04/30/15 11:47	05/02/15 00:13	1
Chromium	**0.039**	**E4**	0.10	0.0050	mg/L		04/30/15 11:47	05/02/15 00:13	1

Method: 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	E8	0.00020	0.000060	mg/L		05/06/15 09:21	05/06/15 15:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	**17000**	**D2**	1000		mg/L			04/30/15 09:15	1
Cyanide, Total	**0.096**	**D1 D5 E4**	0.50	0.035	mg/L		05/01/15 14:30	05/01/15 16:53	1
pH	**8.56**	**H5**	1.68		SU			04/29/15 18:15	1
Temperature	**17.7**	**H5**	0.100		Degrees C			04/29/15 18:15	1
Biochemical Oxygen Demand	**<3.30**	**D1 D5 K1**	800		mg/L			04/30/15 17:22	160

Client Sample ID: Trip Blank **Lab Sample ID: 550-43961-2**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	E8	2.0	0.15	ug/L			05/08/15 04:56	1
2-Chloroethyl vinyl ether	ND	E8	5.0	1.0	ug/L			05/01/15 12:42	1
1,1,2,2-Tetrachloroethane	ND	E8	2.0	0.33	ug/L			05/08/15 04:56	1
Acrolein	ND	E8	50	2.5	ug/L			05/01/15 12:42	1
1,1,2-Trichloroethane	ND	E8	2.0	0.31	ug/L			05/08/15 04:56	1
Acrylonitrile	ND	E8	50	1.0	ug/L			05/01/15 12:42	1

[redacted]

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: Trip Blank **Lab Sample ID: 550-43961-2**
Date Collected: 04/29/15 12:00 **Matrix: Water**
Date Received: 04/29/15 14:45

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND	E8	2.0	0.14	ug/L			05/08/15 04:56	1
1,1-Dichlorethylene	ND	E8	5.0	0.23	ug/L			05/08/15 04:56	1
1,2-Dichloroethane	ND	E8	2.0	0.31	ug/L			05/08/15 04:56	1
1,2-Dichloropropane	ND	E8	2.0	0.23	ug/L			05/08/15 04:56	1
Benzene	ND	E8	2.0	0.12	ug/L			05/08/15 04:56	1
Dichlorobromomethane	ND	E8	2.0	0.23	ug/L			05/08/15 04:56	1
Bromoform	ND	E8	2.0	0.37	ug/L			05/08/15 04:56	1
Methyl bromide	ND	E8	2.0	0.67	ug/L			05/08/15 04:56	1
Carbon tetrachloride	ND	E8	2.5	0.15	ug/L			05/08/15 04:56	1
Chlorobenzene	ND	E8	2.0	0.17	ug/L			05/08/15 04:56	1
Chloroethane	ND	E8	5.0	0.25	ug/L			05/08/15 04:56	1
Chloroform	ND	E8	2.0	0.13	ug/L			05/08/15 04:56	1
Methyl chloride	ND	E8	5.0	0.21	ug/L			05/08/15 04:56	1
Chlorodibromomethane	ND	E8 T2	2.0	0.22	ug/L			05/08/15 04:56	1
Ethylbenzene	ND	E8	2.0	0.32	ug/L			05/08/15 04:56	1
Methylene Chloride	ND	E8	5.0	0.67	ug/L			05/08/15 04:56	1
Tetrachloroethylene	ND	E8	2.0	0.18	ug/L			05/08/15 04:56	1
Toluene	ND	E8	2.0	0.28	ug/L			05/08/15 04:56	1
1,2-trans-Dichloroethylene	ND	E8	2.0	0.29	ug/L			05/08/15 04:56	1
Trichloroethylene	ND	E8	2.0	0.24	ug/L			05/08/15 04:56	1
Trichlorofluoromethane	ND	E8	5.0	0.15	ug/L			05/08/15 04:56	1
Vinyl chloride	ND	E8	2.0	0.18	ug/L			05/08/15 04:56	1
4-Methyl-2-pentanone (MIBK)	ND	E8 T2	10	1.3	ug/L			05/08/15 04:56	1
Styrene	ND	E8 T2	2.0	0.17	ug/L			05/08/15 04:56	1
Xylenes, Total	ND	E8 T2	10	0.86	ug/L			05/08/15 04:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*80 - 128*		*05/01/15 12:42*	*1*
Dibromofluoromethane (Surr)	*99*		*76 - 132*		*05/01/15 12:42*	*1*
4-Bromofluorobenzene (Surr)	*92*		*70 - 130*		*05/08/15 04:56*	*1*
Dibromofluoromethane (Surr)	*102*		*70 - 130*		*05/08/15 04:56*	*1*
Toluene-d8 (Surr)	*103*		*70 - 130*		*05/08/15 04:56*	*1*

[redacted]

Surrogate Summary

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Method: 624 - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	
Lab Sample ID	Client Sample ID	(80-128)	(76-132)	
440-108054-E-5 MS	Matrix Spike	97	99	
440-108054-E-5 MSD	Matrix Spike Duplicate	101	98	
550-43961-1	[redacted]B213	104	95	
550-43961-2	Trip Blank	103	99	
LCS 440-252325/5	Lab Control Sample	96	97	
LCSD 440-252325/6	Lab Control Sample Dup	98	99	
MB 440-252325/4	Method Blank	102	99	

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 624 - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)
550-43844-C-1 MS	Matrix Spike	98	107	105
550-43844-C-1 MSD	Matrix Spike Duplicate	104	101	104
550-43961-1 - DL	[redacted]B213	90	97	106
550-43961-2	Trip Blank	92	102	103
LCS 550-62906/3	Lab Control Sample	90	96	99
LCSD 550-62906/4	Lab Control Sample Dup	97	106	105
MB 550-62906/5	Method Blank	91	87	103

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		2FP	NBZ	TBP	FBP	TPH	PHL
Lab Sample ID	Client Sample ID	(30-120)	(45-120)	(40-120)	(50-120)	(10-150)	(35-120)
550-43961-1	[redacted]B213	64	76	75	74	80	70
LCS 440-252617/2-A	Lab Control Sample	55	64	74	67	67	62
LCSD 440-252617/3-A	Lab Control Sample Dup	53	66	80	68	73	56
MB 440-252617/1-A	Method Blank	56	67	81	71	82	61

Surrogate Legend

2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl
TPH = Terphenyl-d14
PHL = Phenol-d6

[redacted]

Surrogate Summary

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Method: 8015B - Nonhalogenated Organic Compounds - Direct Injection (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		1Pent1
Lab Sample ID	Client Sample ID	(70-130)
440-108560-B-1 MS	Matrix Spike	103
440-108560-B-1 MSD	Matrix Spike Duplicate	98
550-43961-1	[redacted]B213	105
LCS 440-252962/8	Lab Control Sample	73
MB 440-252962/7	Method Blank	80

Surrogate Legend

1Pent = 1-Pentanol

Method: 608 - Organochlorine Pesticides in Water

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(10-103)	(10-132)
550-43961-1	[redacted]B213	23	11
LCS 550-62523/2-A	Lab Control Sample	47	67
LCSD 550-62523/3-A	Lab Control Sample Dup	45	67
MB 550-62523/1-A	Method Blank	40	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene

Method: 608 - Polychlorinated Biphenyls (PCBs) (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCB1	TCX1
Lab Sample ID	Client Sample ID	(10-103)	(10-132)
550-43961-1	[redacted]	23	11
LCS 550-62523/4-A	Lab Control Sample	51	64
MB 550-62523/1-A	Method Blank	40	73

Surrogate Legend

DCB = DCB Decachlorobiphenyl (Surr)
TCX = Tetrachloro-m-xylene (Surr)

[redacted]

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-252325/4
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Chloroethyl vinyl ether	ND	E8	5.0	1.0	ug/L			05/01/15 08:35	1
Acrolein	ND	E8	50	2.5	ug/L			05/01/15 08:35	1
Acrylonitrile	ND	E8	50	1.0	ug/L			05/01/15 08:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 128*		*05/01/15 08:35*	*1*
Dibromofluoromethane (Surr)	*99*		*76 - 132*		*05/01/15 08:35*	*1*

Lab Sample ID: LCS 440-252325/5
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
2-Chloroethyl vinyl ether			25.0	23.7		ug/L		95	37 - 150		
Acrolein			25.0	9.43	E4	ug/L		38	10 - 145		
Acrylonitrile			250	263		ug/L		105	48 - 140		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*80 - 128*
Dibromofluoromethane (Surr)	*97*		*76 - 132*

Lab Sample ID: LCSD 440-252325/6
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Chloroethyl vinyl ether			25.0	24.0		ug/L		96	37 - 150	1	25
Acrolein			25.0	8.66	E4	ug/L		35	10 - 145	9	30
Acrylonitrile			250	251		ug/L		100	48 - 140	5	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*80 - 128*
Dibromofluoromethane (Surr)	*99*		*76 - 132*

Lab Sample ID: 440-108054-E-5 MS
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
2-Chloroethyl vinyl ether	ND	E8	25.0	23.4		ug/L		94	10 - 140		
Acrolein	ND	E8	25.0	9.76	E4	ug/L		39	10 - 147		
Acrylonitrile	ND	E8	250	254		ug/L		102	38 - 144		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*80 - 128*
Dibromofluoromethane (Surr)	*99*		*76 - 132*

[redacted]

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-108054-E-5 MSD
Matrix: Water
Analysis Batch: 252325

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Chloroethyl vinyl ether	ND	E8	25.0	25.7		ug/L		103	10 - 140	9	25
Acrolein	ND	E8	25.0	11.0	E4	ug/L		44	10 - 147	12	40
Acrylonitrile	ND	E8	250	260		ug/L		104	38 - 144	2	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 128*
Dibromofluoromethane (Surr)	*98*		*76 - 132*

Lab Sample ID: MB 550-62906/5
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	E8	2.0	0.15	ug/L			05/07/15 20:08	1
1,1,2,2-Tetrachloroethane	ND	E8	2.0	0.33	ug/L			05/07/15 20:08	1
1,1,2-Trichloroethane	ND	E8	2.0	0.31	ug/L			05/07/15 20:08	1
1,1-Dichloroethane	ND	E8	2.0	0.14	ug/L			05/07/15 20:08	1
1,1-Dichlorethylene	ND	E8	5.0	0.23	ug/L			05/07/15 20:08	1
1,2-Dichloroethane	ND	E8	2.0	0.31	ug/L			05/07/15 20:08	1
1,2-Dichloropropane	ND	E8	2.0	0.23	ug/L			05/07/15 20:08	1
Benzene	ND	E8	2.0	0.12	ug/L			05/07/15 20:08	1
Dichlorobromomethane	ND	E8	2.0	0.23	ug/L			05/07/15 20:08	1
Bromoform	ND	E8	2.0	0.37	ug/L			05/07/15 20:08	1
Methyl bromide	ND	E8	2.0	0.67	ug/L			05/07/15 20:08	1
Carbon tetrachloride	ND	E8	2.5	0.15	ug/L			05/07/15 20:08	1
Chlorobenzene	ND	E8	2.0	0.17	ug/L			05/07/15 20:08	1
Chloroethane	ND	E8	5.0	0.25	ug/L			05/07/15 20:08	1
Chloroform	ND	E8	2.0	0.13	ug/L			05/07/15 20:08	1
Methyl chloride	ND	E8	5.0	0.21	ug/L			05/07/15 20:08	1
Chlorodibromomethane	ND	E8 T2	2.0	0.22	ug/L			05/07/15 20:08	1
Ethylbenzene	ND	E8	2.0	0.32	ug/L			05/07/15 20:08	1
Methylene Chloride	ND	E8	5.0	0.67	ug/L			05/07/15 20:08	1
Tetrachloroethylene	ND	E8	2.0	0.18	ug/L			05/07/15 20:08	1
Toluene	ND	E8	2.0	0.28	ug/L			05/07/15 20:08	1
1,2-trans-Dichloroethylene	ND	E8	2.0	0.29	ug/L			05/07/15 20:08	1
Trichloroethylene	ND	E8	2.0	0.24	ug/L			05/07/15 20:08	1
Trichlorofluoromethane	ND	E8	5.0	0.15	ug/L			05/07/15 20:08	1
Vinyl chloride	ND	E8	2.0	0.18	ug/L			05/07/15 20:08	1
4-Methyl-2-pentanone (MIBK)	ND	E8 T2	10	1.3	ug/L			05/07/15 20:08	1
Styrene	ND	E8 T2	2.0	0.17	ug/L			05/07/15 20:08	1
Xylenes, Total	ND	E8 T2	10	0.86	ug/L			05/07/15 20:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*91*		*70 - 130*		*05/07/15 20:08*	*1*
Dibromofluoromethane (Surr)	*87*		*70 - 130*		*05/07/15 20:08*	*1*
Toluene-d8 (Surr)	*103*		*70 - 130*		*05/07/15 20:08*	*1*

[redacted]

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 550-62906/3
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	25.0	21.7		ug/L		87	52 - 162
1,1,2,2-Tetrachloroethane	25.0	23.9		ug/L		96	46 - 157
1,1,2-Trichloroethane	25.0	22.7		ug/L		91	52 - 150
1,1-Dichloroethane	25.0	21.7		ug/L		87	59 - 155
1,1-Dichlorethylene	25.0	22.1		ug/L		89	5 - 234
1,2-Dichloroethane	25.0	22.7		ug/L		91	49 - 155
1,2-Dichloropropane	25.0	21.8		ug/L		87	5 - 210
Benzene	25.0	22.0		ug/L		88	37 - 151
Dichlorobromomethane	25.0	23.1		ug/L		92	35 - 155
Bromoform	25.0	25.7		ug/L		103	45 - 169
Methyl bromide	25.0	21.8		ug/L		87	5 - 242
Carbon tetrachloride	25.0	22.8		ug/L		91	70 - 140
Chlorobenzene	25.0	22.4		ug/L		90	37 - 160
Chloroethane	25.0	22.9		ug/L		92	14 - 230
Chloroform	25.0	21.5		ug/L		86	51 - 138
Methyl chloride	25.0	22.9		ug/L		92	5 - 273
Chlorodibromomethane	25.0	24.6	T2	ug/L		98	53 - 149
Ethylbenzene	25.0	22.7		ug/L		91	37 - 162
Methylene Chloride	25.0	25.3		ug/L		101	5 - 221
Tetrachloroethylene	25.0	20.8		ug/L		83	64 - 148
Toluene	25.0	21.8		ug/L		87	47 - 150
1,2-trans-Dichloroethylene	25.0	20.9		ug/L		84	54 - 156
Trichloroethylene	25.0	22.3		ug/L		89	71 - 157
Trichlorofluoromethane	25.0	24.3		ug/L		97	17 - 181
Vinyl chloride	25.0	23.9		ug/L		95	5 - 251
4-Methyl-2-pentanone (MIBK)	25.0	22.9	T2	ug/L		91	64 - 142
m,p-Xylenes	25.0	23.1	T2	ug/L		93	70 - 130
o-Xylene	25.0	23.1	T2	ug/L		92	70 - 130
Styrene	25.0	23.6	T2	ug/L		94	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*90*		*70 - 130*
Dibromofluoromethane (Surr)	*96*		*70 - 130*
Toluene-d8 (Surr)	*99*		*70 - 130*

Lab Sample ID: LCSD 550-62906/4
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	25.0	24.8		ug/L		99	52 - 162	14	20
1,1,2,2-Tetrachloroethane	25.0	24.1		ug/L		97	46 - 157	1	20
1,1,2-Trichloroethane	25.0	23.5		ug/L		94	52 - 150	4	20
1,1-Dichloroethane	25.0	24.1		ug/L		96	59 - 155	10	20
1,1-Dichlorethylene	25.0	25.3		ug/L		101	5 - 234	13	20
1,2-Dichloroethane	25.0	25.2		ug/L		101	49 - 155	11	20
1,2-Dichloropropane	25.0	23.9		ug/L		96	5 - 210	9	20
Benzene	25.0	23.7		ug/L		95	37 - 151	7	20

[redacted]

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 550-62906/4
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Dichlorobromomethane	25.0	24.6		ug/L		98	35 - 155	6	20
Bromoform	25.0	26.0		ug/L		104	45 - 169	1	20
Methyl bromide	25.0	24.7		ug/L		99	5 - 242	13	20
Carbon tetrachloride	25.0	24.6		ug/L		98	70 - 140	8	20
Chlorobenzene	25.0	24.4		ug/L		98	37 - 160	9	20
Chloroethane	25.0	26.6		ug/L		107	14 - 230	15	20
Chloroform	25.0	24.6		ug/L		99	51 - 138	14	20
Methyl chloride	25.0	26.5		ug/L		106	5 - 273	14	20
Chlorodibromomethane	25.0	26.6	T2	ug/L		106	53 - 149	8	20
Ethylbenzene	25.0	24.3		ug/L		97	37 - 162	7	20
Methylene Chloride	25.0	28.1		ug/L		112	5 - 221	10	20
Tetrachloroethylene	25.0	22.7		ug/L		91	64 - 148	9	20
Toluene	25.0	23.7		ug/L		95	47 - 150	8	20
1,2-trans-Dichloroethylene	25.0	24.5		ug/L		98	54 - 156	16	20
Trichloroethylene	25.0	24.5		ug/L		98	71 - 157	9	20
Trichlorofluoromethane	25.0	27.9		ug/L		112	17 - 181	14	20
Vinyl chloride	25.0	27.2		ug/L		109	5 - 251	13	20
4-Methyl-2-pentanone (MIBK)	25.0	26.0	T2	ug/L		104	64 - 142	13	25
m,p-Xylenes	25.0	24.7	T2	ug/L		99	70 - 130	6	20
o-Xylene	25.0	25.4	T2	ug/L		102	70 - 130	10	20
Styrene	25.0	25.4	T2	ug/L		102	70 - 130	7	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*70 - 130*
Dibromofluoromethane (Surr)	*106*		*70 - 130*
Toluene-d8 (Surr)	*105*		*70 - 130*

Lab Sample ID: 550-43844-C-1 MS
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND	E8	25.0	24.6		ug/L		98	52 - 162
1,1,2,2-Tetrachloroethane	ND	E8	25.0	23.3		ug/L		93	46 - 157
1,1,2-Trichloroethane	ND	E8	25.0	22.8		ug/L		91	52 - 150
1,1-Dichloroethane	ND	E8	25.0	23.6		ug/L		95	59 - 155
1,1-Dichlorethylene	ND	E8	25.0	25.2		ug/L		101	5 - 234
1,2-Dichloroethane	ND	E8	25.0	23.2		ug/L		93	49 - 155
1,2-Dichloropropane	ND	E8	25.0	23.8		ug/L		95	5 - 210
Benzene	ND	E8	25.0	24.2		ug/L		97	37 - 151
Dichlorobromomethane	ND	E8	25.0	24.2		ug/L		97	35 - 155
Bromoform	ND	E8	25.0	25.6		ug/L		102	45 - 169
Methyl bromide	ND	E8	25.0	22.6		ug/L		90	5 - 242
Carbon tetrachloride	ND	E8	25.0	25.5		ug/L		102	70 - 140
Chlorobenzene	ND	E8	25.0	24.7		ug/L		99	37 - 160
Chloroethane	ND	E8	25.0	25.9		ug/L		103	14 - 230
Chloroform	ND	E8	25.0	23.3		ug/L		93	51 - 138
Methyl chloride	ND	E8	25.0	25.2		ug/L		101	5 - 273

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Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 550-43844-C-1 MS
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorodibromomethane	ND	E8 T2	25.0	25.6	T2	ug/L		102	53 - 149
Ethylbenzene	ND	E8	25.0	25.0		ug/L		100	37 - 162
Methylene Chloride	ND	E8	25.0	23.5		ug/L		94	5 - 221
Tetrachloroethylene	ND	E8	25.0	23.4		ug/L		94	64 - 148
Toluene	ND	E8	25.0	23.8		ug/L		95	47 - 150
1,2-trans-Dichloroethylene	ND	E8	25.0	22.7		ug/L		91	54 - 156
Trichloroethylene	ND	E8	25.0	23.8		ug/L		95	71 - 157
Trichlorofluoromethane	ND	E8	25.0	28.1		ug/L		112	17 - 181
Vinyl chloride	ND	E8	25.0	26.8		ug/L		107	5 - 251
4-Methyl-2-pentanone (MIBK)	ND	E8 T2	25.0	21.5	T2	ug/L		86	52 - 143
m,p-Xylenes	ND	E8 T2	25.0	25.5	T2	ug/L		102	58 - 138
o-Xylene	ND	E8 T2	25.0	26.2	T2	ug/L		105	66 - 137
Styrene	ND	E8 T2	25.0	25.4	T2	ug/L		102	43 - 144

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*70 - 130*
Dibromofluoromethane (Surr)	*107*		*70 - 130*
Toluene-d8 (Surr)	*105*		*70 - 130*

Lab Sample ID: 550-43844-C-1 MSD
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND	E8	25.0	24.1		ug/L		97	52 - 162	2	20
1,1,2,2-Tetrachloroethane	ND	E8	25.0	24.4		ug/L		97	46 - 157	5	20
1,1,2-Trichloroethane	ND	E8	25.0	23.5		ug/L		94	52 - 150	3	20
1,1-Dichloroethane	ND	E8	25.0	23.4		ug/L		94	59 - 155	1	20
1,1-Dichlorethylene	ND	E8	25.0	24.3		ug/L		97	5 - 234	4	20
1,2-Dichloroethane	ND	E8	25.0	23.6		ug/L		95	49 - 155	2	20
1,2-Dichloropropane	ND	E8	25.0	23.8		ug/L		95	5 - 210	0	20
Benzene	ND	E8	25.0	24.0		ug/L		96	37 - 151	1	20
Dichlorobromomethane	ND	E8	25.0	24.6		ug/L		98	35 - 155	2	20
Bromoform	ND	E8	25.0	26.6		ug/L		106	45 - 169	4	20
Methyl bromide	ND	E8	25.0	22.3		ug/L		89	5 - 242	1	20
Carbon tetrachloride	ND	E8	25.0	25.4		ug/L		102	70 - 140	1	20
Chlorobenzene	ND	E8	25.0	25.4		ug/L		102	37 - 160	3	20
Chloroethane	ND	E8	25.0	25.9		ug/L		104	14 - 230	0	20
Chloroform	ND	E8	25.0	23.8		ug/L		95	51 - 138	2	20
Methyl chloride	ND	E8	25.0	24.9		ug/L		100	5 - 273	1	20
Chlorodibromomethane	ND	E8 T2	25.0	27.0	T2	ug/L		108	53 - 149	6	20
Ethylbenzene	ND	E8	25.0	25.9		ug/L		104	37 - 162	4	20
Methylene Chloride	ND	E8	25.0	23.9		ug/L		96	5 - 221	2	20
Tetrachloroethylene	ND	E8	25.0	24.2		ug/L		97	64 - 148	3	20
Toluene	ND	E8	25.0	23.8		ug/L		95	47 - 150	0	20
1,2-trans-Dichloroethylene	ND	E8	25.0	22.9		ug/L		91	54 - 156	1	20
Trichloroethylene	ND	E8	25.0	24.0		ug/L		96	71 - 157	1	20
Trichlorofluoromethane	ND	E8	25.0	27.8		ug/L		111	17 - 181	1	20

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Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 550-43844-C-1 MSD
Matrix: Water
Analysis Batch: 62906

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vinyl chloride	ND	E8	25.0	26.1		ug/L		104	5 - 251	3	20
4-Methyl-2-pentanone (MIBK)	ND	E8 T2	25.0	21.4	T2	ug/L		85	52 - 143	1	35
m,p-Xylenes	ND	E8 T2	25.0	26.9	T2	ug/L		108	58 - 138	5	29
o-Xylene	ND	E8 T2	25.0	26.8	T2	ug/L		107	66 - 137	2	26
Styrene	ND	E8 T2	25.0	26.3	T2	ug/L		105	43 - 144	3	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*104*		*70 - 130*
Dibromofluoromethane (Surr)	*101*		*70 - 130*
Toluene-d8 (Surr)	*104*		*70 - 130*

Method: 625 - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-252617/1-A
Matrix: Water
Analysis Batch: 253127

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252617

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
1,2-Dichlorobenzene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
1,2-Diphenylhydrazine(as Azobenzene)	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
1,3-Dichlorobenzene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
1,4-Dichlorobenzene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,4,6-Trichlorophenol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,4-Dichlorophenol	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,4-Dimethylphenol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,4-Dinitrophenol	ND	E8	40	20	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,4-Dinitrotoluene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2,6-Dinitrotoluene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2-Chloronaphthalene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2-Chlorophenol	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
2-Nitrophenol	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
3,3'-Dichlorobenzidine	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
4,6-Dinitro-o-cresol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
4-Bromophenyl phenyl ether	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
p-Chloro-m-cresol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
4-Chlorophenyl phenyl ether	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
4-Nitrophenol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Acenaphthene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Acenaphthylene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Anthracene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzo[a]anthracene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzidine	ND	E8	40	20	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzo[a]pyrene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzo[b]fluoranthene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzo[g,h,i]perylene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Benzo[k]fluoranthene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1

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Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-252617/1-A
Matrix: Water
Analysis Batch: 253127

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252617

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bis(2-chloroethoxy)methane	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Bis(2-chloroethyl)ether	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
bis (2-chloroisopropyl) ether	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Bis(2-ethylhexyl) phthalate	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Butyl benzyl phthalate	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Chrysene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Dibenz(a,h)anthracene	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Diethyl phthalate	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Dimethyl phthalate	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Di-n-butyl phthalate	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Di-n-octyl phthalate	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Fluoranthene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Fluorene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Hexachlorobenzene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Hexachlorobutadiene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Hexachlorocyclopentadiene	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Hexachloroethane	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Indeno[1,2,3-cd]pyrene	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Isophorone	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Naphthalene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Nitrobenzene	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
N-Nitrosodimethylamine	ND	E8	20	2.5	ug/L		05/03/15 14:21	05/06/15 01:11	1
N-Nitrosodiphenylamine	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Pentachlorophenol	ND	E8	20	10	ug/L		05/03/15 14:21	05/06/15 01:11	1
Phenanthrene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Phenol	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1
Pyrene	ND	E8	10	5.0	ug/L		05/03/15 14:21	05/06/15 01:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorophenol (Surr)	*56*		*30 - 120*	*05/03/15 14:21*	*05/06/15 01:11*	*1*
Nitrobenzene-d5 (Surr)	*67*		*45 - 120*	*05/03/15 14:21*	*05/06/15 01:11*	*1*
2,4,6-Tribromophenol (Surr)	*81*		*40 - 120*	*05/03/15 14:21*	*05/06/15 01:11*	*1*
2-Fluorobiphenyl	*71*		*50 - 120*	*05/03/15 14:21*	*05/06/15 01:11*	*1*
Terphenyl-d14	*82*		*10 - 150*	*05/03/15 14:21*	*05/06/15 01:11*	*1*
Phenol-d6	*61*		*35 - 120*	*05/03/15 14:21*	*05/06/15 01:11*	*1*

Lab Sample ID: LCS 440-252617/2-A
Matrix: Water
Analysis Batch: 253127

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 252617

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	100	52.4		ug/L		52	44 - 142
1,2-Dichlorobenzene	100	49.6		ug/L		50	32 - 129
1,2-Diphenylhydrazine(as Azobenzene)	100	64.6		ug/L		65	55 - 106
1,3-Dichlorobenzene	100	47.3		ug/L		47	10 - 150
1,4-Dichlorobenzene	100	48.5		ug/L		49	20 - 124
2,4,6-Trichlorophenol	100	64.8		ug/L		65	37 - 144

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Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 440-252617/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 253127 **Prep Batch: 252617**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-Dichlorophenol	100	61.7		ug/L		62	39 - 135
2,4-Dimethylphenol	100	53.4		ug/L		53	32 - 119
2,4-Dinitrophenol	100	64.3		ug/L		64	50 - 150
2,4-Dinitrotoluene	100	72.6		ug/L		73	39 - 139
2,6-Dinitrotoluene	100	69.4		ug/L		69	50 - 150
2-Chloronaphthalene	100	59.2	L4	ug/L		59	60 - 118
2-Chlorophenol	100	56.2		ug/L		56	23 - 134
2-Nitrophenol	100	60.6		ug/L		61	29 - 150
3,3'-Dichlorobenzidine	100	38.4		ug/L		38	10 - 150
4,6-Dinitro-o-cresol	100	62.6		ug/L		63	10 - 150
4-Bromophenyl phenyl ether	100	64.5		ug/L		64	53 - 127
p-Chloro-m-cresol	100	66.8		ug/L		67	22 - 147
4-Chlorophenyl phenyl ether	100	66.8		ug/L		67	25 - 150
4-Nitrophenol	100	66.1		ug/L		66	10 - 132
Acenaphthene	100	64.9		ug/L		65	47 - 145
Acenaphthylene	100	67.4		ug/L		67	33 - 145
Anthracene	100	68.3		ug/L		68	27 - 133
Benzo[a]anthracene	100	62.1		ug/L		62	33 - 143
Benzidine	100	52.6		ug/L		53	5 - 137
Benzo[a]pyrene	100	65.7		ug/L		66	17 - 150
Benzo[b]fluoranthene	100	65.9		ug/L		66	24 - 150
Benzo[g,h,i]perylene	100	68.7		ug/L		69	10 - 150
Benzo[k]fluoranthene	100	66.7		ug/L		67	11 - 150
Bis(2-chloroethoxy)methane	100	60.5		ug/L		60	33 - 150
Bis(2-chloroethyl)ether	100	49.6		ug/L		50	12 - 150
bis (2-chloroisopropyl) ether	100	49.7		ug/L		50	44 - 103
Bis(2-ethylhexyl) phthalate	100	65.3		ug/L		65	10 - 150
Butyl benzyl phthalate	100	64.9		ug/L		65	10 - 150
Chrysene	100	69.8		ug/L		70	17 - 150
Dibenz(a,h)anthracene	100	57.9		ug/L		58	10 - 150
Diethyl phthalate	100	70.3		ug/L		70	10 - 114
Dimethyl phthalate	100	67.9		ug/L		68	10 - 112
Di-n-butyl phthalate	100	63.5		ug/L		64	10 - 118
Di-n-octyl phthalate	100	60.8		ug/L		61	10 - 146
Fluoranthene	100	63.5		ug/L		64	26 - 137
Fluorene	100	70.7		ug/L		71	59 - 121
Hexachlorobenzene	100	65.8		ug/L		66	10 - 150
Hexachlorobutadiene	100	47.9		ug/L		48	24 - 116
Hexachlorocyclopentadiene	100	43.8		ug/L		44	20 - 67
Hexachloroethane	100	41.5		ug/L		41	40 - 113
Indeno[1,2,3-cd]pyrene	100	62.2		ug/L		62	10 - 150
Isophorone	100	60.3		ug/L		60	21 - 150
Naphthalene	100	57.4		ug/L		57	21 - 133
Nitrobenzene	100	58.4		ug/L		58	35 - 150
N-Nitrosodimethylamine	100	52.7		ug/L		53	38 - 97
N-Nitrosodiphenylamine	100	62.7		ug/L		63	54 - 111
Pentachlorophenol	100	63.3		ug/L		63	14 - 150
Phenanthrene	100	67.0		ug/L		67	54 - 120

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Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 440-252617/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 253127 — **Prep Batch: 252617**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phenol			100	55.6		ug/L		56	10 - 112		
Pyrene			100	63.8		ug/L		64	52 - 115		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorophenol (Surr)	*55*		*30 - 120*
Nitrobenzene-d5 (Surr)	*64*		*45 - 120*
2,4,6-Tribromophenol (Surr)	*74*		*40 - 120*
2-Fluorobiphenyl	*67*		*50 - 120*
Terphenyl-d14	*67*		*10 - 150*
Phenol-d6	*62*		*35 - 120*

Lab Sample ID: LCSD 440-252617/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 253127 — **Prep Batch: 252617**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2,4-Trichlorobenzene			100	52.6		ug/L		53	44 - 142	0	35
1,2-Dichlorobenzene			100	51.3		ug/L		51	32 - 129	3	35
1,2-Diphenylhydrazine(as Azobenzene)			100	61.3		ug/L		61	55 - 106	5	35
1,3-Dichlorobenzene			100	49.9		ug/L		50	10 - 150	5	35
1,4-Dichlorobenzene			100	50.7		ug/L		51	20 - 124	4	35
2,4,6-Trichlorophenol			100	65.5		ug/L		65	37 - 144	1	35
2,4-Dichlorophenol			100	60.9		ug/L		61	39 - 135	1	35
2,4-Dimethylphenol			100	59.4		ug/L		59	32 - 119	11	35
2,4-Dinitrophenol			100	65.5		ug/L		66	50 - 150	2	35
2,4-Dinitrotoluene			100	69.2		ug/L		69	39 - 139	5	35
2,6-Dinitrotoluene			100	69.2		ug/L		69	50 - 150	0	35
2-Chloronaphthalene			100	58.6	L4	ug/L		59	60 - 118	1	35
2-Chlorophenol			100	55.8		ug/L		56	23 - 134	1	35
2-Nitrophenol			100	61.0		ug/L		61	29 - 150	1	35
3,3'-Dichlorobenzidine			100	ND	E8 L4 R6	ug/L		0	10 - 150	200	35
4,6-Dinitro-o-cresol			100	62.5		ug/L		62	10 - 150	0	35
4-Bromophenyl phenyl ether			100	70.5		ug/L		71	53 - 127	9	35
p-Chloro-m-cresol			100	69.1		ug/L		69	22 - 147	3	35
4-Chlorophenyl phenyl ether			100	65.7		ug/L		66	25 - 150	2	35
4-Nitrophenol			100	63.6		ug/L		64	10 - 132	4	35
Acenaphthene			100	61.9		ug/L		62	47 - 145	5	35
Acenaphthylene			100	66.2		ug/L		66	33 - 145	2	35
Anthracene			100	67.9		ug/L		68	27 - 133	1	35
Benzo[a]anthracene			100	65.0		ug/L		65	33 - 143	4	35
Benzidine			100	48.7		ug/L		49	5 - 137	8	35
Benzo[a]pyrene			100	67.0		ug/L		67	17 - 150	2	35
Benzo[b]fluoranthene			100	69.2		ug/L		69	24 - 150	5	35
Benzo[g,h,i]perylene			100	69.7		ug/L		70	10 - 150	2	35
Benzo[k]fluoranthene			100	69.4		ug/L		69	11 - 150	4	35
Bis(2-chloroethoxy)methane			100	57.7		ug/L		58	33 - 150	5	35
Bis(2-chloroethyl)ether			100	49.6		ug/L		50	12 - 150	0	35

[redacted]

Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 440-252617/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 253127 — **Prep Batch: 252617**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
bis (2-chloroisopropyl) ether			100	50.9		ug/L		51	44 - 103	2	35
Bis(2-ethylhexyl) phthalate			100	67.3		ug/L		67	10 - 150	3	35
Butyl benzyl phthalate			100	67.8		ug/L		68	10 - 150	4	35
Chrysene			100	73.3		ug/L		73	17 - 150	5	35
Dibenz(a,h)anthracene			100	59.5		ug/L		59	10 - 150	3	35
Diethyl phthalate			100	66.8		ug/L		67	10 - 114	5	35
Dimethyl phthalate			100	68.0		ug/L		68	10 - 112	0	35
Di-n-butyl phthalate			100	62.2		ug/L		62	10 - 118	2	35
Di-n-octyl phthalate			100	63.9		ug/L		64	10 - 146	5	35
Fluoranthene			100	58.7		ug/L		59	26 - 137	8	35
Fluorene			100	67.8		ug/L		68	59 - 121	4	35
Hexachlorobenzene			100	70.5		ug/L		71	10 - 150	7	35
Hexachlorobutadiene			100	48.2		ug/L		48	24 - 116	1	35
Hexachlorocyclopentadiene			100	46.2		ug/L		46	20 - 67	5	35
Hexachloroethane			100	44.3		ug/L		44	40 - 113	7	35
Indeno[1,2,3-cd]pyrene			100	65.1		ug/L		65	10 - 150	5	35
Isophorone			100	60.6		ug/L		61	21 - 150	1	35
Naphthalene			100	56.7		ug/L		57	21 - 133	1	35
Nitrobenzene			100	57.8		ug/L		58	35 - 150	1	35
N-Nitrosodimethylamine			100	55.4		ug/L		55	38 - 97	5	35
N-Nitrosodiphenylamine			100	51.9	L4	ug/L		52	54 - 111	19	35
Pentachlorophenol			100	65.2		ug/L		65	14 - 150	3	35
Phenanthrene			100	67.3		ug/L		67	54 - 120	0	35
Phenol			100	51.7		ug/L		52	10 - 112	7	35
Pyrene			100	70.4		ug/L		70	52 - 115	10	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2-Fluorophenol (Surr)	*53*		*30 - 120*
Nitrobenzene-d5 (Surr)	*66*		*45 - 120*
2,4,6-Tribromophenol (Surr)	*80*		*40 - 120*
2-Fluorobiphenyl	*68*		*50 - 120*
Terphenyl-d14	*73*		*10 - 150*
Phenol-d6	*56*		*35 - 120*

Method: 8015B - Nonhalogenated Organic Compounds - Direct Injection (GC)

Lab Sample ID: MB 440-252962/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 252962

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methanol	ND		0.50		mg/L			05/05/15 13:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1-Pentanol	*80*		*70 - 130*		*05/05/15 13:14*	*1*

[redacted]

Method: 8015B - Nonhalogenated Organic Compounds - Direct Injection (GC) (Continued)

Lab Sample ID: LCS 440-252962/8
Matrix: Water
Analysis Batch: 252962

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methanol			10.0	9.69		mg/L		97	70 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1-Pentanol	*73*		*70 - 130*

Lab Sample ID: 440-108560-B-1 MS
Matrix: Water
Analysis Batch: 252962

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methanol	1.2		10.0	10.3		mg/L		91	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1-Pentanol	*103*		*70 - 130*

Lab Sample ID: 440-108560-B-1 MSD
Matrix: Water
Analysis Batch: 252962

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methanol	1.0		10.0	9.72		mg/L		87	70 - 130	4	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1-Pentanol	*98*		*70 - 130*

Method: 608 - Organochlorine Pesticides in Water

Lab Sample ID: MB 550-62523/1-A
Matrix: Water
Analysis Batch: 62555

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62523

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	ND	E8	0.050	0.013	ug/L		05/04/15 11:27	05/04/15 19:11	1
4,4'-DDE	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1
4,4'-DDT	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1
Aldrin	ND	E8	0.050	0.0070	ug/L		05/04/15 11:27	05/04/15 19:11	1
alpha-BHC	ND	E8	0.050	0.011	ug/L		05/04/15 11:27	05/04/15 19:11	1
beta-BHC	ND	E8	0.050	0.0074	ug/L		05/04/15 11:27	05/04/15 19:11	1
Chlordane (technical)	ND	E8	0.50	0.080	ug/L		05/04/15 11:27	05/04/15 19:11	1
delta-BHC	ND	E8	0.050	0.0091	ug/L		05/04/15 11:27	05/04/15 19:11	1
Dieldrin	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1
Endosulfan, alpha	ND	E8	0.050	0.0083	ug/L		05/04/15 11:27	05/04/15 19:11	1
Endosulfan, beta	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1
Endosulfan sulfate	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1
Endrin	ND	E8	0.050	0.0072	ug/L		05/04/15 11:27	05/04/15 19:11	1
Endrin aldehyde	ND	E8	0.050	0.0089	ug/L		05/04/15 11:27	05/04/15 19:11	1
gamma-BHC (Lindane)	ND	E8	0.050	0.0065	ug/L		05/04/15 11:27	05/04/15 19:11	1

[redacted]

Method: 608 - Organochlorine Pesticides in Water (Continued)

Lab Sample ID: MB 550-62523/1-A
Matrix: Water
Analysis Batch: 62555

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62523

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor	ND	E8	0.050	0.014	ug/L		05/04/15 11:27	05/04/15 19:11	1
Heptachlor epoxide	ND	E8	0.050	0.0067	ug/L		05/04/15 11:27	05/04/15 19:11	1
Toxaphene	ND	E8	1.0	0.50	ug/L		05/04/15 11:27	05/04/15 19:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*40*		*10 - 103*	*05/04/15 11:27*	*05/04/15 19:11*	*1*
Tetrachloro-m-xylene	*73*		*10 - 132*	*05/04/15 11:27*	*05/04/15 19:11*	*1*

Lab Sample ID: LCS 550-62523/2-A
Matrix: Water
Analysis Batch: 62555

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62523

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	1.00	0.834		ug/L		83	31 - 141
4,4'-DDE	1.00	0.799		ug/L		80	30 - 145
4,4'-DDT	1.00	0.808		ug/L		81	25 - 160
Aldrin	1.00	0.692		ug/L		69	42 - 122
alpha-BHC	1.00	0.830		ug/L		83	37 - 134
beta-BHC	1.00	0.824		ug/L		82	17 - 147
delta-BHC	1.00	0.831		ug/L		83	19 - 140
Dieldrin	1.00	0.851		ug/L		85	36 - 146
Endosulfan, alpha	1.00	0.819		ug/L		82	45 - 153
Endosulfan, beta	1.00	0.832		ug/L		83	5 - 150
Endosulfan sulfate	1.00	0.839		ug/L		84	25 - 144
Endrin	1.00	0.837		ug/L		84	30 - 147
Endrin aldehyde	1.00	0.844		ug/L		84	60 - 130
gamma-BHC (Lindane)	1.00	0.823		ug/L		82	32 - 127
Heptachlor	1.00	0.731		ug/L		73	34 - 111
Heptachlor epoxide	1.00	0.808		ug/L		81	37 - 142

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*47*		*10 - 103*
Tetrachloro-m-xylene	*67*		*10 - 132*

Lab Sample ID: LCSD 550-62523/3-A
Matrix: Water
Analysis Batch: 62555

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 62523

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	1.00	0.880		ug/L		88	31 - 141	5	33
4,4'-DDE	1.00	0.834		ug/L		83	30 - 145	4	35
4,4'-DDT	1.00	0.852		ug/L		85	25 - 160	5	35
Aldrin	1.00	0.704		ug/L		70	42 - 122	2	33
alpha-BHC	1.00	0.877		ug/L		88	37 - 134	6	28
beta-BHC	1.00	0.867		ug/L		87	17 - 147	5	28
delta-BHC	1.00	0.879		ug/L		88	19 - 140	6	28
Dieldrin	1.00	0.890		ug/L		89	36 - 146	5	30
Endosulfan, alpha	1.00	0.851		ug/L		85	45 - 153	4	30

[redacted]

Method: 608 - Organochlorine Pesticides in Water (Continued)

Lab Sample ID: LCSD 550-62523/3-A
Matrix: Water
Analysis Batch: 62555

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 62523

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endosulfan, beta			1.00	0.873		ug/L		87	5 - 150	5	30
Endosulfan sulfate			1.00	0.888		ug/L		89	25 - 144	6	30
Endrin			1.00	0.879		ug/L		88	30 - 147	5	35
Endrin aldehyde			1.00	0.897		ug/L		90	60 - 130	6	30
gamma-BHC (Lindane)			1.00	0.865		ug/L		87	32 - 127	5	28
Heptachlor			1.00	0.743		ug/L		74	34 - 111	2	33
Heptachlor epoxide			1.00	0.843		ug/L		84	37 - 142	4	29

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*45*		*10 - 103*
Tetrachloro-m-xylene	*67*		*10 - 132*

Method: 608 - Polychlorinated Biphenyls (PCBs) (GC)

Lab Sample ID: MB 550-62523/1-A
Matrix: Water
Analysis Batch: 62556

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62523

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	ND	E8	1.0	0.17	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1221	ND	E8	1.0	0.20	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1232	ND	E8	1.0	0.34	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1242	ND	E8	1.0	0.45	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1248	ND	E8	1.0	0.18	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1254	ND	E8	1.0	0.28	ug/L		05/04/15 11:27	05/04/15 19:11	1
PCB-1260	ND	E8	1.0	0.15	ug/L		05/04/15 11:27	05/04/15 19:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl (Surr)	*40*		*10 - 103*	*05/04/15 11:27*	*05/04/15 19:11*	*1*
Tetrachloro-m-xylene (Surr)	*73*		*10 - 132*	*05/04/15 11:27*	*05/04/15 19:11*	*1*

Lab Sample ID: LCS 550-62523/4-A
Matrix: Water
Analysis Batch: 62556

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62523

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016			10.0	7.56		ug/L		76	50 - 114
PCB-1260			10.0	7.91		ug/L		79	5 - 127

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl (Surr)	*51*		*10 - 103*
Tetrachloro-m-xylene (Surr)	*64*		*10 - 132*

Method: 8315A - Carbonyl Compounds (HPLC)

Lab Sample ID: MB 440-252177/1-A
Matrix: Water
Analysis Batch: 252361

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 252177

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Formaldehyde	ND		0.010		mg/L		04/30/15 13:35	05/01/15 10:13	1

Lab Sample ID: LCS 440-252177/2-A
Matrix: Water
Analysis Batch: 252361

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 252177

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde	0.0500	0.0409		mg/L		82	70 - 129

Lab Sample ID: 550-43961-1 MS
Matrix: Water
Analysis Batch: 252361

Client Sample ID: [redacted]B213
Prep Type: Total/NA
Prep Batch: 252177

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Formaldehyde	1.1		2.50	3.67		mg/L		104	50 - 150

Lab Sample ID: 550-43961-1 MSD
Matrix: Water
Analysis Batch: 252361

Client Sample ID: [redacted]B213
Prep Type: Total/NA
Prep Batch: 252177

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Formaldehyde	1.1		2.50	3.80		mg/L		109	50 - 150	4	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-62315/1-A
Matrix: Water
Analysis Batch: 62492

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 62315

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000281	E4	0.0010	0.00020	mg/L		04/30/15 11:47	05/01/15 22:50	1
Cadmium	ND	E8	0.0010	0.00080	mg/L		04/30/15 11:47	05/01/15 22:50	1
Antimony	ND	E8	0.040	0.0066	mg/L		04/30/15 11:47	05/01/15 22:50	1
Thallium	0.00976	E4	0.10	0.0043	mg/L		04/30/15 11:47	05/01/15 22:50	1
Nickel	ND	E8	0.010	0.0016	mg/L		04/30/15 11:47	05/01/15 22:50	1
Silver	ND	E8	0.010	0.00070	mg/L		04/30/15 11:47	05/01/15 22:50	1
Arsenic	0.00415	E4	0.10	0.0027	mg/L		04/30/15 11:47	05/01/15 22:50	1
Copper	ND	E8	0.010	0.0017	mg/L		04/30/15 11:47	05/01/15 22:50	1
Lead	ND	E8	0.015	0.0030	mg/L		04/30/15 11:47	05/01/15 22:50	1
Zinc	ND	E8	0.050	0.0033	mg/L		04/30/15 11:47	05/01/15 22:50	1
Selenium	ND	E8	0.10	0.0086	mg/L		04/30/15 11:47	05/01/15 22:50	1
Chromium	ND	E8	0.010	0.00050	mg/L		04/30/15 11:47	05/01/15 22:50	1

Lab Sample ID: LCS 550-62315/2-A
Matrix: Water
Analysis Batch: 62492

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62315

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	1.00	0.991		mg/L		99	85 - 115

[redacted]

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-62315/2-A
Matrix: Water
Analysis Batch: 62492

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 62315

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	1.00	0.992		mg/L		99	85 - 115
Antimony	1.00	0.996		mg/L		100	85 - 115
Thallium	1.00	0.996		mg/L		100	85 - 115
Nickel	1.00	1.01		mg/L		101	85 - 115
Silver	0.0750	0.0731		mg/L		97	85 - 115
Arsenic	1.00	0.976		mg/L		98	85 - 115
Copper	1.00	0.970		mg/L		97	85 - 115
Lead	1.00	1.00		mg/L		100	85 - 115
Zinc	1.00	1.00		mg/L		100	85 - 115
Selenium	1.00	1.03		mg/L		103	85 - 115
Chromium	1.00	0.991		mg/L		99	85 - 115

Lab Sample ID: LCSD 550-62315/3-A
Matrix: Water
Analysis Batch: 62492

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 62315

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	1.00	0.989		mg/L		99	85 - 115	0	20
Cadmium	1.00	1.00		mg/L		100	85 - 115	1	20
Antimony	1.00	1.00		mg/L		100	85 - 115	1	20
Thallium	1.00	1.02		mg/L		102	85 - 115	2	20
Nickel	1.00	1.02		mg/L		102	85 - 115	1	20
Silver	0.0750	0.0739		mg/L		99	85 - 115	1	20
Arsenic	1.00	0.992		mg/L		99	85 - 115	2	20
Copper	1.00	0.975		mg/L		97	85 - 115	1	20
Lead	1.00	1.01		mg/L		101	85 - 115	1	20
Zinc	1.00	1.02		mg/L		102	85 - 115	2	20
Selenium	1.00	1.06		mg/L		106	85 - 115	2	20
Chromium	1.00	1.00		mg/L		100	85 - 115	1	20

Lab Sample ID: 550-43849-D-1-A MS
Matrix: Water
Analysis Batch: 62492

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 62315

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND	E8	1.00	0.989		mg/L		99	70 - 130
Cadmium	ND	E8	1.00	0.982		mg/L		98	70 - 130
Antimony	ND	E8	1.00	0.993		mg/L		99	70 - 130
Thallium	0.018	E4	1.00	1.00		mg/L		98	70 - 130
Nickel	ND	E8	1.00	0.987		mg/L		99	70 - 130
Silver	ND	E8	0.0750	0.0734		mg/L		98	70 - 130
Arsenic	0.0043	E4	1.00	0.981		mg/L		98	70 - 130
Copper	0.024		1.00	0.989		mg/L		97	70 - 130
Lead	ND	E8	1.00	1.00		mg/L		100	70 - 130
Zinc	0.13		1.00	1.12		mg/L		99	70 - 130
Selenium	ND	E8	1.00	1.04		mg/L		104	70 - 130
Chromium	0.0089	E4	1.00	0.986		mg/L		98	70 - 130

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-43849-D-1-B MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62492 — **Prep Batch: 62315**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND	E8	1.00	0.979		mg/L		98	70 - 130	1	20
Cadmium	ND	E8	1.00	0.976		mg/L		98	70 - 130	1	20
Antimony	ND	E8	1.00	0.978		mg/L		98	70 - 130	2	20
Thallium	0.018	E4	1.00	0.995		mg/L		98	70 - 130	1	20
Nickel	ND	E8	1.00	0.978		mg/L		98	70 - 130	1	20
Silver	ND	E8	0.0750	0.0733		mg/L		98	70 - 130	0	20
Arsenic	0.0043	E4	1.00	0.969		mg/L		96	70 - 130	1	20
Copper	0.024		1.00	0.989		mg/L		97	70 - 130	0	20
Lead	ND	E8	1.00	0.991		mg/L		99	70 - 130	1	20
Zinc	0.13		1.00	1.11		mg/L		98	70 - 130	1	20
Selenium	ND	E8	1.00	1.02		mg/L		102	70 - 130	1	20
Chromium	0.0089	E4	1.00	0.978		mg/L		97	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-62704/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62795 — **Prep Batch: 62704**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	E8	0.00020	0.000060	mg/L		05/06/15 09:21	05/06/15 15:03	1

Lab Sample ID: LCS 550-62704/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62795 — **Prep Batch: 62704**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.0100	0.00877		mg/L		88	85 - 115

Lab Sample ID: LCSD 550-62704/3-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62795 — **Prep Batch: 62704**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.0100	0.00899		mg/L		90	85 - 115	2	20

Lab Sample ID: 550-43908-H-1-E MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62795 — **Prep Batch: 62704**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND	E8	0.0100	0.00876		mg/L		88	70 - 130

Lab Sample ID: 550-43908-H-1-F MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62795 — **Prep Batch: 62704**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND	E8	0.0100	0.00847		mg/L		85	70 - 130	3	20

[redacted]

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 550-62282/1 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62282

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		10		mg/L			04/30/15 09:15	1

Lab Sample ID: LCS 550-62282/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62282

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	200	192		mg/L		96	90 - 110

Lab Sample ID: LCSD 550-62282/3 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62282

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	200	193		mg/L		97	90 - 110	1	10

Lab Sample ID: 550-43961-1 DU — **Client Sample ID: [redacted] B213**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62282

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	17000	D2	16400	D2	mg/L		1	10

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 550-62444/16-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62465 — **Prep Batch: 62444**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND	E8	0.050	0.0035	mg/L		05/01/15 14:30	05/01/15 16:53	1

Lab Sample ID: LCS 550-62444/1-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62465 — **Prep Batch: 62444**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.100	0.0913		mg/L		91	90 - 110

Lab Sample ID: LCSD 550-62444/21-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62465 — **Prep Batch: 62444**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	0.100	0.0929		mg/L		93	90 - 110	2	20

[redacted]

Method: SM 4500 CN E - Cyanide, Total (Continued)

Lab Sample ID: 550-43808-AC-1-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62465 — **Prep Batch: 62444**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	ND	E8 M2	0.100	0.0728	M2	mg/L		73	80 - 120

Lab Sample ID: 550-43808-AC-1-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62465 — **Prep Batch: 62444**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cyanide, Total	ND	E8 M2	0.100	0.0842		mg/L		84	80 - 120	14	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCSSRM 550-62258/13 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62258

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.010		SU		100.1	98.5 - 101.5

Lab Sample ID: LCSSRM 550-62258/16 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62258

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.000		SU		100.0	98.5 - 101.5

Method: SM 5210B - BOD, 5-Day

Lab Sample ID: MB 550-62348/1 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62348

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	ND		5.0		mg/L			04/30/15 17:22	1

Lab Sample ID: LCS 550-62348/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 62348

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Biochemical Oxygen Demand	198	193		mg/L		98	84.6 - 115.4

Method: SM 5210B - BOD, 5-Day (Continued)

Lab Sample ID: 550-43951-A-1 DU
Matrix: Water
Analysis Batch: 62348

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Biochemical Oxygen Demand	250			244		mg/L				4	20

QC Association Summary

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

GC/MS VOA

Analysis Batch: 62906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43844-C-1 MS	Matrix Spike	Total/NA	Water	624	
550-43844-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	624	
550-43961-1 - DL	[redacted]B213	Total/NA	Water	624	
550-43961-2	Trip Blank	Total/NA	Water	624	
LCS 550-62906/3	Lab Control Sample	Total/NA	Water	624	
LCSD 550-62906/4	Lab Control Sample Dup	Total/NA	Water	624	
MB 550-62906/5	Method Blank	Total/NA	Water	624	

Analysis Batch: 252325

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-108054-E-5 MS	Matrix Spike	Total/NA	Water	624	
440-108054-E-5 MSD	Matrix Spike Duplicate	Total/NA	Water	624	
550-43961-1	[redacted]B213	Total/NA	Water	624	
550-43961-2	Trip Blank	Total/NA	Water	624	
LCS 440-252325/5	Lab Control Sample	Total/NA	Water	624	
LCSD 440-252325/6	Lab Control Sample Dup	Total/NA	Water	624	
MB 440-252325/4	Method Blank	Total/NA	Water	624	

GC/MS Semi VOA

Prep Batch: 252617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	625	
LCS 440-252617/2-A	Lab Control Sample	Total/NA	Water	625	
LCSD 440-252617/3-A	Lab Control Sample Dup	Total/NA	Water	625	
MB 440-252617/1-A	Method Blank	Total/NA	Water	625	

Analysis Batch: 253127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 440-252617/2-A	Lab Control Sample	Total/NA	Water	625	252617
LCSD 440-252617/3-A	Lab Control Sample Dup	Total/NA	Water	625	252617
MB 440-252617/1-A	Method Blank	Total/NA	Water	625	252617

Analysis Batch: 253529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	625	252617

GC VOA

Analysis Batch: 252962

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-108560-B-1 MS	Matrix Spike	Total/NA	Water	8015B	
440-108560-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8015B	
550-43961-1	[redacted]B213	Total/NA	Water	8015B	
LCS 440-252962/8	Lab Control Sample	Total/NA	Water	8015B	
MB 440-252962/7	Method Blank	Total/NA	Water	8015B	

[redacted]

QC Association Summary

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

GC Semi VOA

Prep Batch: 62523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	608	
LCS 550-62523/2-A	Lab Control Sample	Total/NA	Water	608	
LCS 550-62523/4-A	Lab Control Sample	Total/NA	Water	608	
LCSD 550-62523/3-A	Lab Control Sample Dup	Total/NA	Water	608	
MB 550-62523/1-A	Method Blank	Total/NA	Water	608	

Analysis Batch: 62555

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	608	62523
LCS 550-62523/2-A	Lab Control Sample	Total/NA	Water	608	62523
LCSD 550-62523/3-A	Lab Control Sample Dup	Total/NA	Water	608	62523
MB 550-62523/1-A	Method Blank	Total/NA	Water	608	62523

Analysis Batch: 62556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	608	62523
LCS 550-62523/4-A	Lab Control Sample	Total/NA	Water	608	62523
MB 550-62523/1-A	Method Blank	Total/NA	Water	608	62523

HPLC/IC

Prep Batch: 252177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	8315_W_Prep	
550-43961-1 MS	[redacted]B213	Total/NA	Water	8315_W_Prep	
550-43961-1 MSD	[redacted]B213	Total/NA	Water	8315_W_Prep	
LCS 440-252177/2-A	Lab Control Sample	Total/NA	Water	8315_W_Prep	
MB 440-252177/1-A	Method Blank	Total/NA	Water	8315_W_Prep	

Analysis Batch: 252361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	8315A	252177
550-43961-1 MS	[redacted]B213	Total/NA	Water	8315A	252177
550-43961-1 MSD	[redacted]B213	Total/NA	Water	8315A	252177
LCS 440-252177/2-A	Lab Control Sample	Total/NA	Water	8315A	252177
MB 440-252177/1-A	Method Blank	Total/NA	Water	8315A	252177

Metals

Prep Batch: 62315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43849-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-43849-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	
550-43961-1	[redacted]B213	Total/NA	Water	200.7	
LCS 550-62315/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-62315/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
MB 550-62315/1-A	Method Blank	Total/NA	Water	200.7	

Metals (Continued)

Analysis Batch: 62492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43849-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	62315
550-43849-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	62315
550-43961-1	[redacted]B213	Total/NA	Water	200.7 Rev 4.4	62315
LCS 550-62315/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	62315
LCSD 550-62315/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	62315
MB 550-62315/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	62315

Prep Batch: 62704

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43908-H-1-E MS	Matrix Spike	Total/NA	Water	245.1	
550-43908-H-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	245.1	
550-43961-1	[redacted]B213	Total/NA	Water	245.1	
LCS 550-62704/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-62704/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
MB 550-62704/1-A	Method Blank	Total/NA	Water	245.1	

Analysis Batch: 62795

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43908-H-1-E MS	Matrix Spike	Total/NA	Water	245.1	62704
550-43908-H-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	245.1	62704
550-43961-1	[redacted]B213	Total/NA	Water	245.1	62704
LCS 550-62704/2-A	Lab Control Sample	Total/NA	Water	245.1	62704
LCSD 550-62704/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	62704
MB 550-62704/1-A	Method Blank	Total/NA	Water	245.1	62704

General Chemistry

Analysis Batch: 62258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-62258/13	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCSSRM 550-62258/16	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 62282

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	SM 2540D	
550-43961-1 DU	[redacted]B213	Total/NA	Water	SM 2540D	
LCS 550-62282/2	Lab Control Sample	Total/NA	Water	SM 2540D	
LCSD 550-62282/3	Lab Control Sample Dup	Total/NA	Water	SM 2540D	
MB 550-62282/1	Method Blank	Total/NA	Water	SM 2540D	

Analysis Batch: 62348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43951-A-1 DU	Duplicate	Total/NA	Water	SM 5210B	
550-43961-1	[redacted]B213	Total/NA	Water	SM 5210B	
LCS 550-62348/2	Lab Control Sample	Total/NA	Water	SM 5210B	
MB 550-62348/1	Method Blank	Total/NA	Water	SM 5210B	

General Chemistry (Continued)

Prep Batch: 62444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	SM 4500 CN C	
550-43808-AC-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN C	
550-43808-AC-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN C	
LCS 550-62444/1-A	Lab Control Sample	Total/NA	Water	SM 4500 CN C	
LCSD 550-62444/21-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN C	
MB 550-62444/16-A	Method Blank	Total/NA	Water	SM 4500 CN C	

Analysis Batch: 62465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-43961-1	[redacted]B213	Total/NA	Water	SM 4500 CN E	62444
550-43808-AC-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	62444
550-43808-AC-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	62444
LCS 550-62444/1-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	62444
LCSD 550-62444/21-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN E	62444
MB 550-62444/16-A	Method Blank	Total/NA	Water	SM 4500 CN E	62444

Lab Chronicle

Client: [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Client Sample ID: [redacted]B213
Lab Sample ID: 550-43961-1
Date Collected: 04/29/15 12:00
Matrix: Water
Date Received: 04/29/15 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		500	252325	05/01/15 17:17	RM	[redacted]
Total/NA	Analysis	624	DL	1000	62906	05/08/15 07:30	UT	[redacted]
Total/NA	Prep	625			252617	05/03/15 14:21	AK	[redacted]
Total/NA	Analysis	625		4	253529	05/07/15 20:08	AI	[redacted]
Total/NA	Analysis	8015B		1	252962	05/05/15 16:49	KS	[redacted]
Total/NA	Prep	608			62523	05/04/15 11:27	CPA	[redacted]
Total/NA	Analysis	608		5	62555	05/04/15 22:07	ANT	[redacted]
Total/NA	Prep	608			62523	05/04/15 11:27	CPA	[redacted]
Total/NA	Analysis	608		5	62556	05/04/15 22:07	ANT	[redacted]
Total/NA	Prep	8315_W_Prep			252177	04/30/15 13:35	JB	[redacted]
Total/NA	Analysis	8315A		1	252361	05/01/15 11:19	DD	[redacted]
Total/NA	Prep	200.7			62315	04/30/15 11:47	SGO	[redacted]
Total/NA	Analysis	200.7 Rev 4.4		1	62492	05/02/15 00:13	AJC	[redacted]
Total/NA	Prep	245.1			62704	05/06/15 09:21	JRC	[redacted]
Total/NA	Analysis	245.1		1	62795	05/06/15 15:14	JRC	[redacted]
Total/NA	Analysis	SM 2540D		1	62282		YAF	[redacted]
					(Start)	04/30/15 09:15		
					(End)	05/01/15 09:40		
Total/NA	Prep	SM 4500 CN C			62444	05/01/15 14:30	BCB	[redacted]
Total/NA	Analysis	SM 4500 CN E		1	62465	05/01/15 16:53	BCB	[redacted]
Total/NA	Analysis	SM 4500 H+ B		1	62258	04/29/15 18:15	CDC	[redacted]
Total/NA	Analysis	SM 5210B		160	62348		CDC	[redacted]
					(Start)	04/30/15 17:22		
					(End)	05/05/15 13:29		

Client Sample ID: Trip Blank
Lab Sample ID: 550-43961-2
Date Collected: 04/29/15 12:00
Matrix: Water
Date Received: 04/29/15 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	252325	05/01/15 12:42	RM	TAL IRV
Total/NA	Analysis	624		1	62906	05/08/15 04:56	UT	TAL PHX

Laboratory References:

[redacted]

[redacted]

Certification Summary

Client: [redacted] [redacted]Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Laboratory: [redacted]

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arizona	State Program	9	AZ[redacted]	06-09-16

Laboratory: [redacted]

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA[redacted]	06-30-16
Arizona	State Program	9	AZ[redacted]	10-13-15
California	LA Cty Sanitation Districts	9	[redacted]	01-31-16 *
California	State Program	9	[redacted]	06-30-16
Guam	State Program	9	Cert. No. [redacted]	01-23-16
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA[redacted]	07-31-15
New Mexico	State Program	6	N/A	01-29-15 *
Northern Mariana Islands	State Program	9	MP[redacted]	01-29-15 *
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P[redacted]	06-06-15

* Certification renewal pending - certification considered valid.

[redacted]

Method Summary

Client: [redacted] [redacted] Job ID: 550-43961-1
Project/Site: Baseline Monitoring

Method	Method Description	Protocol	Laboratory
624	Volatile Organic Compounds (GC/MS)	40CFR136A	TAL IRV
624	Volatile Organic Compounds (GC/MS)	40CFR136A	TAL PHX
625	Semivolatile Organic Compounds (GC/MS)	40CFR136A	TAL IRV
8015B	Nonhalogenated Organic Compounds - Direct Injection (GC)	SW846	TAL IRV
608	Organochlorine Pesticides in Water	40CFR136A	TAL PHX
608	Polychlorinated Biphenyls (PCBs) (GC)	40CFR136A	TAL PHX
8315A	Carbonyl Compounds (HPLC)	SW846	TAL IRV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL PHX
245.1	Mercury (CVAA)	EPA	TAL PHX
SM 2540D	Solids, Total Suspended (TSS)	SM	TAL PHX
SM 4500 CN E	Cyanide, Total	SM	TAL PHX
SM 4500 H+ B	pH	SM	TAL PHX
SM 5210B	BOD, 5-Day	SM	TAL PHX

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
EPA = US Environmental Protection Agency
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

[redacted]

[redacted]

Chain of Custody Record

8/7/2015

BBU4 3961

Client Information

Client Contact: [redacted]	Sampler: [redacted]	Lab PM: [redacted]	Carrier Tracking No(s):
Company: [redacted]		E-Mail: [redacted]	
Address: [redacted]	Due Date Requested:		
City: Phoenix	TAT Requested (days): NORMAL		
State, Zip: AZ, 85043			
Phone: [redacted]	PO #: Pay by Credit Card		
Email: [redacted]	WO #:		
Project Name: Baseline Monitoring	Project #: 55005422		
Site:	SSOW#:		

COC No: 550-16357-5081.1
Page: Page 1 of 1
Job #:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	200.7_CWA, 245.1	2540D, SM5210B_Calc	608_PCB, 608_Pest, 625	4500_CN_E - Cyanide, Total	8016B_DAI - Methanol	8315 - Local Method	624_10ml_UP_3D - Acrolein, Acrylonitrile and 2-Chloroethy	SM4500_H+ - pH and Temperature	624_PREC - (MOD) 624 List	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	N	N	B	A	N	N	N	A		
[redacted] B213-1 -2	4/29/15	12:00	C	Water	N	N	X	X	X	X	X	X	X	X	X		
				Water													
				Water													
				Water													

550-43961 Chain of Custody

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 4/29/15 2:45 PM	Company [redacted]	Received by: / Date/Time: / Company
Relinquished by:	Date/Time:	Company	Received by: / Date/Time: / Company
Relinquished by:	Date/Time:	Company	Received by: / Date/Time: 4-29-15 1445 / Company [redacted]

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.0°C, 3.7°C

Chain of Custody Record

Client Information (Sub Contract Lab)	Sampler:	Lab PM: [redacted]	Carrier Tracking No(s):	COC No: 550-9887.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: [redacted]		Page: Page 1 of 1
Company: [redacted]			Analysis Requested	Job #: 550-43961-1

Address: [redacted]	Due Date Requested: 5/6/2015
City: Irvine	TAT Requested (days):
State, Zip: CA, 92614-5817	
Phone: [redacted]	PO #:
Email:	WO #:
Project Name: Baseline Monitoring	Project #: 55005422
Site:	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	624_10ml_UP_3D/ Acrolein, Acrylonitrile and 2-Chloroethy	8015B_DAI/ Methanol	8315/8315_W_LLE_Prep	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
[redacted] (550-43961-1)	4/29/15	12:00 Arizona		Water			X	X	X	19	
Trip Blank (550-43961-2)	4/29/15	12:00 Arizona		Water			X			1	

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment: Fed: 6243 7059 5160

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[redacted] 0C-28-15	[redacted]	LAB	[redacted]	4/30/15 9:30	[redacted]
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: (CF) 3.1/2.4 IR-72

Login Sample Receipt Checklist

Client: [redacted]

Job Number: 550-43961-1

Login Number: 43961
List Number: 1
Creator: Shoemaker, Cory M

List Source: [redacted]

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Login Sample Receipt Checklist

Client [redacted] Job Number: 550-43961-1

Login Number: 43961
List Number: 2
Creator: Ornelas, Olga

List Source: [redacted]
List Creation: 04/30/15 12:40 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: [redacted]

Job Number: 550-43961-1

Login Number: 43961
List Number: 3
Creator: Ornelas, Olga

List Source: [redacted]
List Creation: 04/30/15 12:46 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	Headspace larger than 1/4".15/15 sample#1 [redacted]B213)
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

40 CFR 136.3 TABLE II – REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, & HOLDING TIMES

§136.3 Identification of test procedures.

(e) Sample preservation procedures, container materials, and maximum allowable holding times for parameters are cited in Tables IA, IB, IC, ID, IE, IF, IG, and IH are prescribed in Table II. Information in the table takes precedence over information in specific methods or elsewhere. Any person may apply for a change from the prescribed preservation techniques, container materials, and maximum holding times applicable to samples taken from a specific discharge. Applications for such limited use changes may be made by letters to the Regional Alternative Test Procedure (ATP) Program Coordinator or the permitting authority in the Region in which the discharge will occur. Sufficient data should be provided to assure such changes in sample preservation, containers or holding times do not adversely affect the integrity of the sample. The Regional ATP Coordinator or permitting authority will review the application and then notify the applicant and the appropriate State agency of approval or rejection of the use of the alternate test procedure. A decision to approve or deny any request on deviations from the prescribed Table II requirements will be made within 90 days of receipt of the application by the Regional Administrator. An analyst may not modify any sample preservation and/or holding time requirements of an approved method unless the requirements of this section are met.

TABLE II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
Table IA—Bacterial Tests:			
1-5. Coliform, total, fecal, and *E. coli*	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$ [5]	8 hours.[22 23]
6. Fecal streptococci	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$ [5]	8 hours.[22]
7. Enterococci	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$ [5]	8 hours.[22]
8. *Salmonella*	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$ [5]	8 hours.[22]
Table IA—Aquatic Toxicity Tests:			
9-12. Toxicity, acute and chronic	P, FP, G	Cool, ≤6 °C[16]	36 hours.
Table IB—Inorganic Tests:			
1. Acidity	P, FP, G	Cool, ≤6 °C[18]	14 days.
2. Alkalinity	P, FP, G	Cool, ≤6 °C[18]	14 days.
4. Ammonia	P, FP, G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
9. Biochemical oxygen demand	P, FP, G	Cool, ≤6 °C[18]	48 hours.
10. Boron	P, FP, or Quartz	HNO_3 to pH <2	6 months.
11. Bromide	P, FP, G	None required	28 days.
14. Biochemical oxygen demand, carbonaceous	P, FP G	Cool, ≤6 °C[18]	48 hours.
15. Chemical oxygen demand	P, FP, G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
16. Chloride	P, FP, G	None required	28 days.

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
17. Chlorine, total residual	P, G	None required	Analyze within 15 minutes.
21. Color	P, FP, G	Cool, ≤6 °C[18]	48 hours.
23-24. Cyanide, total or available (or CATC) and free	P, FP, G	Cool, ≤6 °C[18], NaOH to pH >10[5 6], reducing agent if oxidizer present	14 days.
25. Fluoride	P	None required	28 days.
27. Hardness	P, FP, G	HNO_3 or H_2SO_4 to pH <2	6 months.
28. Hydrogen ion (pH)	P, FP, G	None required	Analyze within 15 minutes.
31, 43. Kjeldahl and organic N	P, FP, G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
Table IB—Metals:[7]			
18. Chromium VI	P, FP, G	Cool, ≤6 °C[18], pH = 9.3-9.7[20]	28 days.
35. Mercury (CVAA)	P, FP, G	HNO_3 to pH <2	28 days.
35. Mercury (CVAFS)	FP, G; and FP-lined cap[17]	5 mL/L 12N HCl or 5 mL/L BrCl[17]	90 days.[17]
3, 5-8, 12, 13, 19, 20, 22, 26, 29, 30, 32-34, 36, 37, 45, 47, 51, 52, 58-60, 62, 63, 70-72, 74, 75. Metals, except boron, chromium VI, and mercury	P, FP, G	HNO_3 to pH <2, or at least 24 hours prior to analysis[19]	6 months.
38. Nitrate	P, FP, G	Cool, ≤6 °C[18]	48 hours.
39. Nitrate-nitrite	P, FP, G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
40. Nitrite	P, FP, G	Cool, ≤6 °C[18]	48 hours.
41. Oil and grease	G	Cool to ≤6 °C[18], HCl or H_2SO_4 to pH <2	28 days.
42. Organic Carbon	P, FP, G	Cool to ≤6 °C[18], HCl, H_2SO_4, or H_3PO_4 to pH <2	28 days.
44. Orthophosphate	P, FP, G	Cool, to ≤6 °C[18 24]	Filter within 15 minutes; Analyze within 48 hours.
46. Oxygen, Dissolved Probe	G, Bottle and top	None required	Analyze within 15 minutes.
47. Winkler	G, Bottle and top	Fix on site and store in dark	8 hours.
48. Phenols	G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
49. Phosphorous (elemental)	G	Cool, ≤6 °C[18]	48 hours.

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
50. Phosphorous, total	P, FP, G	Cool, ≤6 °C[18], H_2SO_4 to pH <2	28 days.
53. Residue, total	P, FP, G	Cool, ≤6 °C[18]	7 days.
54. Residue, Filterable	P, FP, G	Cool, ≤6 °C[18]	7 days.
55. Residue, Nonfilterable (TSS)	P, FP, G	Cool, ≤6 °C[18]	7 days.
56. Residue, Settleable	P, FP, G	Cool, ≤6 °C[18]	48 hours.
57. Residue, Volatile	P, FP, G	Cool, ≤6 °C[18]	7 days.
61. Silica	P or Quartz	Cool, ≤6 °C[18]	28 days.
64. Specific conductance	P, FP, G	Cool, ≤6 °C[18]	28 days.
65. Sulfate	P, FP, G	Cool, ≤6 °C[18]	28 days.
66. Sulfide	P, FP, G	Cool, ≤6 °C[18], add zinc acetate plus sodium hydroxide to pH >9	7 days.
67. Sulfite	P, FP, G	None required	Analyze within 15 minutes.
68. Surfactants	P, FP, G	Cool, ≤6 °C[18]	48 hours.
69. Temperature	P, FP, G	None required	Analyze.
73. Turbidity	P, FP, G	Cool, ≤6 °C[18]	48 hours.
Table IC—Organic Tests:[8]			
13, 18-20, 22, 24-28, 34-37, 39-43, 45-47, 56, 76, 104, 105, 108-111, 113. Purgeable Halocarbons	G, FP-lined septum	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$[5]	14 days.
6, 57, 106. Purgeable aromatic hydrocarbons	G, FP-lined septum	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$[5], HCl to pH 2[9]	14 days.[9]
3, 4. Acrolein and acrylonitrile	G, FP-lined septum	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$, pH to 4-5[10]	14 days.[10]
23, 30, 44, 49, 53, 77, 80, 81, 98, 100, 112. Phenols[11]	G, FP-lined cap	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction.
7, 38. Benzidines[11 12]	G, FP-lined cap	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$[5]	7 days until extraction.[13]
14, 17, 48, 50-52. Phthalate esters[11]	G, FP-lined cap	Cool, ≤6 °C[18]	7 days until extraction, 40 days after extraction.
82-84. Nitrosamines[11 14]	G, FP-lined cap	Cool, ≤6 °C[18], store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
88-94. PCBs[11]	G, FP-lined cap	Cool, ≤6 °C[18]	1 year until extraction, 1 year after extraction.

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
54, 55, 75, 79. Nitroaromatics and isophorone[11]	G, FP-lined cap	Cool, ≤6 °C[18], store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
1, 2, 5, 8-12, 32, 33, 58, 59, 74, 78, 99, 101. Polynuclear aromatic hydrocarbons[11]	G, FP-lined cap	Cool, ≤6 °C[18], store in dark, 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
15, 16, 21, 31, 87. Haloethers[11]	G, FP-lined cap	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$[5]	7 days until extraction, 40 days after extraction.
29, 35-37, 63-65, 107. Chlorinated hydrocarbons[11]	G, FP-lined cap	Cool, ≤6 °C[18]	7 days until extraction, 40 days after extraction.
60-62, 66-72, 85, 86, 95-97, 102, 103. CDDs/CDFs[11]			
Aqueous Samples: Field and Lab Preservation	G	Cool, ≤6 °C[18], 0.008% $Na_2S_2O_3$[5], pH <9	1 year.
Solids and Mixed-Phase Samples: Field Preservation	G	Cool, ≤6 °C[18]	7 days.
Tissue Samples: Field Preservation	G	Cool, ≤6 °C[18]	24 hours.
Solids, Mixed-Phase, and Tissue Samples: Lab Preservation	G	Freeze, ≤–10 °C	1 year.
114-118. Alkylated phenols	G	Cool, <6 °C, H_2SO_4 to pH <2	28 days until extraction, 40 days after extraction.
119. Adsorbable Organic Halides (AOX)	G	Cool, <6 °C, 0.008% $Na_2S_2O_3$ HNO_3 to pH <2	Hold *at least* 3 days, but not more than 6 months.
120. Chlorinated Phenolics		Cool, <6 °C, 0.008% $Na_2S_2O_3$ H_2SO_4 to pH <2	30 days until acetylation, 30 days after acetylation.
Table ID—Pesticides Tests:			
1-70. Pesticides[11]	G, FP-lined cap	Cool, ≤6 °C[18], pH 5-9-[15]	7 days until extraction, 40 days after extraction.
Table IE—Radiological Tests:			
1-5. Alpha, beta, and radium	P, FP, G	HNO_3 to pH <2	6 months.
Table IH—Bacterial Tests:			
1. *E. coli*	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$[5]	8 hours.[22]
2. Enterococci	PA, G	Cool, <10 °C, 0.0008% $Na_2S_2O_3$ [5]	8 hours.[22]
Table IH—Protozoan Tests:			

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
8. *Cryptosporidium*	LDPE; field filtration	1-10 °C	96 hours.[21]
9. *Giardia*	LDPE; field filtration	1-10 °C	96 hours.[21]

[1]"P" is for polyethylene; "FP" is fluoropolymer (polytetrafluoroethylene (PTFE); Teflon®), or other fluoropolymer, unless stated otherwise in this Table II; "G" is glass; "PA" is any plastic that is made of a sterilizable material (polypropylene or other autoclavable plastic); "LDPE" is low density polyethylene.

[2]Except where noted in this Table II and the method for the parameter, preserve each grab sample within 15 minutes of collection. For a composite sample collected with an automated sample (e.g., using a 24-hour composite sample; see 40 CFR 122.21(g)(7)(i) or 40 CFR Part 403, Appendix E), refrigerate the sample at ≤6 °C during collection unless specified otherwise in this Table II or in the method(s). For a composite sample to be split into separate aliquots for preservation and/or analysis, maintain the sample at ≤6 °C, unless specified otherwise in this Table II or in the method(s), until collection, splitting, and preservation is completed. Add the preservative to the sample container prior to sample collection when the preservative will not compromise the integrity of a grab sample, a composite sample, or aliquot split from a composite sample within 15 minutes of collection. If a composite measurement is required but a composite sample would compromise sample integrity, individual grab samples must be collected at prescribed time intervals (e.g., 4 samples over the course of a day, at 6-hour intervals). Grab samples must be analyzed separately and the concentrations averaged. Alternatively, grab samples may be collected in the field and composited in the laboratory if the compositing procedure produces results equivalent to results produced by arithmetic averaging of results of analysis of individual grab samples. For examples of laboratory compositing procedures, see EPA Method 1664 Rev. A (oil and grease) and the procedures at 40 CFR 141.34(f)(14)(iv) and (v) (volatile organics).

[3]When any sample is to be shipped by common carrier or sent via the U.S. Postal Service, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirement of Table II, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater; Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

[4]Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before the start of analysis and still be considered valid. Samples may be held for longer periods only if the permittee or monitoring laboratory has data on file to show that, for the specific types of samples under study, the analytes are stable for the longer time, and has received a variance from the Regional Administrator under Sec. 136.3(e). For a grab sample, the holding time begins at the time of collection. For a composite sample collected with an automated sampler (e.g., using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR part 403, Appendix E), the holding time begins at the time of the end of collection of the composite sample. For a set of grab samples composited in the field or laboratory, the holding time begins at the time of collection of the last grab sample in the set. Some samples may not be stable for the maximum time period given in the table. A permittee or monitoring laboratory is obligated to hold the sample for a shorter time if it knows that a shorter time is necessary to maintain sample stability. See 136.3(e) for details. The date and time of collection of an individual grab sample is the date and time at which the sample is collected. For a set of grab samples to be composited, and that are all collected on the same calendar date, the date of collection is the date on which the samples are collected. For a set of grab samples to be composited, and that are collected across two calendar dates, the date of collection is the dates of the two days; e.g., November 14-15. For a composite sample collected automatically on a given date, the date of collection is the date on which the sample is collected. For a composite sample collected automatically, and that is collected across two calendar dates, the date of collection is the dates of the two days; e.g., November 14-15. For static-

renewal toxicity tests, each grab or composite sample may also be used to prepare test solutions for renewal at 24 h, 48 h, and/or 72 h after first use, if stored at 0-6 °C, with minimum head space.

[5]ASTM D7365-09a specifies treatment options for samples containing oxidants (e.g., chlorine). Also, Section 9060A of Standard Methods for the Examination of Water and Wastewater (20th and 21st editions) addresses dechlorination procedures.

[6]Sampling, preservation and mitigating interferences in water samples for analysis of cyanide are described in ASTM D7365-09a. There may be interferences that are not mitigated by the analytical test methods or D7365-09a. Any technique for removal or suppression of interference may be employed, provided the laboratory demonstrates that it more accurately measures cyanide through quality control measures described in the analytical test method. Any removal or suppression technique not described in D7365-09a or the analytical test method must be documented along with supporting data.

[7]For dissolved metals, filter grab samples within 15 minutes of collection and before adding preservatives. For a composite sample collected with an automated sampler (e.g., using a 24-hour composite sampler; see 40 CFR 122.21(g)(7)(i) or 40 CFR Part 403, Appendix E), filter the sample within 15 minutes after completion of collection and before adding preservatives. If it is known or suspected that dissolved sample integrity will be compromised during collection of a composite sample collected automatically over time (e.g., by interchange of a metal between dissolved and suspended forms), collect and filter grab samples to be composited (footnote 2) in place of a composite sample collected automatically.

[8]Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

[9]If the sample is not adjusted to pH 2, then the sample must be analyzed within seven days of sampling.

[10]The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

[11]When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity (*i.e.,* use all necessary preservatives and hold for the shortest time listed). When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to ≤6 °C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for seven days before extraction and for forty days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (regarding the requirement for thiosulfate reduction), and footnotes 12, 13 (regarding the analysis of benzidine).

[12]If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0 ±0.2 to prevent rearrangement to benzidine.

[13]Extracts may be stored up to 30 days at <0 °C.

[14]For the analysis of diphenylnitrosamine, add 0.008% $Na_2S_2O_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

[15]The pH adjustment may be performed upon receipt at the laboratory and may be omitted if the samples are extracted within 72 hours of collection. For the analysis of aldrin, add 0.008% $Na_2S_2O_3$.

[16]Place sufficient ice with the samples in the shipping container to ensure that ice is still present when the samples arrive at the laboratory. However, even if ice is present when the samples arrive, immediately measure the temperature of the samples and confirm that the preservation temperature maximum has not been exceeded. In the isolated cases where it can be documented that this holding temperature cannot be met, the permittee can be given the option of on-site testing or can request a variance. The request for a variance should include supportive data which show that the toxicity of the effluent samples is not reduced because of the

increased holding temperature. Aqueous samples must not be frozen. Hand-delivered samples used on the day of collection do not need to be cooled to 0 to 6 °C prior to test initiation.

[17]Samples collected for the determination of trace level mercury (<100 ng/L) using EPA Method 1631 must be collected in tightly-capped fluoropolymer or glass bottles and preserved with BrCl or HCl solution within 48 hours of sample collection. The time to preservation may be extended to 28 days if a sample is oxidized in the sample bottle. A sample collected for dissolved trace level mercury should be filtered in the laboratory within 24 hours of the time of collection. However, if circumstances preclude overnight shipment, the sample should be filtered in a designated clean area in the field in accordance with procedures given in Method 1669. If sample integrity will not be maintained by shipment to and filtration in the laboratory, the sample must be filtered in a designated clean area in the field within the time period necessary to maintain sample integrity. A sample that has been collected for determination of total or dissolved trace level mercury must be analyzed within 90 days of sample collection.

[18]Aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. Also, for purposes of NPDES monitoring, the specification of "≤°C" is used in place of the "4 °C" and "<4 °C" sample temperature requirements listed in some methods. It is not necessary to measure the sample temperature to three significant figures (1/100th of 1 degree); rather, three significant figures are specified so that rounding down to 6 °C may not be used to meet the ≤6 °C requirement. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[19]An aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid immediately (see footnote 2). Soil and sediment samples do not need to be preserved with acid. The allowances in this footnote supersede the preservation and holding time requirements in the approved metals methods.

[20]To achieve the 28-day holding time, use the ammonium sulfate buffer solution specified in EPA Method 218.6. The allowance in this footnote supersedes preservation and holding time requirements in the approved hexavalent chromium methods, unless this supersession would compromise the measurement, in which case requirements in the method must be followed.

[21]Holding time is calculated from time of sample collection to elution for samples shipped to the laboratory in bulk and calculated from the time of sample filtration to elution for samples filtered in the field.

[22]Sample analysis should begin as soon as possible after receipt; sample incubation must be started no later than 8 hours from time of collection.

[23]For fecal coliform samples for sewage sludge (biosolids) only, the holding time is extended to 24 hours for the following sample types using either EPA Method 1680 (LTB-EC) or 1681 (A-1): Class A composted, Class B aerobically digested, and Class B anaerobically digested.

[24]The immediate filtration requirement in orthophosphate measurement is to assess the dissolved or bio-available form of orthophosphorus (*i.e.,* that which passes through a 0.45-micron filter), hence the requirement to filter the sample immediately upon collection (*i.e.,* within 15 minutes of collection).

[38 FR 28758, Oct. 16, 1973]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §136.3, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.fdsys.gov.*

40 CFR 136.3 TABLE IB - INORGANICS

Title 40: Protection of Environment

PART 136—GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS

§ 136.3 Identification of test procedures.

(a) Parameters or pollutants, for which methods are approved, are listed together with test procedure descriptions and references in Tables IA, IB, IC, ID, IE, IF, IG, and IH. The methods listed in Tables IA, IB, IC, ID, IE, IF, IG, and IH are incorporated by reference, see paragraph (b) of this section, with the exception of EPA Methods 200.7, 601-613, 624, 625, 1613, 1624, and 1625. The full texts of Methods 601-613, 624, 625, 1613, 1624, and 1625 are printed in appendix A of this part 136, and the full text of Method 200.7 is printed in appendix C of this part 136. The full text for determining the method detection limit when using the test procedures is given in appendix B of this part 136. The full text of Method 200.7 is printed in appendix C of this part 136. In the event of a conflict between the reporting requirements of 40 CFR Parts 122 and 125 and any reporting requirements associated with the methods listed in these tables, the provisions of 40 CFR Parts 122 and 125 are controlling and will determine a permittee's reporting requirements. The full text of the referenced test procedures are incorporated by reference into Tables IA, IB, IC, ID, IE, IF, IG, and IH. The discharge parameter values for which reports are required must be determined by one of the standard analytical test procedures incorporated by reference and described in Tables IA, IB, IC, ID, IE, IF, IG, and IH or by any alternate test procedure which has been approved by the Administrator under the provisions of paragraph (d) of this section and §§ 136.4 and 136.5. Under certain circumstances paragraph (c) of this section, § 136.5(a) through (d) or 40 CFR 401.13, other additional or alternate test procedures may be used.

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
1. Acidity, as $CaCO_3$, mg/L	Electrometric endpoint or phenolphthalein endpoint		2310 B-1997	D1067-06	I-1020-85.[2]
2. Alkalinity, as $CaCO_3$, mg/L	Electrometric or Colorimetric titration to pH 4.5, Manual		2320 B-1997	D1067-06	973.43 [3], I-1030-85.[2]
	Automatic	310.2 (Rev. 1974)[1]			I-2030-85.[2]
3. Aluminum—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration [36]		3111 D-1999 or 3111 E-1999		I-3051-85.[2]
	AA furnace		3113 B-2004		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	Direct Current Plasma (DCP) [36]			D4190-08	See footnote.[34]
	Colorimetric (Eriochrome cyanine R)		3500-Al B-2001		
4. Ammonia (as N), mg/L	Manual distillation [6]or gas diffusion (pH > 11), followed by any of the following:	350.1, Rev. 2.0 (1993)	4500-NH_3B-1997		973.49[3].
	Nesslerization			D1426-08 (A)	973.49[3], I-3520-85.[2]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Titration		4500-NH_3C-1997		
	Electrode		4500-NH_3D-1997 or E-1997	D1426-08 (B)	
	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH_3F-1997		See footnote.[60]
	Automated phenate, salicylate, or other substituted phenols in Berthelot reaction based methods	350.1[30], Rev. 2.0 (1993)	4500-NH_3G-1997 4500-NH_3H-1997.		I-4523-85.[2]
	Automated electrode	Ion Chromatography		D6919-09	See footnote.[7]
5. Antimony—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999		
	AA furnace		3113 B-2004		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
6. Arsenic-Total,[4]mg/L	Digestion,[4]followed by any of the following:	206.5 (Issued 1978) [1]			
	AA gaseous hydride		3114 B-2009 or	D2972-08 (B)	I-3062-85.[2]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
			3114 C-2009		
	AA furnace		3113 B-2004	D2972-08 (C)	I-4063-98.[49]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4020-05.[70]
	Colorimetric (SDDC)		3500-As B-1997	D2972-08 (A)	I-3060-85.[2]
7. Barium-Total,[4]mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration [36]		3111 D-1999		I-3084-85.[2]
	AA furnace		3113 B-2004	D4382-02(07)	
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP [36]				See footnote.[34]
8. Beryllium—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration		3111 D-1999 or 3111 E-1999	D3645-08 (A)	I-3095-85.[2]
	AA furnace		3113 B-2004	D3645-08 (B)	
	STGFAA	200.9, Rev. 2.2 (1994)			

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	ICP/AES	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP			D4190-08	See footnote.[34]
	Colorimetric (aluminon)		See footnote [61]		
9. Biochemical oxygen demand (BOD5), mg/L	Dissolved Oxygen Depletion		5210 B-2001		973.44[3], p. 17.[9], I-1578-78,[8]See footnote.[10,63]
10. Boron—Total,[37]mg/L	Colorimetric (curcumin)		4500-B B -2000		I-3112-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP			D4190-08	See footnote.[34]
11. Bromide, mg/L	Electrode			D1246-05	I-1125-85.[2]
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000, C-2000, D-2000	D4327-03	993.30.[3]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
12. Cadmium—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999 or 3111 C-1999	D3557-02(07) (A or B)	974.27,[3]p. 37.[9], I-3135-85 [2]or I-3136-85.[2]
	AA furnace		3113 B-	D3557-	I-4138-89.[51]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
			2004	02(07) (D)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-1472-85 [2]or I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP[36]			D4190-08	See footnote.[34]
	Voltametry[11]			D3557-02(07) (C)	
	Colorimetric (Dithizone)		3500-Cd-D-1990		
13. Calcium—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration		3111 B-1999	D511-08(B)	I-3152-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP				See footnote.[34]
	Titrimetric (EDTA)		3500-Ca B-1997	D511-08 (A)	
	Ion Chromatography			D6919-09	
14. Carbonaceous biochemical oxygen demand ($CBOD_5$), mg/L[12]	Dissolved Oxygen Depletion with nitrification inhibitor		5210 B-2001		See footnote.[35,63]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
15. Chemical oxygen demand (COD), mg/L	Titrimetric	410.3 (Rev. 1978)[1]	5220 B-1997 or C-1997	D1252-06 (A)	973.46,[3]p. 17,[9]I-3560-85.[2]
	Spectrophotometric, manual or automatic	410.4, Rev. 2.0 (1993)	5220 D-1997	D1252-06 (B)	See footnotes.[13,14]I-3561-85.[2]
16. Chloride, mg/L	Titrimetric: (silver nitrate)		4500-Cl^-B-1997	D512-04 (B)	I-1183-85.[2]
	(Mercuric nitrate)		4500-Cl^-C-1997	D512-04 (A)	973.51,[3]I-1184-85.[2]
	Colorimetric: manual				I-1187-85.[2]
	Automated (Ferricyanide)		4500-Cl^-E-1997		I-2187-85.[2]
	Potentiometric Titration		4500-Cl^-D-1997		
	Ion Selective Electrode			D512-04 (C)	
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or 4110 C-2000	D4327-03	993.30[3], I-2057-90.[51]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
17. Chlorine-Total residual, mg/L	Amperometric direct		4500-Cl D-2000	D1253-08	
	Amperometric direct (low level)		4500-Cl E-2000		
	Iodometric direct		4500-Cl B-2000		
	Back titration ether end-point[15]		4500-Cl C-2000		
	DPD-FAS		4500-Cl F-2000		
	Spectrophotometric, DPD		4500-Cl G-2000		

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Electrode				See footnote.[16]
17A. Chlorine-Free Available, mg/L	Amperometric direct		4500-Cl D-2000	D1253-08	
	Amperometric direct (low level)		4500-Cl E-2000		
	DPD-FAS		4500-Cl F-2000		
	Spectrophotometric, DPD		4500-Cl G-2000		
18. Chromium VI dissolved, mg/L	0.45-micron Filtration followed by any of the following:				
	AA chelation-extraction		3111 C-1999		I-1232-85.[2]
	Ion Chromatography	218.6, Rev. 3.3 (1994)	3500-Cr C-2009	D5257-03	993.23.
	Colorimetric (Diphenyl-carbazide)		3500-Cr B-2009	D1687-02(07) (A)	I-1230-85.[2]
19. Chromium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999	D1687-02(07) (B)	974.27,[3] I-3236-85.[2]
	AA chelation-extraction		3111 C-1999		
	AA furnace		3113 B-2004	D1687-02(07) (C)	I-3233-93.[46]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003),[68] 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3] I-4020-05.[70]
	DCP [36]			D4190-08	See footnote.[34]
	Colorimetric (Diphenyl-carbazide)		3500-Cr B-2009		
20. Cobalt—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-1999 or 3111 C-1999	D3558-08 (A or B)	p. 37,[9] I-3239-85.[2]
	AA furnace		3113 B-2004	D3558-08 (C)	I-4243-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3] I-4020-05.[70]
	DCP			D4190-08	See footnote.[34]
21. Color, platinum cobalt units or dominant wavelength, hue, luminance purity	Colorimetric (ADMI)				See footnote.[18]
	(Platinum cobalt)		2120 B-2001		I-1250-85.[2]
	Spectrophotometric				
22. Copper—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999 or	D1688-07 (A	974.27,[3] p. 37,[9] I-3270-85 [2] or I-3271-

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
			3111 C-1999	or B)	85.[2]
	AA furnace		3113 B-2004	D1688-07 (C)	I-4274-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3] I-4020-05.[70]
	DCP [36]			D4190-08	See footnote.[34]
	Colorimetric (Neocuproine)		3500-Cu B-1999		
	(Bathocuproine)		3500-Cu C-1999		See footnote.[19]
23. Cyanide—Total, mg/L	Automated UV digestion/distillation and Colorimetry				Kelada-01.[55]
	Segmented Flow Injection, In-Line Ultraviolet Digestion, followed by gas diffusion amperometry			D7511-09	
	Manual distillation with $MgCl_2$, followed by any of the following:	335.4, Rev. 1.0 (1993) [57]	4500-CN^-B-1999 or C-1999	D2036-09(A), D7284-08	10-204-00-1-X.[56]
	Flow Injection, gas diffusion amperometry			D2036-09(A) D7284-08	
	Titrimetric		4500-CN^-D-1999	D2036-09(A)	p. 22.[9]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Spectrophotometric, manual		4500-CN^-E-1999	D2036-09(A)	I-3300-85.[2]
	Semi-Automated [20]	335.4, Rev. 1.0 (1993) [57]			10-204-00-1-X,[56]I-4302-85.[2]
	Ion Chromatography			D2036-09(A)	
	Ion Selective Electrode		4500-CN^-F-1999	D2036-09(A)	
24. Cyanide-Available, mg/L	Cyanide Amenable to Chlorination (CATC); Manual distillation with $MgCl_2$, followed by Titrimetric or Spectrophotometric		4500-CN^-G-1999	D2036-09(B)	
	Flow injection and ligand exchange, followed by gas diffusion amperometry [59]			D6888-09	OIA-1677-09.[44]
	Automated Distillation and Colorimetry (no UV digestion)				Kelada-01.[55]
24.A Cyanide-Free, mg/L	Flow Injection, followed by gas diffusion amperometry			D7237-10	OIA-1677-09.[44]
	Manual micro-diffusion and colorimetry			D4282-02	
25. Fluoride—Total, mg/L	Manual distillation,[6]followed by any of the following:		4500-F^-B-1997		
	Electrode, manual		4500-F^-C-1997	D1179-04 (B)	
	Electrode, automated				I-4327-85.[2]
	Colorimetric, (SPADNS)		4500-F^-D-1997	D1179-04 (A)	

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Automated complexone		4500-F^-E-1997		
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or C-2000	D4327-03	993.30.[3]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
26. Gold—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration		3111 B-1999		
	AA furnace	231.2 (Issued 1978)[1]	3113 B-2004		
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP				See footnote.[34]
27. Hardness—Total, as $CaCO_3$, mg/L	Automated colorimetric	130.1 (Issued 1971)[1]			
	Titrimetric (EDTA)		2340 C-1997	D1126-02(07)	973.52B,[3] I-1338-85.[2]
	Ca plus Mg as their carbonates, by inductively coupled plasma or AA direct aspiration. (See Parameters 13 and 33).		2340 B-1997		
28. Hydrogen ion (pH), pH units	Electrometric measurement		4500-H^+B-2000	D1293-99 (A or B)	973.41,[3] I-1586-85.[2]
	Automated electrode	150.2 (Dec. 1982)[1]			See footnote,[21] I-2587-85.[2]
29. Iridium—Total,[4] mg/L	Digestion,[4] followed by any of the following:				

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	AA direct aspiration		3111 B-1999		
	AA furnace	235.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2009		
30. Iron—Total,[4] mg/L	Digestion,[4] followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999 or 3111 C-1999	D1068-05 (A or B)	974.27,[3] I-3381-85.[2]
	AA furnace		3113 B-2004	D1068-05 (C)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP [36]			D4190-08	See footnote.[34]
	Colorimetric (Phenanthroline)		3500-Fe-1997	D1068-05 (D)	See footnote.[22]
31. Kjeldahl Nitrogen [5]—Total, (as N), mg/L	Manual digestion [20] and distillation or gas diffusion, followed by any of the following:		4500-N_{org}B-1997 or C-1997 and 4500-NH_3B-1997	D3590-02(06) (A)	I-4515-91.[45]
	Titration		4500-NH_3C-1997		973.48.[3]
	Nesslerization			D1426-	

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
				08 (A)	
	Electrode		4500-NH_3D-1997 or E-1997	D1426-08 (B)	
	Semi-automated phenate	350.1 Rev 2.0 1993	4500-NH_3G-1997. 4500-NH_3H-1997		
	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH_3F-1997		See footnote.[60]
	Automated Methods for TKN that do not require manual distillation				
	Automated phenate, salicylate, or other substituted phenols in Berthelot reaction based methods colorimetric (auto digestion and distillation)	351.1 (Rev. 1978)[1]			I-4551-78.[8]
	Semi-automated block digestor colorimetric (distillation not required)	351.2, Rev. 2.0 (1993)	4500-N_{org}D-1997	D3590-02(06) (B)	I-4515-91.[45]
	Block digester, followed by Auto distillation and Titration				See footnote.[39]
	Block digester, followed by Auto distillation and Nesslerization				See footnote.[40]
	Block Digester,				See footnote.[41]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	followed by Flow injection gas diffusion (distillation not required)				
32. Lead—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999 or 3111 C-1999.	D3559-08 (A or B)	974.27,[3]I-3399-85.[2]
	AA furnace		3113 B-2004	D3559-08 (D)	I-4403-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP [36]			D4190-08	See footnote.[34]
	Voltametry[11]			D3559-08 (C)	
	Colorimetric (Dithizone)		3500-Pb B-1997		
33. Magnesium—Total,[4]mg/L	Digestion,[4]followed by any of the following:				
	AA direct aspiration		3111 B-1999	D511-08 (B)	974.27,[3]I-3447-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP				See footnote.[34]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Gravimetric				
	Ion Chromatography			D6919-09	
34. Manganese—Total,[4]mg/L	Digestion [4]followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999	D858-07 (A or B)	974.27,[3]I-3454-85.[2]
	AA furnace		3113 B-2004	D858-07 (C)	
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3]I-4471-97.[50]
	DCP [36]			D4190-08	See footnote.[34]
	Colorimetric (Persulfate)		3500-Mn B-1999		920.203.[3]
	(Periodate)				See footnote.[23]
35. Mercury—Total,[4]mg/L	Cold vapor, Manual	245.1, Rev. 3.0 (1994)	3112 B-2009	D3223-02(07)	977.22,[3]I-3462-85.[2]
	Cold vapor, Automated	245.2 (Issued 1974)[1]			
	Cold vapor atomic fluorescence spectrometry (CVAFS)	245.7 Rev. 2.0 (2005)[17]			I-4464-01.[71]
	Purge and Trap CVAFS	1631E[43]			
36. Molybdenum—Total,[4]mg/L	Digestion,[4]followed by any of the following:				

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	AA direct aspiration		3111 D-1999		I-3490-85.[2]
	AA furnace		3113 B-2004		I-3492-96.[47]
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3] I-4471-97.[50]
	DCP				See footnote.[34]
37. Nickel—Total,[4] mg/L	Digestion [4] followed by any of the following:				
	AA direct aspiration [36]		3111 B-1999 or 3111 C-1999	D1886-08 (A or B)	I-3499-85.[2]
	AA furnace		3113 B-2004	D1886-08 (C)	I-4503-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES [36]	200.5, Rev 4.2 (2003) [68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14,[3] I-4020-05.[70]
	DCP [36]			D4190-08	See footnote.[34]
38. Nitrate (as N), mg/L	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or C-2000	D4327-03	993.30.[3]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
	Ion Selective Electrode		4500-NO_3^-D-2000		

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Colorimetric (Brucine sulfate)	352.1 (Issued 1971)[1]			973.50,[3]419D[1,7], p. 28.[9]
	Nitrate-nitrite N minus Nitrite N (See parameters 39 and 40)				See footnote.[62]
39. Nitrate-nitrite (as N), mg/L	Cadmium reduction, Manual		4500-NO_3^-E-2000	D3867-04 (B)	
	Cadmium reduction, Automated	353.2, Rev. 2.0 (1993)	4500-NO_3^-F-2000	D3867-04 (A)	I-2545-90.[51]
	Automated hydrazine		4500-NO_3^-H-2000		
	Reduction/Colorimetric				See footnote.[62]
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or C-2000	D4327-03	993.30.[3]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
40. Nitrite (as N), mg/L	Spectrophotometric: Manual		4500-NO_2^-B-2000		See footnote.[25]
	Automated (Diazotization)				I-4540-85[2], See footnote.[62]
	Automated (*bypass cadmium reduction)	353.2, Rev. 2.0 (1993)	4500-NO_3^-F-2000	D3867-04 (A)	I-4545-85.[2]
	Manual (*bypass cadmium reduction)		4500-NO_3^-E-2000	D3867-04 (B)	
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or C-2000	D4327-03	993.30.[3]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
41. Oil and grease—Total recoverable, mg/L	Hexane extractable material (HEM): n-Hexane extraction and gravimetry	1664 Rev. A; 1664 Rev. B[42]	5520 B-2001[38]		
	Silica gel treated HEM (SGT-HEM): Silica gel treatment and gravimetry	1664 Rev. A; 1664 Rev. B[42]	5520 B-2001[38]and 5520 F-2001[38]		
42. Organic carbon—Total (TOC), mg/L	Combustion		5310 B-2000	D7573-09	973.47[3], p. 14.[24]
	Heated persulfate or UV persulfate oxidation		5310 C 2000 5310 D 2000.	D4839-03	973.47[3,], p. 14.[24]
43. Organic nitrogen (as N), mg/L	Total Kjeldahl N (Parameter 31) minus ammonia N (Parameter 4)				
44. Ortho-phosphate (as P), mg/L		Ascorbic acid method:			
	Automated	365.1, Rev. 2.0 (1993)	4500-P F-1999 or G-1999		973.56[3], I-4601-85.[2]
	Manual single reagent		4500-P E-1999	D515-88(A)	973.55.[3]
	Manual two reagent	365.3 (Issued 1978)[1]			
	Ion Chromatography	300.0, Rev 2.1 (1993) and 300.1-1, Rev 1.0 (1997)	4110 B-2000 or C-2000	D4327-03	993.30.[3]
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
45. Osmium—Total[4], mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration,		3111 D-1999		
	AA furnace	252.2 (Issued 1978)[1]			
46. Oxygen, dissolved, mg/L	Winkler (Azide modification)		4500-O B-2001, C-2001, D-2001, E-2001, F-2001	D888-09 (A)	973.45B[3], I-1575-78.[8]
	Electrode		4500-O G-2001	D888-09 (B)	I-1576-78.[8]
	Luminescence Based Sensor			D888-09 (C)	See footnote[63] See footnote.[64]
47. Palladium—Total,[4]mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 B-1999		
	AA furnace	253.2[1](Issued 1978)			
	ICP/MS		3125 B-2009		
	DCP				See footnote.[34]
48. Phenols, mg/L	Manual distillation[26], followed by any of the following:	420.1[1](Rev. 1978)	5530 B-2005	D1783-01	
	Colorimetric (4AAP) manual	420.1[1](Rev. 1978)	5530 D-2005[27]	D1783-01 (A or B)	
	Automated colorimetric (4AAP)	420.4 Rev. 1.0 (1993)			
49. Phosphorus (elemental), mg/L	Gas-liquid chromatography				See footnote.[28]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
50. Phosphorus—Total, mg/L	Digestion[20], followed by any of the following:		4500-P B(5)-1999		973.55.[3]
	Manual	365.3[1](Issued 1978)	4500-P E-1999	D515-88 (A)	
	Automated ascorbic acid reduction	365.1 Rev. 2.0 (1993)	4500-P F-1999, G-1999, H-1999		973.56[3], I-4600-85.[2]
	ICP/AES[4, 36]	200.7, Rev. 4.4 (1994)	3120 B-1999		I-4471-97.[50]
	Semi-automated block digestor (TKP digestion)	365.4[1](Issued 1974)		D515-88 (B)	I-4610-91.[48]
51. Platinum—Total,[4]mg/L	Digestion[4]followed by any of the following:				
	AA direct aspiration		3111 B-1999		
	AA furnace	255.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2009		
	DCP				See footnote.[34]
52. Potassium—Total,[4]mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 B-1999		973.53[3], I-3630-85.[2]
	ICP/AES	200.7, Rev. 4.4 (1994)	3120 B-1999		
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	Flame photometric		3500-K B-1997		
	Electrode		3500-K C-1997		

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	Ion Chromatography			D6919-09	
53. Residue—Total, mg/L	Gravimetric, 103-105°		2540 B-1997		I-3750-85.[2]
54. Residue—filterable, mg/L	Gravimetric, 180°		2540 C-1997	D5907-03	I-1750-85.[2]
55. Residue—non-filterable (TSS), mg/L	Gravimetric, 103-105° post washing of residue		2540 D-1997	D5907-03	I-3765-85.[2]
56. Residue—settleable, mg/L	Volumetric, (Imhoff cone), or gravimetric		2540 F-1997		
57. Residue—Volatile, mg/L	Gravimetric, 550°	160.4 (Issued 1971)[1]	2540-E-1997		I-3753-85.[2]
58. Rhodium—Total,[4] mg/L	Digestion[4] followed by any of the following:				
	AA direct aspiration, or		3111 B-1999		
	AA furnace	265.2 (Issued 1978)[1]			
	ICP/MS		3125 B-2009		
59. Ruthenium—Total,[4] mg/L	Digestion[4] followed by any of the following:				
	AA direct aspiration, or		3111 B-1999		
	AA furnace	267.2[1]			
	ICP/MS		3125 B-2009		
60. Selenium—Total,[4] mg/L	Digestion[4], followed by any of the following:				
	AA furnace		3113 B-2004	D3859-08 (B)	I-4668-98.[49]
	STGFAA	200.9, Rev. 2.2 (1994)			

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
	ICP/AES[36]	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14[3], I-4020-05.[70]
	AA gaseous hydride		3114 B-2009, or 3111 C-2009.	D3859-08 (A)	I-3667-85.[2]
61. Silica—Dissolved,[37]mg/L	0.45-micron filtration followed by any of the following:				
	Colorimetric, Manual		4500-SiO_2C-1997	D859-05	I-1700-85.[2]
	Automated (Molybdosilicate)		4500-SiO_2E-1997 or F-1997		I-2700-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-1999		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
62. Silver—Total,[4, 31]mg/L	Digestion[4, 29], followed by any of the following:				
	AA direct aspiration		3111 B-1999 or 3111 C-1999		974.27[3], p. 37[9], I-3720-85.[2]
	AA furnace		3113 B-2004		I-4724-89.[51]
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.5, Rev 4.2 (2003)[68]; 200.7,	3120 B-1999	D1976-07	I-4471-97.[50]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
		Rev. 4.4 (1994)			
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14[3], I-4471-97.[50]
	DCP				See footnote.[34]
63. Sodium—Total,[4] mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 B-1999		973.54[3], I-3735-85.[2]
	ICP/AES	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-1999		I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP				See footnote.[34]
	Flame photometric		3500-Na B-1997		
	Ion Chromatography			D6919-09	
64. Specific conductance, micromhos/cm at 25 °C	Wheatstone bridge	120.1[1](Rev. 1982)	2510 B-1997	D1125-95(99) (A)	973.40[3], I-2781-85.[2]
65. Sulfate (as SO_4), mg/L	Automated colorimetric	375.2, Rev. 2.0 (1993)	4500-SO_4^{2-}F-1997 or G-1997		
	Gravimetric		4500-SO_4^{2-}C-1997 or D-1997		925.54.[3]
	Turbidimetric		4500-SO_4^{2-}E-1997	D516-07	
	Ion Chromatography	300.0, Rev 2.1 (1993) and	4110 B-2000 or	D4327-03	993.30[3], I-4020-05.[70]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
		300.1-1, Rev 1.0 (1997)	C-2000		
	CIE/UV		4140 B-1997	D6508-00(05)	D6508, Rev. 2.[54]
66. Sulfide (as S), mg/L	Sample Pretreatment		4500-S^{2-}B, C-2000		
	Titrimetric (iodine)		4500-S^{2-}F-2000		I-3840-85.[2]
	Colorimetric (methylene blue)		4500-S^{2-}D-2000		
	Ion Selective Electrode		4500-S^{2-}G-2000	D4658-08	
67. Sulfite (as SO_3), mg/L	Titrimetric (iodine-iodate)		4500-SO_3^{2-}B-2000		
68. Surfactants, mg/L	Colorimetric (methylene blue)		5540 C-2000	D2330-02	
69. Temperature, °C	Thermometric		2550 B-2000		See footnote.[32]
70. Thallium-Total,[4] mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 B-1999		
	AA furnace	279.2[1](Issued 1978)	3113 B-2004		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.7, Rev. 4.4 (1994); 200.5 Rev. 4.2 (2003)[68]	3120 B-1999	D1976-07	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14[3], I-4471-97.[50]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
71. Tin-Total,[4]mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 B-1999		I-3850-78.[8]
	AA furnace		3113 B-2004		
	STGFAA	200.9, Rev. 2.2 (1994)			
	ICP/AES	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)			
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
72. Titanium-Total,[4]mg/L	Digestion[4]followed by any of the following:				
	AA direct aspiration		3111 D-1999		
	AA furnace	283.2[1](Issued 1978)			
	ICP/AES	200.7, Rev. 4.4 (1994)			
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14.[3]
	DCP				See footnote.[34]
73. Turbidity, NTU[53]	Nephelometric	180.1, Rev. 2.0 (1993)	2130 B-2001	D1889-00	I-3860-85.[2] See footnote.[65] See footnote.[66] See footnote.[67]
74. Vanadium-Total,[4]mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration		3111 D-1999		
	AA furnace		3113 B-2004	D3373-03(07)	
	ICP/AES	200.5, Rev 4.2	3120 B-	D1976-	I-4471-97.[50]

Parameter	Methodology [58]	EPA [52]	Standard methods	ASTM	USGS/AOAC/Other
		(2003)[68]; 200.7, Rev. 4.4 (1994)	1999	07	
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14[3], I-4020-05.[70]
	DCP			D4190-08	See footnote.[34]
	Colorimetric (Gallic Acid)		3500-V B-1997		
75. Zinc-Total[4], mg/L	Digestion[4], followed by any of the following:				
	AA direct aspiration[36]		3111 B-1999 or 3111 C-1999	D1691-02(07) (A or B)	974.27[3], p. 37[9], I-3900-85.[2]
	AA furnace	289.2[1](Issued 1978)			
	ICP/AES[36]	200.5, Rev 4.2 (2003)[68]; 200.7, Rev. 4.4 (1994)	3120 B-1999	D1976-07	I-4471-97.[50]
	ICP/MS	200.8, Rev. 5.4 (1994)	3125 B-2009	D5673-05	993.14[3], I-4020-05.[70]
	DCP[36]			D4190-08	See footnote.[34]
	Colorimetric (Zincon)		3500 Zn B-1997		See footnote.[33]
76. Acid Mine Drainage		1627[69]			

Table IB Notes:

[1] Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020. Revised March 1983 and 1979, where applicable. U.S. EPA.

[2] Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resource Investigations of the U.S. Geological Survey, Book 5, Chapter A1., unless otherwise stated. 1989. USGS.

[3] Official Methods of Analysis of the Association of Official Analytical Chemists, Methods Manual, Sixteenth Edition, 4th Revision, 1998. AOAC International.

[4] For the determination of total metals (which are equivalent to total recoverable metals) the sample is not filtered before processing. A digestion procedure is required to solubilize analytes in suspended material and to break down organic-metal complexes (to convert the analyte to a detectable form for colorimetric analysis). For non-platform graphite furnace atomic absorption determinations a digestion using nitric acid (as specified in Section 4.1.3 of Methods for the Chemical Analysis of Water and Wastes) is required prior to analysis. The procedure used should subject the sample to gentle, acid refluxing and at no time should the sample be taken to dryness. For direct aspiration flame atomic absorption determinations (FLAA) a combination acid (nitric and hydrochloric acids) digestion is preferred prior to analysis. The approved total recoverable digestion is described as Method 200.2 in Supplement I of "Methods for the Determination of Metals in Environmental Samples" EPA/600R-94/111, May, 1994, and is reproduced in EPA Methods 200.7, 200.8, and 200.9 from the same Supplement. However, when using the gaseous hydride technique or for the determination of certain elements such as antimony, arsenic, selenium, silver, and tin by non-EPA graphite furnace atomic absorption methods, mercury by cold vapor atomic absorption, the noble metals and titanium by FLAA, a specific or modified sample digestion procedure may be required and in all cases the referenced method write-up should be consulted for specific instruction and/or cautions. For analyses using inductively coupled plasma-atomic emission spectrometry (ICP-AES), the direct current plasma (DCP) technique or the EPA spectrochemical techniques (platform furnace AA, ICP-AES, and ICP-MS) use EPA Method 200.2 or an approved alternate procedure (e.g., CEM microwave digestion, which may be used with certain analytes as indicated in Table IB); the total recoverable digestion procedures in EPA Methods 200.7, 200.8, and 200.9 may be used for those respective methods. Regardless of the digestion procedure, the results of the analysis after digestion procedure are reported as "total" metals.

[5] Copper sulfate or other catalysts that have been found suitable may be used in place of mercuric sulfate.

[6] Manual distillation is not required if comparability data on representative effluent samples are on file to show that this preliminary distillation step is not necessary: however, manual distillation will be required to resolve any controversies. In general, the analytical method should be consulted regarding the need for distillation. If the method is not clear, the laboratory may compare a minimum of 9 different sample matrices to evaluate the need for distillation. For each matrix, a matrix spike and matrix spike duplicate are analyzed both with and without the distillation step. (A total of 36 samples, assuming 9 matrices). If results are comparable, the laboratory may dispense with the distillation step for future analysis. Comparable is defined as < 20% RPD for all tested matrices). Alternatively the two populations of spike recovery percentages may be compared using a recognized statistical test.

[7] Industrial Method Number 379-75 WE Ammonia, Automated Electrode Method, Technicon Auto Analyzer II. February 19, 1976. Bran & Luebbe Analyzing Technologies Inc.

[8] The approved method is that cited in Methods for Determination of Inorganic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A1. 1979. USGS.

[9] American National Standard on Photographic Processing Effluents. April 2, 1975. American National Standards Institute.

[10] In-Situ Method 1003-8-2009, Biochemical Oxygen Demand (BOD) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[11] The use of normal and differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

[12] Carbonaceous biochemical oxygen demand ($CBOD_5$) must not be confused with the traditional BOD_5test method which measures "total BOD." The addition of the nitrification inhibitor is not a procedural option, but must be included to report the $CBOD_5$parameter. A discharger whose permit requires reporting the traditional BOD_5may not use a nitrification inhibitor in the procedure for reporting the results. Only when a discharger's permit specifically states $CBOD_5$is required can the permittee report data using a nitrification inhibitor.

[13] OIC Chemical Oxygen Demand Method. 1978. Oceanography International Corporation.

[14] Method 8000, Chemical Oxygen Demand, Hach Handbook of Water Analysis, 1979. Hach Company.

[15] The back titration method will be used to resolve controversy.

[16] Orion Research Instruction Manual, Residual Chlorine Electrode Model 97-70. 1977. Orion Research Incorporated. The calibration graph for the Orion residual chlorine method must be derived using a reagent blank and three standard solutions, containing 0.2, 1.0, and 5.0 mL 0.00281 N potassium iodate/100 mL solution, respectively.

[17] Method 245.7, Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, EPA-821-R-05-001. Revision 2.0, February 2005. US EPA.

[18] National Council of the Paper Industry for Air and Stream Improvement (NCASI) Technical Bulletin 253, December 1971.

[19] Method 8506, Biocinchoninate Method for Copper, Hach Handbook of Water Analysis. 1979. Hach Company.

[20] When using a method with block digestion, this treatment is not required.

[21] Industrial Method Number 378-75WA, Hydrogen ion (pH) Automated Electrode Method, Bran & Luebbe (Technicon) Autoanalyzer II. October 1976. Bran & Luebbe Analyzing Technologies.

[22] Method 8008, 1,10-Phenanthroline Method using FerroVer Iron Reagent for Water. 1980. Hach Company.

[23] Method 8034, Periodate Oxidation Method for Manganese, Hach Handbook of Wastewater Analysis. 1979. Hach Company.

[24] Methods for Analysis of Organic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3, (1972 Revised 1987) p. 14. 1987. USGS.

[25] Method 8507, Nitrogen, Nitrite-Low Range, Diazotization Method for Water and Wastewater. 1979. Hach Company.

[26] Just prior to distillation, adjust the sulfuric-acid-preserved sample to pH 4 with 1 + 9 NaOH.

[27] The colorimetric reaction must be conducted at a pH of 10.0 ± 0.2.

[28] Addison, R.F., and R.G. Ackman. 1970. Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography,*Journal of Chromatograph*y, 47(3):421-426.

[29] Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are inadequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in reagents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to pH of 12. Therefore, for levels of silver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M $Na_2S_2O_3$and NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved method is satisfactory.

[30] The use of EDTA decreases method sensitivity. Analysts may omit EDTA or replace with another suitable complexing reagent provided that all method specified quality control acceptance criteria are met.

[31] For samples known or suspected to contain high levels of silver (e.g., in excess of 4 mg/L), cyanogen iodide should be used to keep the silver in solution for analysis. Prepare a cyanogen iodide solution by adding 4.0 mL of concentrated NH_4OH, 6.5 g of KCN, and 5.0 mL of a 1.0 N solution of I2 to 50 mL of reagent water in a volumetric flask and dilute to 100.0 mL. After digestion of the sample, adjust the pH of the digestate to >7 to prevent the formation of HCN under acidic conditions. Add 1 mL of the cyanogen iodide solution to the sample digestate and adjust the volume to 100 mL with reagent water (NOT acid). If cyanogen iodide is added to sample digestates, then silver standards must be prepared that contain cyanogen iodide as well. Prepare working standards by diluting a small volume of a silver stock solution with water and adjusting the pH>7 with NH_4OH. Add 1 mL of the cyanogen iodide solution and let stand 1 hour. Transfer to a 100-mL volumetric flask and dilute to volume with water.

[32] "Water Temperature-Influential Factors, Field Measurement and Data Presentation," Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chapter D1. 1975. USGS.

[33] Method 8009, Zincon Method for Zinc, Hach Handbook of Water Analysis, 1979. Hach Company.

[34] Method AES0029, Direct Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes. 1986-Revised 1991. Thermo Jarrell Ash Corporation.

[35] In-Situ Method 1004-8-2009, Carbonaceous Biochemical Oxygen Demand (CBOD) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[36] Microwave-assisted digestion may be employed for this metal, when analyzed by this methodology. Closed Vessel Microwave Digestion of Wastewater Samples for Determination of Metals. April 16, 1992. CEM Corporation

[37] When determining boron and silica, only plastic, PTFE, or quartz laboratory ware may be used from start until completion of analysis.

[38] Only use n-hexane (n-Hexane—85% minimum purity, 99.0% min. saturated C6 isomers, residue less than 1 mg/L) extraction solvent when determining Oil and Grease parameters—Hexane Extractable Material (HEM), or Silica Gel Treated HEM (analogous to EPA Methods 1664 Rev. A and 1664 Rev. B). Use of other extraction solvents is prohibited.

[39] Method PAI-DK01, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Titrimetric Detection. Revised December 22, 1994. OI Analytical.

[40] Method PAI-DK02, Nitrogen, Total Kjeldahl, Block Digestion, Steam Distillation, Colorimetric Detection. Revised December 22, 1994. OI Analytical.

[41] Method PAI-DK03, Nitrogen, Total Kjeldahl, Block Digestion, Automated FIA Gas Diffusion. Revised December 22, 1994. OI Analytical.

[42] Method 1664 Rev. B is the revised version of EPA Method 1664 Rev. A. U.S. EPA. February 1999, Revision A. Method 1664, n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry. EPA-821-R-98-002. U.S. EPA. February 2010, Revision B. Method 1664, n-Hexane Extractable Material (HEM; Oil and Grease) and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM; Non-polar Material) by Extraction and Gravimetry. EPA-821-R-10-001.

[43] Method 1631, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry, EPA-821-R-02-019. Revision E. August 2002, U.S. EPA. The application of clean techniques described in EPA's Method 1669:*Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels,*EPA-821-R-96-011, are recommended to preclude contamination at low-level, trace metal determinations.

[44] Method OIA-1677-09, Available Cyanide by Ligand Exchange and Flow Injection Analysis (FIA). 2010. OI Analytical.

[45] Open File Report 00-170, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Ammonium Plus Organic Nitrogen by a Kjeldahl Digestion Method and an Automated Photometric Finish that Includes Digest Cleanup by Gas Diffusion. 2000. USGS.

[46] Open File Report 93-449, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Chromium in Water by Graphite Furnace Atomic Absorption Spectrophotometry. 1993. USGS.

[47] Open File Report 97-198, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Molybdenum by Graphite Furnace Atomic Absorption Spectrophotometry. 1997.. USGS.

[48] Open File Report 92-146, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Total Phosphorus by Kjeldahl Digestion Method and an Automated Colorimetric Finish That Includes Dialysis. 1992. USGS.

[49] Open File Report 98-639, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Arsenic and Selenium in Water and Sediment by Graphite Furnace-Atomic Absorption Spectrometry. 1999. USGS.

[50] Open File Report 98-165, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Elements in Whole-water Digests Using Inductively Coupled Plasma-Optical Emission Spectrometry and Inductively Coupled Plasma-Mass Spectrometry. 1998. USGS.

[51] Open File Report 93-125, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments. 1993.. USGS.

[52] Unless otherwise indicated, all EPA methods, excluding EPA Method 300.1-1, are published in U.S. EPA. May 1994. Methods for the Determination of Metals in Environmental Samples, Supplement I, EPA/600/R-94/111; or U.S. EPA. August 1993. Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100. EPA Method 300.1 is US EPA. Revision 1.0, 1997, including errata cover sheet April 27, 1999. Determination of Inorganic Ions in Drinking Water by Ion Chromatography.

[53] Styrene divinyl benzene beads (e.g., AMCO-AEPA-1 or equivalent) and stabilized formazin (e.g., Hach StablCal™ or equivalent) are acceptable substitutes for formazin.

[54] Method D6508, Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte. December 2000. Waters Corp.

[55] Kelada-01, Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, and Thiocyanate, EPA 821-B-01-009, Revision 1.2, August 2001. US EPA. Note: A 450-W UV lamp may be used in this method instead of the 550-W lamp specified if it provides performance within the quality control (QC) acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the QC acceptance criteria are met.

[56] QuikChem Method 10-204-00-1-X, Digestion and Distillation of Total Cyanide in Drinking and Wastewaters using MICRO DIST and Determination of Cyanide by Flow Injection Analysis. Revision 2.2, March 2005. Lachat Instruments.

[57] When using sulfide removal test procedures described in EPA Method 335.4-1, reconstitute particulate that is filtered with the sample prior to distillation.

[58] Unless otherwise stated, if the language of this table specifies a sample digestion and/or distillation “followed by” analysis with a method, approved digestion and/or distillation are required prior to analysis.

[59] Samples analyzed for available cyanide using OI Analytical method OIA-1677-09 or ASTM method D6888-09 that contain particulate matter may be filtered only after the ligand exchange reagents have been added to the samples, because the ligand exchange process converts complexes containing available cyanide to free cyanide, which is not removed by filtration. Analysts are further cautioned to limit the time between the addition of the ligand exchange reagents and sample filtration to no more than 30 minutes to preclude settling of materials in samples.

[60] Analysts should be aware that pH optima and chromophore absorption maxima might differ when phenol is replaced by a substituted phenol as the color reagent in Berthelot Reaction (“phenol-hypochlorite reaction”) colorimetric ammonium determination methods. For example when phenol is used as the color reagent, pH optimum and wavelength of maximum absorbance are about 11.5 and 635 nm, respectively—see, Patton, C.J. and S.R. Crouch. March 1977. Anal. Chem. 49:464-469. These reaction parameters increase to pH > 12.6 and 665 nm when salicylate is used as the color reagent—see, Krom, M.D. April 1980. The Analyst 105:305-316.

[61] If atomic absorption or ICP instrumentation is not available, the aluminon colorimetric method detailed in the 19th Edition of *Standard Methods* may be used. This method has poorer precision and bias than the methods of choice.

[62] Easy (1-Reagent) Nitrate Method, Revision November 12, 2011. Craig Chinchilla.

[63] Hach Method 10360, Luminescence Measurement of Dissolved Oxygen in Water and Wastewater and for Use in the Determination of BOD_5 and $cBOD_5$. Revision 1.2, October 2011. Hach Company. This method may be used to measure dissolved oxygen when performing the methods approved in Table IB for measurement of biochemical oxygen demand (BOD) and carbonaceous biochemical oxygen demand (CBOD).

[64] In-Situ Method 1002-8-2009, Dissolved Oxygen (DO) Measurement by Optical Probe. 2009. In-Situ Incorporated.

[65] Mitchell Method M5331, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Leck Mitchell.

[66] Mitchell Method M5271, Determination of Turbidity by Nephelometry. Revision 1.0, July 31, 2008. Leck Mitchell.

[67] Orion Method AQ4500, Determination of Turbidity by Nephelometry. Revision 5, March 12, 2009. Thermo Scientific.

[68] EPA Method 200.5, Determination of Trace Elements in Drinking Water by Axially Viewed Inductively Coupled Plasma-Atomic Emission Spectrometry, EPA/600/R-06/115. Revision 4.2, October 2003. US EPA.

[69] Method 1627, Kinetic Test Method for the Prediction of Mine Drainage Quality, EPA-821-R-09-002. December 2011. US EPA.

[70] Techniques and Methods Book 5-B1, Determination of Elements in Natural-Water, Biota, Sediment and Soil Samples Using Collision/Reaction Cell Inductively Coupled Plasma-Mass Spectrometry, Chapter 1, Section B, Methods of the National Water Quality Laboratory, Book 5, Laboratory Analysis, 2006. USGS.

[71] Water-Resources Investigations Report 01-4132, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Organic Plus Inorganic Mercury in Filtered and Unfiltered Natural Water With Cold Vapor-Atomic Fluorescence Spectrometry, 2001. USGS.

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
1. Acenaphthene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98)	
2. Acenaphthylene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
3. Acrolein	GC	603.			
	GC/MS	624 [4], 1624B.			
4. Acrylonitrile	GC	603.			
	GC/MS	624 [4], 1624B.			
5. Anthracene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440B-2000	D4657-92 (98).	
6. Benzene	GC	602	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
7. Benzidine	Spectro-photometric				See footnote [3], p.1.
	GC/MS	625 [5], 1625B	6410 B-2000.		

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
	HPLC	605.			
8. Benzo(a)anthracene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
9. Benzo(a)pyrene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
10. Benzo(b)fluoranthene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
11. Benzo(g,h,i)perylene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
12. Benzo(k)fluoranthene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
13. Benzyl chloride	GC				See footnote [3], p. 130.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
	GC/MS				See footnote [6], p. S102.
14. Butyl benzyl phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
15. bis(2-Chloroethoxy) methane	GC	611.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
16. bis(2-Chloroethyl) ether	GC	611.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
17. bis(2-Ethylhexyl) phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
18. Bromodichloromethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
19. Bromoform	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
20. Bromomethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
21. 4-Bromophenyl phenyl ether	GC	611.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
22. Carbon tetrachloride	GC	601	6200 C-1997		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
23. 4-Chloro-3-methyl phenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000.		See footnote [9], p. 27.
24. Chlorobenzene	GC	601, 602	6200 C-1997		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
25. Chloroethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
26. 2-Chloroethylvinyl ether	GC	601.			
	GC/MS	624, 1624B.			
27. Chloroform	GC	601	6200 C-1997		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
28. Chloromethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
29. 2-Chloronaphthalene	GC	612.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
30. 2-Chlorophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
31. 4-Chlorophenyl phenyl ether	GC	611.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
32. Chrysene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
33. Dibenzo(a,h)anthracene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
34. Dibromochloromethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
35. 1,2-Dichlorobenzene	GC	601, 602	6200 C-1997.		
	GC/MS	624, 1625B	6200 B-1997		See footnote [9], p. 27.
36. 1,3-Dichlorobenzene	GC	601, 602	6200 C-1997.		
	GC/MS	624, 1625B	6200 B-1997		See footnote [9], p. 27.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
37. 1,4-Dichlorobenzene	GC	601, 602	6200 C-1997.		
	GC/MS	624, 1625B	6200 B-1997		See footnote [9], p. 27.
38. 3,3'-Dichlorobenzidine	GC/MS	625, 1625B	6410 B-2000.		
	HPLC	605.			
39. Dichlorodifluoromethane	GC	601.			
	GC/MS		6200 C-1997.		
40. 1,1-Dichloroethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
41. 1,2-Dichloroethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
42. 1,1-Dichloroethene	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
43. trans-1,2-Dichloroethene	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
44. 2,4-Dichlorophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
45. 1,2-Dichloropropane	GC	601	6200 C-1997.		

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
	GC/MS	624, 1624B	6200 B-1997.		
46. cis-1,3-Dichloropropene	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
47. trans-1,3-Dichloropropene	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
48. Diethyl phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
49. 2,4-Dimethylphenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
50. Dimethyl phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
51. Di-n-butyl phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
52. Di-n-octyl phthalate	GC	606.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
53. 2, 4-Dinitrophenol	GC	604	6420 B-2000		See footnote [9], p. 27.
	GC/MS	625,	6410 B-		

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
		1625B	2000.		
54. 2,4-Dinitrotoluene	GC	609.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
55. 2,6-Dinitrotoluene	GC	609.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
56. Epichlorohydrin	GC				See footnote [3], p. 130.
	GC/MS				See footnote [6], p. S102.
57. Ethylbenzene	GC	602	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
58. Fluoranthene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
59. Fluorene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
60. 1,2,3,4,6,7,8-Heptachloro-dibenzofuran	GC/MS	1613B.			
61. 1,2,3,4,7,8,9-Heptachloro-dibenzofuran	GC/MS	1613B.			

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
62. 1,2,3,4,6,7,8- Heptachloro-dibenzo-p-dioxin	GC/MS	1613B.			
63. Hexachlorobenzene	GC	612.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
64. Hexachlorobutadiene	GC	612.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
65. Hexachlorocyclopentadiene	GC	612.			
	GC/MS	625 [5], 1625B	6410 B-2000		See footnote [9], p. 27.
66. 1,2,3,4,7,8-Hexachloro-dibenzofuran	GC/MS	1613B.			
67. 1,2,3,6,7,8-Hexachloro-dibenzofuran	GC/MS	1613B.			
68. 1,2,3,7,8,9-Hexachloro-dibenzofuran	GC/MS	1613B.			
69. 2,3,4,6,7,8-Hexachloro-dibenzofuran	GC/MS	1613B.			
70. 1,2,3,4,7,8-Hexachloro-dibenzo-p-dioxin	GC/MS	1613B.			
71. 1,2,3,6,7,8-Hexachloro-dibenzo-p-dioxin	GC/MS	1613B.			
72. 1,2,3,7,8,9-Hexachloro-dibenzo-p-dioxin	GC/MS	1613B.			
73. Hexachloroethane	GC	612.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
74. Indeno(1,2,3-c,d) pyrene	GC	610.			
	GC/MS	625,	6410 B-		See

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
		1625B	2000		footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
75. Isophorone	GC	609.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
76. Methylene chloride	GC	601	6200 C-1997.		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
77. 2-Methyl-4,6-dinitrophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000.		See footnote [9], p. 27.
78. Naphthalene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000.		See footnote [9], p. 27
	HPLC	610	6440 B-2000.		
79. Nitrobenzene	GC	609.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC			D4657-92 (98).	
80. 2-Nitrophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
81. 4-Nitrophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
82. N-Nitrosodimethylamine	GC	607.			
	GC/MS	625 [5], 1625B	6410 B-2000		See footnote [9], p. 27.
83. N-Nitrosodi-n-propylamine	GC	607.			
	GC/MS	625 [5], 1625B	6410 B-2000		See footnote [9], p. 27.
84. N-Nitrosodiphenylamine	GC	607.			
	GC/MS	625 [5], 1625B	6410 B-2000		See footnote [9], p. 27.
85. Octachlorodibenzofuran	GC/MS	1613B.[10]			
86. Octachlorodibenzo-p-dioxin	GC/MS	1613B.[10]			
87. 2,2'-Oxybis(2-chloro-propane) [also known as bis(2-Chloroisopropyl) ether]	GC	611.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
88. PCB-1016	GC	608			See footnote [3], p. 43; See footnote. [8]
	GC/MS	625	6410 B-2000.		
89. PCB-1221	GC	608			See footnote [3], p. 43; See footnote. [8]

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
	GC/MS	625	6410 B-2000.		
90. PCB-1232	GC	608			See footnote [3], p. 43; See footnote. [8]
	GC/MS	625	6410 B-2000.		
91. PCB-1242	GC	608			See footnote [3], p. 43; See footnote. [8]
	GC/MS	625	6410 B-2000.		
92. PCB-1248	GC	608.			
	GC/MS	625	6410 B-2000.		
93. PCB-1254	GC	608			See footnote [3], p. 43; See footnote. [8]
	GC/MS	625	6410 B-2000.		
94. PCB-1260	GC	608			See footnote [3], p. 43; See footnote. [8]
	GC/MS	625	6410 B-2000.		
95. 1,2,3,7,8-Pentachloro-dibenzofuran	GC/MS	1613B.			
96. 2,3,4,7,8-Pentachloro-dibenzofuran	GC/MS	1613B.			
97. 1,2,3,7,8,-Pentachloro-dibenzo-p-dioxin	GC/MS	1613B.			
98. Pentachlorophenol	GC	604	6420 B-		See

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
			2000		footnote [3], p. 140.
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
99. Phenanthrene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
100. Phenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
101. Pyrene	GC	610.			
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
	HPLC	610	6440 B-2000	D4657-92 (98).	
102. 2,3,7,8-Tetrachloro-dibenzofuran	GC/MS	1613B.[10]			
103. 2,3,7,8-Tetrachloro-dibenzo-p-dioxin	GC/MS	613, 625 [5a], 1613B			
104. 1,1,2,2-Tetrachloroethane	GC	601	6200 C-1997		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
105. Tetrachloroethene	GC	601	6200 C-1997		See footnote [3], p. 130.

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
	GC/MS	624, 1624B	6200 B-1997.		
106. Toluene	GC	602	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
107. 1,2,4-Trichlorobenzene	GC	612			See footnote [3], p. 130.
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
108. 1,1,1-Trichloroethane	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
109. 1,1,2-Trichloroethane	GC	601	6200 C-1997.		See footnote [3], p. 130.
	GC/MS	624, 1624B	6200 B-1997.		
110. Trichloroethene	GC	601	6200 C-1997.		
	GC/MS	624, 1624B	6200 B-1997.		
111. Trichlorofluoromethane	GC	601	6200 C-1997.		
	GC/MS	624	6200 B-1997.		
112. 2,4,6-Trichlorophenol	GC	604	6420 B-2000.		
	GC/MS	625, 1625B	6410 B-2000		See footnote [9], p. 27.
113. Vinyl chloride	GC	601	6200 C-		

Parameter [1]	Method	EPA [2,7]	Standard methods	ASTM	Other
			1997.		
	GC/MS	624, 1624B	6200 B-1997.		
114. Nonylphenol	GC/MS			D7065-06.	
115. Bisphenol A (BPA)	GC/MS			D7065-06.	
116. p-tert-Octylphenol (OP)	GC/MS			D7065-06.	
117. Nonylphenol Monoethoxylate (NP1EO)	GC/MS			D7065-06.	
118. Nonylphenol Diethoxylate (NP2EO)	GC/MS			D7065-06.	
119. Adsorbable Organic Halides (AOX)	Adsorption and Coulometric Titration	1650.[11]			
120. Chlorinated Phenolics	In Situ Acetylation and GC/MS	1653.[11]			

Table IC notes:

[1] All parameters are expressed in micrograms per liter (µg/L) except for Method 1613B, in which the parameters are expressed in picograms per liter (pg/L).

[2] The full text of Methods 601-613, 624, 625, 1613B, 1624B, and 1625B are provided at Appendix A, Test Procedures for Analysis of Organic Pollutants, of this Part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B, Definition and Procedure for the Determination of the Method Detection Limit, of this Part 136.

[3] Methods for Benzidine: Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater. September 1978. U.S. EPA.

[4] Method 624 may be used for quantitative determination of acrolein and acrylonitrile, provided that the laboratory has documentation to substantiate the ability to detect and quantify these analytes at levels necessary to comply with any associated regulations. In addition, the use of sample introduction techniques other than simple purge-and-trap may be required. QC acceptance criteria from Method 603 should be used when analyzing samples for acrolein and acrylonitrile in the absence of such criteria in Method 624.

[5] Method 625 may be extended to include benzidine, hexachlorocyclopentadiene, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, and N-nitrosodiphenylamine. However, when they are known to be present, Methods 605, 607, and 612, or Method 1625B, are preferred methods for these compounds.

[5a] Method 625, screening only.

[6] Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency, Supplement to the 15th Edition of *Standard Methods for the Examination of Water and Wastewater.* 1981. American Public Health Association (APHA).

[7] Each analyst must make an initial, one-time demonstration of their ability to generate acceptable precision and accuracy with Methods 601-603, 624, 625, 1624B, and 1625B in accordance with procedures each in Section 8.2 of each of these Methods. Additionally, each laboratory, on an on-going basis must spike and analyze 10% (5% for Methods 624 and 625 and 100% for methods 1624B and 1625B) of all samples to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect. The results should be reported, but cannot be used to demonstrate regulatory compliance. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other methods cited.

[8] Organochlorine Pesticides and PCBs in Wastewater Using Empore™ Disk. Revised October 28, 1994. 3M Corporation.

[9] Method O-3116-87 is in Open File Report 93-125, Methods of Analysis by U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments. 1993. USGS.

[10] Analysts may use Fluid Management Systems, Inc. Power-Prep system in place of manual cleanup provided the analyst meets the requirements of Method 1613B (as specified in Section 9 of the method) and permitting authorities. Method 1613, Revision B, Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS. Revision B, 1994. U.S. EPA. The full text of this method is provided in Appendix A to 40 CFR Part 136 and at *http://water.epa.gov/scitech/methods/cwa/index.cfm*

[11] Method 1650, Adsorbable Organic Halides by Adsorption and Coulometric Titration. Revision C, 1997. U.S. EPA. Method 1653, Chlorinated Phenolics in Wastewater by In Situ Acetylation and GCMS. Revision A, 1997. U.S. EPA. The full text for both of these methods is provided at Appendix A in Part 430, The Pulp, Paper, and Paperboard Point Source Category.

TABLE ID—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES [1]

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
1. Aldrin	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96 (02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
2. Ametryn	GC	507, 619			See footnote [3], p. 83; See footnote [9], O-3106-93; See footnote [6], p. S68.
	GC/MS	525.2			See footnote [14], O-1121-91.
3. Aminocarb	TLC				See footnote [3], p. 94; See footnote [6], p. S60.
	HPLC	632.			
4. Atraton	GC	619			See footnote [3], p. 83; See footnote [6], p. S68.
5. Atrazine	GC	507, 619			See footnote [3], p. 83; See footnote [6], p. S68; See footnote [9], O-3106-93.
	HPLC/MS				See footnote [12], O-2060-01.
	GC/MS	525.1, 525.2			See footnote [11], O-1126-95.
6. Azinphos methyl	GC	614, 622, 1657			See footnote [3], p. 25; See footnote [6], p. S51.
	GC-MS				See footnote [11], O-1126-95.
7. Barban	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
8. α-BHC	GC	608, 617	6630 B-2000 & C-	D3086-90, D5812-	See footnote [3], p. 7; See footnote [8],

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
			2000	96(02)	3M0222.
	GC/MS	625 [5]	6410 B-2000		See footnote [11], O-1126-95.
9. β-BHC	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
10. δ-BHC	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
11. γ-BHC (Lindane)	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	625 [5]	6410 B-2000		See footnote [11], O-1126-95.
12. Captan	GC	617	6630 B-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7.
13. Carbaryl	TLC				See footnote [3], p. 94, See footnote [6], p. S60.
	HPLC	531.1, 632.			
	HPLC/MS	553			See footnote [12], O-2060-01.
	GC/MS				See footnote [11], O-1126-95.
14. Carbophenothion	GC	617	6630 B-2000		See footnote [4], page 27; See footnote [6], p. S73.
15. Chlordane	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
	GC/MS	625	6410 B-2000.		
16. Chloropropham	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
17. 2,4-D	GC	615	6640 B-2001		See footnote [3], p. 115; See footnote [4], O-3105-83.
	HPLC/MS				See footnote [12], O-2060-01.
18. 4,4'-DDD	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3105-83; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
19. 4,4'-DDE	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000		See footnote [11], O-1126-95.
20. 4,4'-DDT	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
21. Demeton-O	GC	614, 622			See footnote [3], p. 25; See footnote [6], p. S51.
22. Demeton-S	GC	614, 622			See footnote [3], p. 25; See footnote [6], p. S51.
23. Diazinon	GC	507, 614, 622, 1657			See footnote [3], p. 25; See footnote [4], O-3104-83; See footnote [6], p. S51.

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
	GC/MS	525.2			See footnote [11], O-1126-95.
24. Dicamba	GC	615			See footnote [3], p. 115.
	HPLC/MS				See footnote [12], O-2060-01.
25. Dichlofenthion	GC	622.1			See footnote [4], page 27; See footnote [6], p. S73.
26. Dichloran	GC	608.2, 617	6630 B-2000		See footnote [3], p. 7;
27. Dicofol	GC	617			See footnote [4], O-3104-83.
28. Dieldrin	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000		See footnote [11], O-1126-95.
29. Dioxathion	GC	614.1, 1657			See footnote [4], page 27; See footnote [6], p. S73.
30. Disulfoton	GC	507, 614, 622, 1657			See footnote [3], p. 25; See footnote [6]p. S51.
	GC/MS	525.2			See footnote [11], O-1126-95.
31. Diuron	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS	553			See footnote [12], O-2060-01.
32. Endosulfan I	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M022).
	GC/MS	625 [5]	6410 B-		See footnote [13], O-

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
			2000		2002-01.
33. Endosulfan II	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [8], 3M0222.
	GC/MS	625 [5]	6410 B-2000		See footnote [13], O-2002-01.
34. Endosulfan Sulfate	GC	608, 617	6630 C-2000		See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000		
35. Endrin	GC	505, 508, 608, 617, 1656	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	525.1, 525.2, 625 [5]	6410 B-2000.		
36. Endrin aldehyde	GC	608, 617	6630 C-2000		See footnote [8], 3M0222.
	GC/MS	625.			
37. Ethion	GC	614, 614.1,1657			See footnote [4], page 27; See footnote [6], p. S73.
	GC/MS				See footnote [13], O-2002-01.
38. Fenuron	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS				See footnote [12], O-2060-01.
39. Fenuron-TCA	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
40. Heptachlor	GC	505, 508, 608, 617, 1656	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8],

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
					3M0222.
	GC/MS	525.1, 525.2, 625	6410 B-2000.		
41. Heptachlor epoxide	GC	608, 617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [6], p. S73; See footnote [8], 3M0222.
	GC/MS	625	6410 B-2000.		
42. Isodrin	GC	617	6630 B-2000 & C-2000		See footnote [4], O-3104-83; See footnote [6], p. S73.
43. Linuron	GC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS	553			See footnote [12], O-2060-01.
	GC/MS				See footnote [11], O-1126-95.
44. Malathion	GC	614, 1657	6630 B-2000		See footnote [3], p. 25; See footnote [6], p. S51.
	GC/MS				See footnote [11], O-1126-95.
45. Methiocarb	TLC				See footnote [3], p. 94; See footnote [6], p. S60.
	HPLC	632.			
	HPLC/MS				See footnote [12], O-2060-01.
46. Methoxychlor	GC	505, 508, 608.2, 617, 1656	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83; See footnote [8], 3M0222.
	GC/MS	525.1, 525.2			See footnote [11], O-1126-95.

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
47. Mexacarbate	TLC				See footnote [3], p. 94; See footnote [6], p.S60.
	HPLC	632.			
48. Mirex	GC	617	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [4], O-3104-83.
49. Monuron	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
50. Monuron-TCA	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
51. Neburon	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS				See footnote [12], O-2060-01.
52. Parathion methyl	GC	614, 622, 1657	6630 B-2000		See footnote [4], page 27; See footnote [3], p. 25.
	GC/MS				See footnote [11], O-1126-95.
53. Parathion ethyl	GC	614	6630 B-2000		See footnote [4], page 27; See footnote [3], p. 25.
	GC/MS				See footnote [11], O-1126-95.
54. PCNB	GC	608.1, 617	6630 B-2000 & C-2000	D3086-90,D5812-96(02)	See footnote [3], p. 7.
55. Perthane	GC	617		D3086-90, D5812-96(02)	See footnote [4], O-3104-83.
56. Prometon	GC	507, 619			See footnote [3], p. 83; See footnote [6], p. S68;

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
					See footnote [9], O-3106-93.
	GC/MS	525.2			See footnote [11], O-1126-95.
57. Prometryn	GC	507, 619			See footnote [3], p. 83; See footnote [6], p. S68; See footnote [9],O-3106-93.
	GC/MS	525.1, 525.2			See footnote [13], O-2002-01.
58. Propazine	GC	507, 619, 1656			See footnote [3], p. 83; See footnote [6], p. S68; See footnote [9], O-3106-93.
	GC/MS	525.1, 525.2.			
59. Propham	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS				See footnote [12], O-2060-01.
60. Propoxur	TLC				See footnote [3], p. 94; See footnote [6], p. S60.
	HPLC	632.			
61. Secbumeton	TLC				See footnote [3], p. 83; See footnote [6], p. S68.
	GC	619.			
62. Siduron	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
	HPLC/MS				See footnote [12], O-2060-01.
63. Simazine	GC	505, 507, 619, 1656			See footnote [3], p. 83; See footnote [6], p. S68; See footnote [9], O-3106-93.

Parameter	Method	EPA [2,7,10]	Standard methods	ASTM	Other
	GC/MS	525.1, 525.2			See footnote [11], O-1126-95.
64. Strobane	GC	617	6630 B-2000 & C-2000		See footnote [3], p. 7.
65. Swep	TLC				See footnote [3], p. 104; See footnote [6], p. S64.
	HPLC	632.			
66. 2,4,5-T	GC	615	6640 B-2001		See footnote [3], p. 115; See footnote [4], O-3105-83.
67. 2,4,5-TP (Silvex)	GC	615	6640 B-2001		See footnote [3], p. 115; See footnote [4], O-3105-83.
68. Terbuthylazine	GC	619, 1656			See footnote [3], p. 83; See footnote [6], p. S68.
	GC/MS				See footnote [13], O-2002-01.
69. Toxaphene	GC	505, 508, 608, 617, 1656	6630 B-2000 & C-2000	D3086-90, D5812-96(02)	See footnote [3], p. 7; See footnote [8]; See footnote [4], O-3105-83.
	GC/MS	525.1, 525.2, 625	6410 B-2000.		
70. Trifluralin	GC	508, 617, 627, 1656	6630 B-2000		See footnote [3], p. 7; See footnote [9], O-3106-93.
	GC/MS	525.2			See footnote [11], O-1126-95.

Table ID notes:

[1] Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table IC, where entries are listed by chemical name.

[2] The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B, Definition and Procedure for the Determination of the Method Detection Limit, of this Part 136.

[3] Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater. September 1978. U.S. EPA. This EPA publication includes thin-layer chromatography (TLC) methods.

[4] Methods for the Determination of Organic Substances in Water and Fluvial Sediments, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3. 1987. USGS.

[5] The method may be extended to include α-BHC, γ-BHC, endosulfan I, endosulfan II, and endrin. However, when they are known to exist, Method 608 is the preferred method.

[6] Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency, Supplement to the 15th Edition of*Standard Methods for the Examination of Water and Wastewater.*1981. American Public Health Association (APHA).

[7] Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 608 and 625 in accordance with procedures given in Section 8.2 of each of these methods. Additionally, each laboratory, on an on-going basis, must spike and analyze 10% of all samples analyzed with Method 608 or 5% of all samples analyzed with Method 625 to monitor and evaluate laboratory data quality in accordance with Sections 8.3 and 8.4 of these methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect. The results should be reported, but cannot be used to demonstrate regulatory compliance. These quality control requirements also apply to the Standard Methods, ASTM Methods, and other methods cited.

[8] Organochlorine Pesticides and PCBs in Wastewater Using Empore ™Disk. Revised October 28, 1994. 3M Corporation.

[9] Method O-3106-93 is in Open File Report 94-37, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Triazine and Other Nitrogen-Containing Compounds by Gas Chromatography With Nitrogen Phosphorus Detectors. 1994. USGS.

[10] EPA Methods 608.1, 608.2, 614, 614.1, 615, 617, 619, 622, 622.1, 627, and 632 are found in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, EPA 821-R-92-002, April 1992, U.S. EPA. The full text of Methods 608 and 625 are provided at Appendix A, Test Procedures for Analysis of Organic Pollutants, of this Part 136. EPA Methods 505, 507, 508, 525.1, 531.1 and 553 are in Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume II, EPA 821-R-93-010B, 1993, U.S. EPA. EPA Method 525.2 is in Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry, Revision 2.0, 1995, U.S. EPA. EPA methods 1656 and 1657 are in Methods For The Determination of Nonconventional Pesticides In Municipal and Industrial Wastewater, Volume I, EPA 821-R-93-010A, 1993, U.S. EPA.

[11] Method O-1126-95 is in Open-File Report 95-181, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of pesticides in water by C-18 solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected-ion monitoring. 1995. USGS.

[12] Method O-2060-01 is in Water-Resources Investigations Report 01-4134, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Pesticides in Water by Graphitized Carbon-Based Solid-Phase Extraction and High-Performance Liquid Chromatography/Mass Spectrometry. 2001. USGS.

[13] Method O-2002-01 is in Water-Resources Investigations Report 01-4098, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of moderate-use pesticides in water by C-18 solid-phase extraction and capillary-column gas chromatography/mass spectrometry. 2001. USGS.

[14] Method O-1121-91 is in Open-File Report 91-519, Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of organonitrogen herbicides in water by solid-phase extraction and capillary-column gas chromatography/mass spectrometry with selected-ion monitoring. 1992. USGS.

TABLE IE—LIST OF APPROVED RADIOLOGIC TEST PROCEDURES

Parameter and units	Method	Reference (method number or page)				
		EPA [1]	Standard Methods 18th, 19th, 20th Ed.	Standard Methods Online	ASTM	USGS [2]
1. Alpha-Total, pCi per liter	Proportional or scintillation counter	900.0	7110 B	7110 B-00	D1943-90, 96	pp. 75 and 78 [3]
2. Alpha-Counting error, pCi per liter	Proportional or scintillation counter	Appendix B	7110 B	7110 B-00	D1943-90, 96	p. 79
3. Beta-Total, pCi per liter	Proportional counter	900.0	7110 B	7110 B-00	D1890-90, 96	pp. 75 and 78 [3]
4. Beta-Counting error, pCi	Proportional counter	Appendix B	7110 B	7110 B-00	D1890-90, 96	p. 79
5. (a) Radium Total pCi per liter (b) Ra, pCi per liter	Proportional counter	903.0	7500-Ra B	7500-Ra B-01	D2460-90, 97	
	Scintillation counter	903.1	7500-Ra C	7500-Ra C-01	D3454-91, 97	p. 81

[1] Prescribed Procedures for Measurement of Radioactivity in Drinking Water, EPA-600/4-80-032 (1980), U.S. Environmental Protection Agency, August 1980.

[2] Fishman, M. J. and Brown, Eugene, “Selected Methods of the U.S. Geological Survey of Analysis of Wastewaters,” U.S. Geological Survey, Open-File Report 76-177 (1976).

[3] The method found on p. 75 measures only the dissolved portion while the method on p. 78 measures only the suspended portion. Therefore, the two results must be added to obtain the “total.”

TABLE IF—LIST OF APPROVED METHODS FOR PHARMACEUTICAL POLLUTANTS

Pharmaceuticals pollutants	CAS registry No.	Analytical method number
acetonitrile	75-05-8	1666/1671/D3371/D3695.
n-amyl acetate	628-63-7	1666/D3695.
n-amyl alcohol	71-41-0	1666/D3695
benzene	71-43-2	D4763/D3695/502.2/524.2.
n-butyl-acetate	123-86-4	1666/D3695.
tert-butyl alcohol	75-65-0	1666.
chlorobenzene	108-90-7	502.2/524.2.
chloroform	67-66-3	502.2/524.2/551.
o-dichlorobenzene	95-50-1	1625C/502.2/524.2.
1,2-dichloroethane	107-06-2	D3695/502.2/524.2.
diethylamine	109-89-7	1666/1671.
dimethyl sulfoxide	67-68-5	1666/1671.
ethanol	64-17-5	1666/1671/D3695.
ethyl acetate	141-78-6	1666/D3695.
n-heptane	142-82-5	1666/D3695.
n-hexane	110-54-3	1666/D3695.
isobutyraldehyde	78-84-2	1666/1667.
isopropanol	67-63-0	1666/D3695.
isopropyl acetate	108-21-4	1666/D3695.
isopropyl ether	108-20-3	1666/D3695.
methanol	67-56-1	1666/1671/D3695.
Methyl Cellosolve Δ	109-86-4	1666/1671
methylene chloride	75-09-2	502.2/524.2
methyl formate	107-31-3	1666.
4-methyl-2-pentanone (MIBK)	108-10-1	1624C/1666/D3695/D4763/524.2.
phenol	108-95-2	D4763.
n-propanol	71-23-8	1666/1671/D3695.
2-propanone (acetone)	67-64-1	D3695/D4763/524.2.

Pharmaceuticals pollutants	CAS registry No.	Analytical method number
tetrahydrofuran	109-99-9	1666/524.2.
toluene	108-88-3	D3695/D4763/502.2/524.2.
triethlyamine	121-44-8	1666/1671.
xylenes	(Note 1)	1624C/1666.

Table 1F note:

1. 1624C: m-xylene 108-38-3, o,p-xylene E-14095 (Not a CAS number; this is the number provided in the Environmental Monitoring Methods Index (EMMI) database.); 1666: m,p-xylene 136777-61-2, o-xylene 95-47-6.

City of Phoenix

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