

**CITY OF PHOENIX
INDUSTRIAL PRETREATMENT
COMPLIANCE ACADEMY**

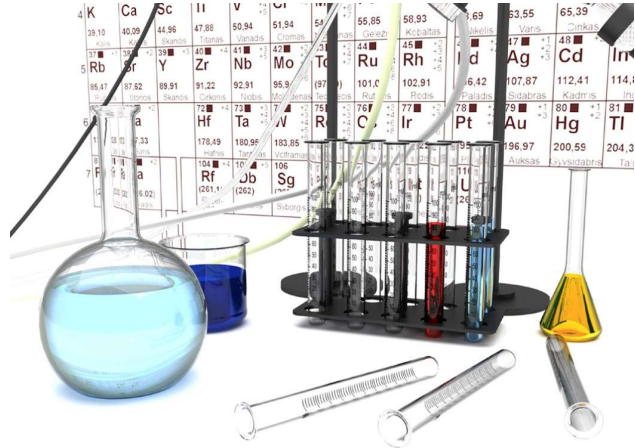


Laboratory Analytical Issues

Welcome to
The City of Phoenix
Industrial Pretreatment Program
2026 Compliance Academy



**Laboratory
Analytical
Issues**



Laboratory Analytical Issues

- Tony Genco
 - Chemist III - Quality Assurance
- Kyle Smith
 - Environmental Quality Specialist, Pretreatment
- Tyler Swayne
 - Senior Water Quality Inspector

Pretreatment Group:

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Vacant - (EQS)

IPP Section:

Ayodele Agunbiade– (WQI), 602-534-2082, ayodele.agunbiade@phoenix.gov

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Pretreatment Compliance Coordinator - PCC

Environmental Services Supervisor/Chief Water Quality Inspector – ESS/CWQI

Environmental Quality Specialist - EQS

Water Services Projects Planner - WSPP

(Senior) Water Quality Inspector – (S)WQI



Join us for the next class:

Enforcement

Wednesday, July 22, 2026

WebEx – Webinar & In-Person

9:00 a.m. - 11:00 a.m.

Request class registration using our website:

www.phoenix.gov/IPPCompAcademy

Chelsey Mc Cluskey is the enrollment officer

2026 Compliance Academy Schedule

<u>Class Name</u>	<u>Date</u>
Wastewater Discharge Permit	January 20
Wastewater Compliance Sampling	March 25
Laboratory Analytical Issues	May 21
Enforcement	July 22
Pollution Prevention (P2)	September 22
Stormwater Compliance Overview	November 17



INDUSTRIAL PRETREATMENT COMPLIANCE ACADEMY

2026 CLASS SCHEDULE*

**Class enrollment opens approximately one month before the scheduled date. Because class dates are tentative and subject to change without notice please do not attempt to enroll in any class outside of the enrollment period.*

The Compliance Academy is a free, voluntary program designed for the staff of Phoenix's Class A, B and C Permitted Industrial Users. Contractors and government employees may attend based on space availability. No one will be admitted to a class without receiving prior confirmation of enrollment. Confirmation of enrollment is usually completed within one week of the online enrollment request and will include log-in information for WebEx for those attending virtually.

Based on ongoing feedback, we are continuing to host the Compliance Academy in a hybrid format both virtually through WebEx and in-person and will provide each course presentation and materials via our website:

phoenix.gov/IPPCompAcademy. To attend a Compliance Academy class in-person requires obtaining access to the 23rd Avenue Wastewater Treatment Plant: **A U.S.**

Government issued photo I.D., (such as a driver's license) or a Passport must be shown at the entrance gate. PHOTOGRAPHS WILL NOT BE PERMITTED.

Please Remember: In order to receive credit for this training, attendance verification is required. Attendance confirmation will be verified at the beginning of this training session. If you log in or arrive late, please announce your attendance via the chat option or sign-in on the sheet. Attendance later than 30 minutes after beginning of training will not receive credit.

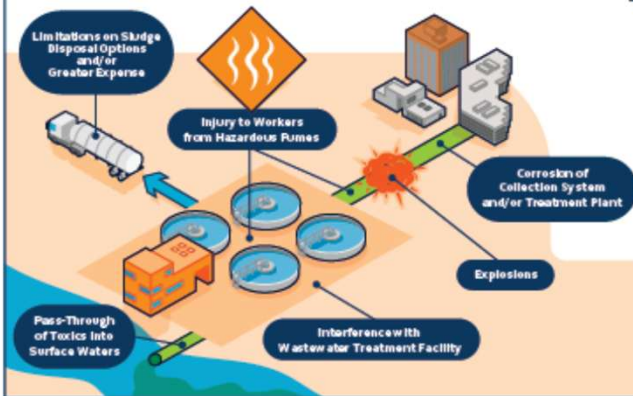
2026 COMPLIANCE ACADEMY

Class Name	Date	Time	Enrollment Period
Wastewater Discharge Permit	January 20	9 – 11 a.m.	Dec 23 – Jan 20
Wastewater Compliance Sampling	March 25	9 – 11 a.m.	Feb 25 – Mar 25
Laboratory Analytical Issues	May 21	8 – 11 a.m.	April 23 – May 21
Enforcement	July 22	9 – 11 a.m.	June 24 – July 22
Pollution Prevention (P2)	September 22	9 – 11 a.m.	Aug 25 – Sept 22
Stormwater Compliance Overview	November 17	9 – 11 a.m.	Oct 20 – Nov 17

For enrollment status information or confirmations, please contact Pretreatment Compliance Coordinator - Chelsey Mc Cluskey (Weaver) by phone at (602) 495-5926 or by email at chelsey.mccluskey@phoenix.gov.

LEARN MORE AND REGISTER BY VISITING:

phoenix.gov/IPPCompAcademy



CITY OF PHOENIX
WATER SERVICES DEPARTMENT

QUALITY.
RELIABILITY.
VALUE.

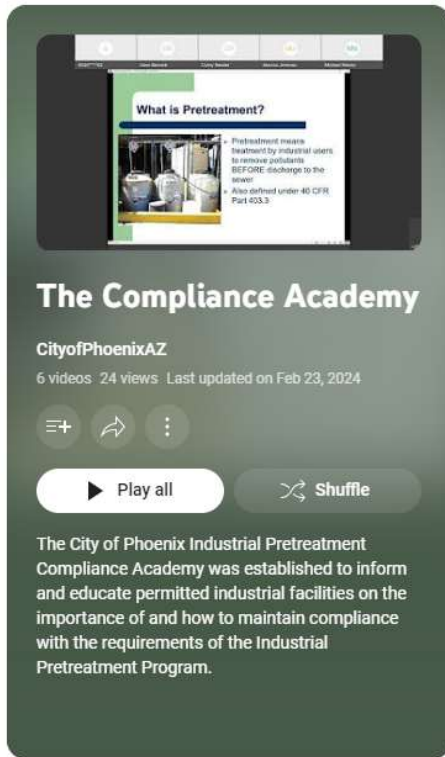
PHOENIX.GOV/WATER



/PHXWATER

Check out our 2026 Industrial Pretreatment Compliance Academy flyer!

YouTube



What is Pretreatment?

Pretreatment means treatment by industrial users to remove pollutants BEFORE discharge to the sewer.
Also defined under 40 CFR Part 403.3.







The Compliance Academy

CityofPhoenixAZ

6 videos 24 views Last updated on Feb 23, 2024

Play all Shuffle

The City of Phoenix Industrial Pretreatment Compliance Academy was established to inform and educate permitted industrial facilities on the importance of and how to maintain compliance with the requirements of the Industrial Pretreatment Program.

- 1  **Wastewater Discharge Permit**
CityofPhoenixAZ • 9 views • 4 months ago
- 2  **Wastewater Compliance Sampling**
CityofPhoenixAZ • 4 views • 4 months ago
- 3  **Lab Analytical Issues**
CityofPhoenixAZ • 5 views • 4 months ago
- 4  **Enforcement**
CityofPhoenixAZ • 1 view • 4 months ago
- 5  **Pollution Prevention (P2)**
CityofPhoenixAZ • 2 views • 4 months ago
- 6  **Stormwater Compliance Overview**
CityofPhoenixAZ • 3 views • 4 months ago

- Link to YouTube Channel:
https://www.youtube.com/playlist?list=PL22YB12L5NbRHw8rSF7O1pqfhce_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
- Blank
- Blank Spike
- Matrix
- Spiked Sample
- Matrix Spike Duplicate

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

Matrix: The type of media in which the analyte of interest is contained (e.g., wastewater, drinking water, soil)

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.

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 (new update), 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 in your booklet: Arizona Data Qualifiers, Tables from 40 CFR 136.3, Periodic Table of Elements, Glossary, Acronyms, List of Federal Point Source Categories

LABORATORY TOUR VIDEO



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.

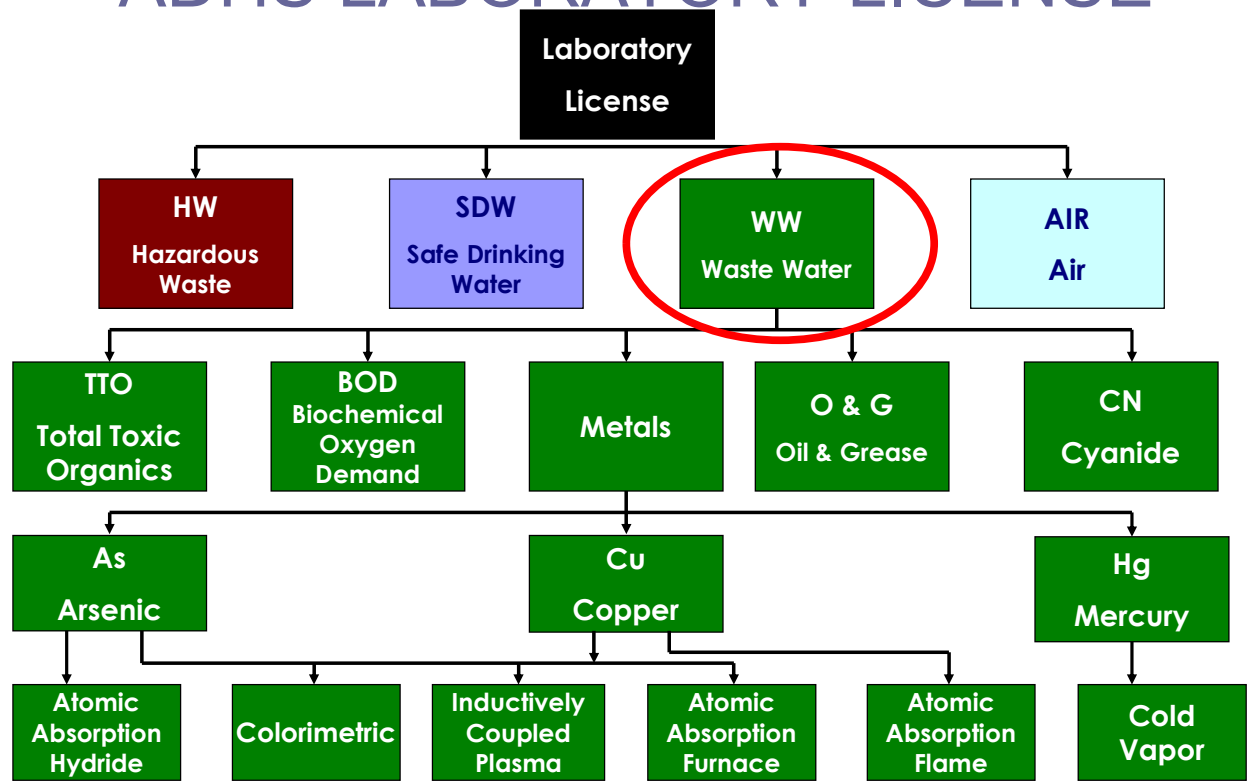


ADHS Licensed Laboratories

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:



ENVIRONMENTAL LABORATORY LICENSE

Issued to:

Laboratory Director: Britney Dempster
Owner/Representative: Ms. Berai Kimball

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: 05/05/2026 TO: 05/04/2027



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

Laboratory License is required to be renewed every year

ADHS LABORATORY LICENSE

Laboratory Methods, Instrument & Softwares

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

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
BARIIUM	EPA 200.7 (4.4)	3/6/1992 12:00:00 AM
BARIIUM	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 IV.2.0	5/26/2022 7:10:22 PM
FLUORIDE	EPA 300.0 (2.1)	4/28/2009 12:00:00 AM

4/3/2026 7:45:15 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

Parameter	EPA Method	Certified On
GIARDIA AND CRYPTOSPORIDIUM	EPA 1623	12/19/2014 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
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
ZINC	EPA 200.8 (5.4)	10/12/1999 12:00:00 AM
Total Count: 57		

4/3/2026 7:48:15 AM
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SDW - Safe Drinking Water

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

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
CADIUM	EPA 6020A	8/11/2011 12:00:00 AM
CADIUM	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
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

4/3/2026 7:48:15 AM
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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

SW		
Parameter	EPA Method	Certified On
ZINC	6010D	10/21/2016 2:13:28 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
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 5310C (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
CHLORITE	EPA 300.1 (2.1)	4/2/2026 4:37:01 PM
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

4/3/2028 7:45:15 AM
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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



Parameter	EPA Method	Certified On
WW		
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)	4/17/2005 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/MSD (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 (TDS)	SM 2540D (2011)	1/3/2006 12:00:00 AM
RESIDUE, FILTERABLE (TDS)	SM 2540C (2011)	2/28/2003 12:00:00 AM
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

4/8/2020 7:45:15 AM
Page 6 of 8

Example: Copper with analysis method and date lab became certified to run analysis

ADHS LABORATORY LICENSE

Laboratory Methods, Instrument & Softwares

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

WW

Parameter	EPA Method	Certified On
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 TRIHALOMETHANES	524.2 (4.1)	4/2/2026 4:37:01 PM
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: 71		

Instrument

Instrument	Instrument Code	Quantity	Certified On
HIGH PERFORMANCE LIQUID CHROMATOGRAPH	HPLC	1	3/19/2026 12:32:14 PM
HIGH PERFORMANCE LIQUID CHROMATOGRAPH	HPLC	1	3/19/2026 12:32:14 PM
GAS CHROMATOGRAPH	GC	3	3/19/2026 12:32:14 PM
LIQUID CHROMATOGRAPH/MASS SPEC	LC/MS	1	3/14/2025 12:25:09 PM
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	ICP/MS	-1	3/14/2025 12:25:09 PM
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

4/3/2028 7:48:15 AM
Page 6 of 8

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.

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

Laboratory Methods, Instrument & Softwares

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

Instrument	Instrument Code	Quantity	Certified On
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	1	3/24/2023 3:52:27 PM
INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETER	ICP/MS	2	4/16/1999 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: 17

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
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		4/7/2006 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

4/3/2026 7:48:15 AM
Page 7 of 8

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

Laboratory Methods, Instrument & Softwares

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

Software	Certified On
CHROMELEON (DIONEX) - IC	3/27/2025 1:21:58 PM
AGILENT/HP CHEMSTATION - GC	4/2/2026 4:37:01 PM
CHEMSTATION - HPLC	4/2/2026 4:37:01 PM
CHEMSTATION - HPLC	4/2/2026 4:37:01 PM
Aurora 1030	4/1/2024 3:56:41 PM
Total Count: 23	

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.

The screenshot shows a web browser window with the URL <http://azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home>. The browser tabs show 'ADHS - Laboratory Licensure ...', 'ADHS - Laboratory Licensur...', and 'Untitled Page'. The website header includes the Arizona Department of Health Services logo and the tagline 'Health and Wellness for All Arizonans'. A navigation menu contains 'HOME', 'AUDIENCES', 'TOPICS', 'DIVISIONS', and 'A-Z INDEX'. A search bar is labeled 'Google Custom Search'. The main heading is 'Laboratory Licensure & Certification'. Below the heading is a breadcrumb trail: 'ADHS Home / Public Health Preparedness / State Laboratory Services / Laboratory Licensure & Certification - Environmental Laboratory Licensure - Home'. A large, faint watermark of the State of Arizona seal is visible in the background.

- Home
- Clinical Laboratory Certification
- Environmental Laboratory Licensure
- Home
- Drinking Water Facility Information
- AZPDES/APP Field Testing Info
- Licensed Laboratories with Parameters
- Safe Drinking Water Commercial Lab List
- Safe Drinking Water Commercial Lab

Environmental Laboratory Licensure - Home

The rules for licensing of environmental laboratories were approved by the Governor's Regulatory Review Council on October 1, 2016, and became effective the same day. The Environmental Laboratory Licensure Program's main phone number is (602) 364-0720.

Mission Statement

To help protect the Public Health and Environment by surveying all licensed laboratories for compliance with all applicable regulations and reviewing their compliance testing data for scientific validity and defensibility.

How is this accomplished?

1. Annual on-site audits of each laboratory
2. Proficiency evaluation samples
3. Training and technical resources

Annual On-Site Audits of Each Laboratory

Feedback & Support

Research time!

Which Lab is the right choice for your facility? 🤔

1. Can you use Complete Analytical Services, LLC located in Tucson, AZ for the analysis of Copper for your compliance samples?
2. Can you use ACZ Laboratories, Inc. located in Steamboat Springs, CO for the analysis of your Copper compliance samples?
3. Can you use AGAT Laboratories located in Calgary, Alberta, Canada for the analysis of your Copper compliance samples?

NOTES:



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:

Program:

EPA Method:

Parameter / Analyte:

Lab ID

Lab Name

	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: X
Government:
Other:

Laboratory Facility Program Parameters:

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

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

Not licensed for Copper

NOTES:



Arizona Certified Laboratories Facilities

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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:

Program:

EPA Method:

Parameter / Analyte:

Lab ID

Lab Name

	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: X
 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: X
Government:
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

 Copper!

NOTES:

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 Monday, May 4, 2026 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:

Program:

EPA Method:

Parameter / Analyte:

Lab ID

Lab Name

	Lab Name	Phone	City	State
Select	AGAT Laboratories	(403) 736-5300	Calgary	AB
Select	AGAT Laboratories	(403) 735-2005	Calgary	AB
Select	Apache Junction Sewer District	(480) 941-6754	Apache Junction	AZ
Select	Arizona City Sanitary District Lab	(520) 466-5203	Arizona City	AZ
Select	Bisbee WWTP	(520) 508-3370	Bisbee	AZ
Select	Agua Fria Laboratory	(623) 445-2431	Buckeye	AZ
Select	Mohave Environmental Labs	(928) 754-8101	Bullhead City	AZ



NOTES:

	Lab Name	Phone	City	State
Select	AGAT Laboratories	(403) 736-5300	Calgary	AB
Select	AGAT Laboratories	(403) 735-2005	Calgary	AB
Select	Apache Junction Sewer District	(480) 941-6754	Apache Junction	AZ
Select	Arizona City Sanitary District Lab	(520) 466-5203	Arizona City	AZ
Select	Bisbee WWTP	(520) 508-3370	Bisbee	AZ
Select	Agua Fria Laboratory	(623) 445-2431	Buckeye	AZ
Select	Mohave Environmental Labs	(928) 754-8101	Bullhead City	AZ
Select	City of Chandler	(480) 782-3624	Chandler	AZ
Select	Radiation Safety Engineering, Inc.	(480) 897-9459	Chandler	AZ
Select	City of Douglas	(520) 417-7310	Douglas	AZ

1 2 3 4 5 6 7 8 9 10 ...

Laboratory Facility Detail:

License: AZ0843
 Name: AGAT Laboratories
 Address: 2420 42nd Avenue NE
 Calgary, AB T2E7T6
 Phone: (403) 736-5300
 Fax: (000) 000-0000
 Type
 Commercial: X
 Company:
 Government:
 Other:

Laboratory Facility Program Parameters:

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



Select WW - Wastewater

NOTES:

Laboratory Facility Detail:

License: AZ0843
Name: AGAT Laboratories
Address: 2420 42nd Avenue NE
Calgary, AB T2E7T6
Phone: (403) 736-5300
Fax: (000) 000-0000

Type

Commercial: X
Company:
Government:
Other:

Laboratory Facility Program Parameters:

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

Program	Parameter	EPA Method	Cert Date
WW	PFAS IN AQ., SOLIDS BY LC-MS/MS	EPA 1633 (Jan 2024)	12/12/2024

Not licensed for Copper

NOTES:

Laboratory Facility Detail:

License: AZ0845
 Name: AGAT Laboratories
 Address: 2910 12th Street NE
 Calgary, AB T2E7P7
 Phone: (403) 735-2005
 Fax: (000) 000-0000
 Type
 Commercial: X
 Company:
 Government:
 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	ALKALINITY, TOTAL	SM 2320B (2011)	12/11/2024
WW	BIOCHEMICAL OXYGEN DEMAND/CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND	SM 5210B (2011)	12/11/2024
WW	CARBON, TOTAL ORGANIC (TOC)	SM 5310 B (2011)	12/11/2024
WW	CHEMICAL OXYGEN DEMAND	SM 5220 D (2011)	12/11/2024
WW	CHLORIDE	SM 4110B (2011)	12/11/2024
WW	CHROMIUM(VI) HEXAVALENT	SM 3500-CR B (2011)	12/11/2024
WW	HYDROGEN ION (pH)	SM 4500-H B (2011)	12/11/2024
WW	NITRIC ACID	SM 3030E (2004)	12/11/2024
WW	ORTHOPHOSPHATE	SM 4110B (2011)	12/11/2024
WW	PHENOLS	EPA 420.4 (1.0)	12/11/2024

Program	Parameter	EPA Method	Cert Date
WW	RESIDUE NONFILTERABLE (TSS)	SM 2540D (2011)	12/11/2024
WW	RESIDUE, FILTERABLE (TDS)	SM 2540C (2011)	12/11/2024
WW	SPECIFIC CONDUCTANCE	SM 2510B (2011)	12/11/2024
WW	SULFATE	SM 4110B (2011)	12/11/2024

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Not licensed for Copper

NOTES:

Research time!

Which Lab is the right choice for your facility? 🤔

1. Can you use Complete Analytical Services, LLC located in Tucson, AZ for the analysis of Copper for your compliance samples? **NO**
2. Can you use ACZ Laboratories, Inc. located in Steamboat Springs, CO for the analysis of your Copper compliance samples? **YES**
3. Can you use AGAT Laboratories located in Calgary, Alberta, Canada for the analysis of your Copper compliance samples? **NO**

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

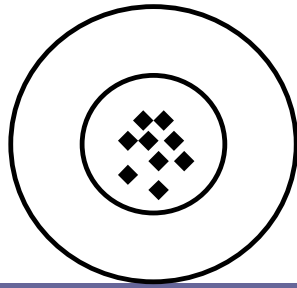
1. Standard Permit Conditions Part D (a) of your Wastewater Discharge Permit (Permit) requires the use of "Approved Laboratory Procedures." The Permit may also restrict the test method and/or require the use of a particular method approved by 40 CFR 136 (such as for Total Copper).
2. EPA specifies test 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!!

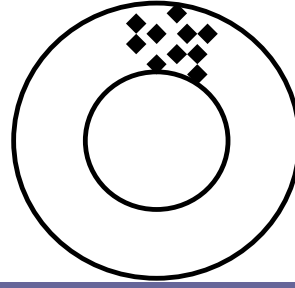
10 minutes please. Thank you!



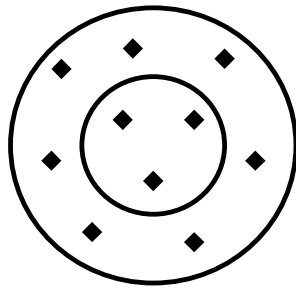
Error, Accuracy, Precision, & Bias



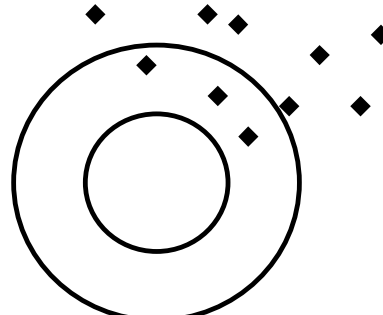
A. Accurate & Precise
(no bias; small random errors)



B. Inaccurate but Precise
(strong bias; small random errors)



C. Accurate but Imprecise
(no bias; large random errors)



D. Inaccurate & Imprecise
(strong bias; large random errors)

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

Limits & Method Procedures

- Calibration Standards
- Calibration Curves
- Sample Dilution
- Matrix Interference
- Surrogate Recovery

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.

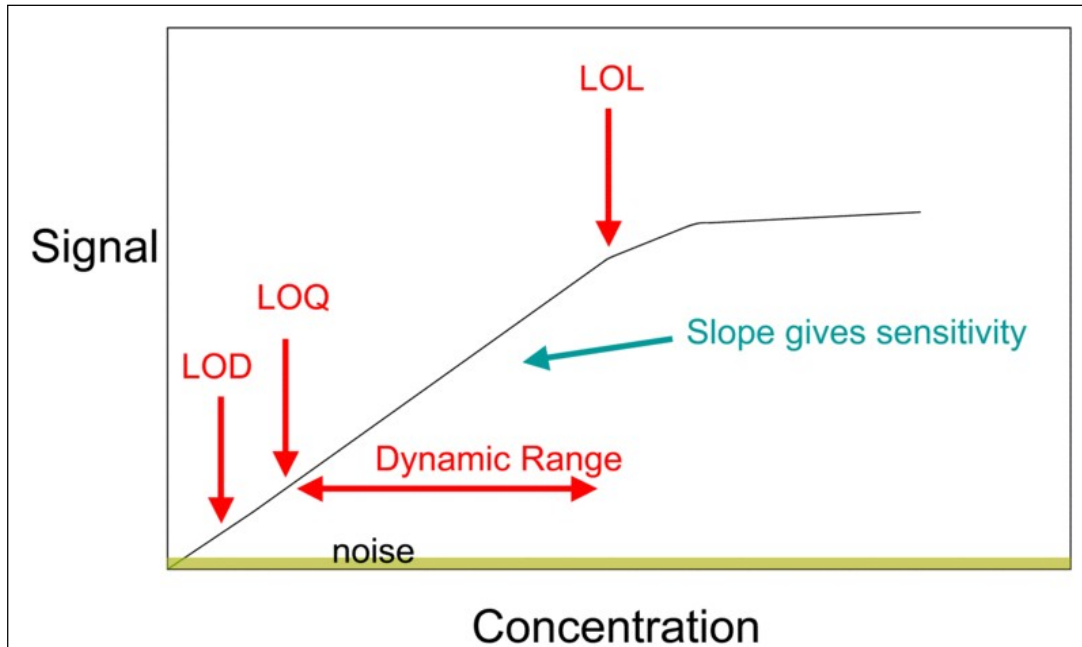
What is matrix interference?

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.

Calibration Curves



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)

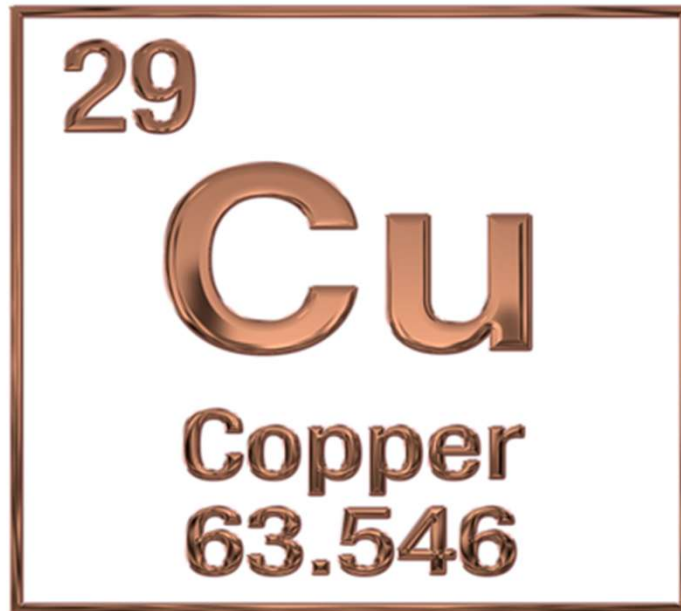
Limit of Linearity (LOL)

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

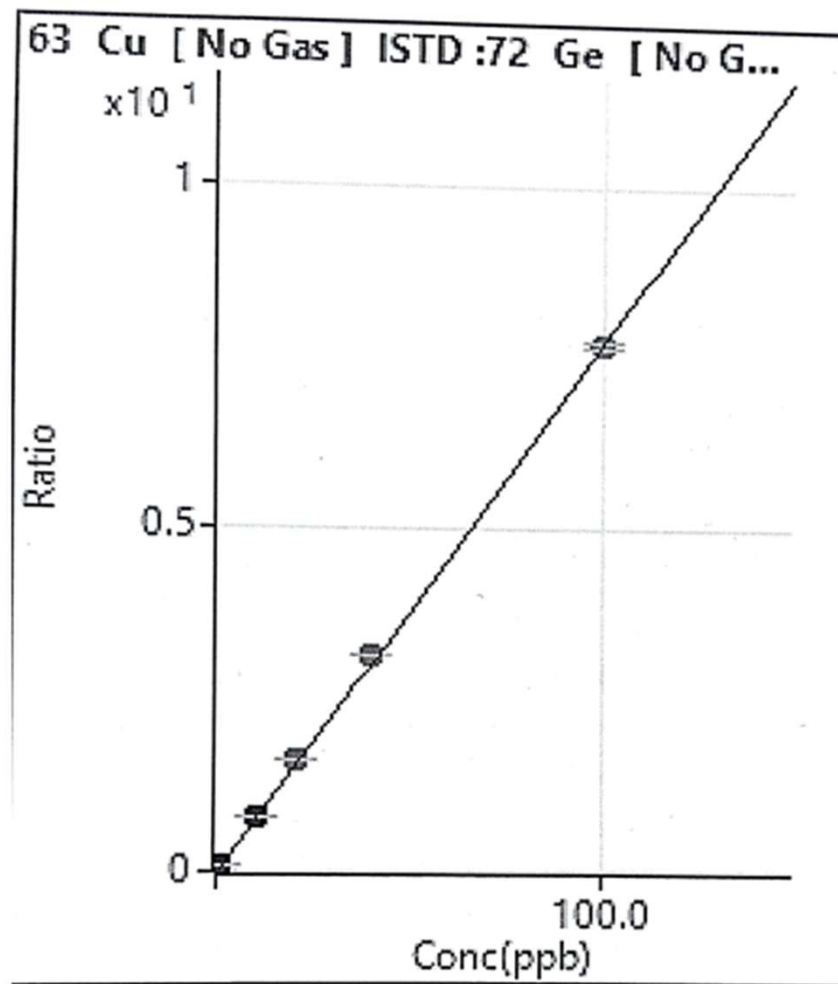
Suppose you are at an airport with lots of noise from jets taking off. If the person next to you speaks softly, you will probably not hear them. Their voice is less than the LOD. If they speak a bit louder, you may hear them but it is not possible to be certain of what they are saying and there is still 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).

Laboratory Analysis Example

Let's look at:



Calibration Curve – Copper



Quantitation Report - Metals

Total Dilution 10.0000
 Comment ---
 ISTD Ref FileName 003CALB.d
 Sample QC Pass/Fail Pass
 ISTD QC Pass/Fail Pass
 Operator WSLMETA
 L

QC Analyte Table

Name	Mass	ISTD	Tune	Raw Conc.	Units	Conc.	RSD	CPS	LDR	QC Flag
Be	9	6	No Gas	0.002	ppb	0.023	76.4	55.56	100	
V	51	72	No Gas	0.026	ppb	0.262	9.9	15639.06	100	
Cr	52	72	No Gas	0.081	ppb	0.808	3.4	49211.13	100	
Mn	55	72	No Gas	0.124	ppb	1.242	1.9	31790.22	100	
Co	59	72	No Gas	0.009	ppb	0.075	4.5	1652.38	100	
Ni	60	72	No Gas	0.325	ppb	3.252	1.4	11948.72	100	
Cu	63	72	No Gas	75.895	ppb	758.960	2.0	6717358.44	100	
Cu	65	72	No Gas	76.284	ppb	762.843	1.4	3246951.13	100	
Zn	66	72	No Gas	3.667	ppb	36.675	1.7	89851.38	100	
Zn	67	72	No Gas	3.749	ppb	37.493	1.5	13458.16	100	
Zn	68	72	No Gas	3.751	ppb	37.514	1.6	63568.87	100	
As	75	72	No Gas	0.076	ppb	0.755	4.0	1284.34	100	
Se	82	72	No Gas	0.038	ppb	0.379	7.3	-30.11	100	
Mo	97	115	No Gas	0.143	ppb	1.434	6.8	4047.39	100	
Mo	98	115	No Gas	0.145	ppb	1.447	4.6	9971.05	100	
Ag	107	115	No Gas	0	ppb	0.003	100.0	451.14	100	
Ag	109	115	No Gas	0	ppb	<0.000	N/A	401.13	100	
Cd	111	115	No Gas	-0.047	ppb	<0.000	N/A	3691.76	100	
Cd	114	115	No Gas	0.001	ppb	0.014	32.5	63.71	100	
Sb	121	115	No Gas	0.039	ppb	0.386	5.3	4009.50	100	
Sb	123	115	No Gas	0.039	ppb	0.387	1.7	3066.01	100	
Ba	135	115	No Gas	4.503	ppb	45.027	1.9	92878.64	100	
Ba	137	115	No Gas	4.449	ppb	44.485	2.4	169957.70	100	
Tl	203	209	No Gas	-0.001	ppb	<0.000	N/A	113.34	100	
Tl	205	209	No Gas	-0.001	ppb	<0.000	N/A	285.57	100	
Pb	208	209	No Gas	2.903	ppb	29.028	3.0	646242.11	100	
U	238	209	No Gas	0.047	ppb	0.468	1.8	8830.03	100	

QC ISTD Table

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 by 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 5.0 dated 08/23/2024*

BREAK TIME!!
5 minutes please. Thank you!





Examples of Lab Reports

Laboratory Reports A, B, C, and D examples are in the back of the book for reference.

The back of the booklet has examples of the different laboratory reports.

Laboratory A

[Redacted] Lic. No. [Redacted]

LABORATORY REPORT

Client: [Redacted] Date Submitted: 01/14/26
Date Reported: 01/30/26

Attn: [Redacted] Project: WW Monitoring

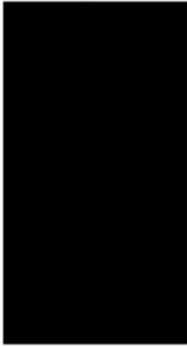
RESULTS

Parameter	Analysis Date		Method No.	Result	Unit
	Start	End			
Biochemical Oxygen Demand	01/15/26	01/20/26	SM5210 B	4090	mg/L
Arsenic, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Cadmium, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Copper, Total	01/19/26	01/19/26	200.8	0.215 *	mg/L
Lead, Total	01/19/26	01/19/26	200.8	0.003 *	mg/L
Mercury, Total	01/19/26	01/19/26	245.1	<0.0008 *	mg/L
Molybdenum, Total	01/19/26	01/19/26	200.8	0.007 *	mg/L
Selenium, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Silver, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Zinc, Total	01/19/26	01/19/26	200.8	0.333 *	mg/L
Total Suspended Solids	01/21/26	01/23/26	SM2540 D	712	mg/L

Parameter	Analysis Date		Method No.	Result	Unit
	Start	End			
Cyanide, Total	01/14/26	01/21/26	SM4500CN CE	<0.01	mg/L

* Analysis performed by [Redacted]

Reviewed by: [Redacted]



Lic. No. [Redacted]

QC Report

QC Parameter	Sample Result	Method Blank Result	QCS % Rec	Duplicate Result	Duplicate RPD	Spike Result	Spike % Rec
Batch ID: BOD-10679 QC ID: CJ00299 Samples: CJ00204							
Biochemical Oxygen Demand	<3		99	<3	0.0		
Batch ID: CN-10689 QC ID: CJ00207 Samples: CJ00205							
Cyanide, Total	<0.01		100	0.092	5.59	0.087	87.0
Batch ID: TSS-10705 QC ID: CJ00408 Samples: CJ00204							
Total Suspended Solids	10600			9900	6.83		

					LAB ID, NUMBER														
					DATE: January 14, 2026 PAGE 1 OF 1														
Sample Identification	Date	Time	Type	Lab ID	BOD/TSS	Total Metals (Cu, Pb)	Total Metals (As, Cd, Hg, Mn, Se, Ag, Zn)	Cyanide	Automated Sample Collection								Number/Containers		
Parshall Flume	14-Jan-26	10:15	FWC	CJ00204	X	X	X		X	(Metals - HNO3 pres)							2		
Parshall Flume	14-Jan-26	10:15	Grab	205				X		(Cyanide - NaOH Pres)							1		
										(BOD/TSS - None Pres)									
Project Name					Sample Receipt					RELINQUISHED BY:					RELINQUISHED BY:				
Semi/Annual WW					No. Containers: 3					Signature: [Redacted]					Time: 11:50				
Project ID					Custody Seal: [Redacted]					Printed Name: [Redacted]					Date: 1/14/2026				
Field Measurements:					Received Initial: [Redacted]					Company: [Redacted]					SAMPLED RECEIVED BY:				
Temperature: 5°C					Received Cont: [Redacted]					Signature: [Redacted]					Time: 11:50				
PRIORITY: Blue					Temperature: [Redacted]					Printed Name: [Redacted]					Date: 1-14-26				
					Company: [Redacted]					Company: [Redacted]									

Laboratory Analysis Report Total Number of Pages: 7

Job ID : 26010102

Client Project Name :
Semi Annual WW

Report To : Client Name: Attn: Client Address: City, State, Zip:	<div style="background-color: black; width: 100%; height: 40px;"></div>	P.O.#: Sample Collected By: Date Collected: 01/14/26
---	---	--

_____ has analyzed the following samples...

Client Sample ID	Matrix	
CJ00204	Waste Water	26010102.01

Released By: _____
 Title: Customer service manager
 Date: 01/21/2026

ADHS ACCREDITATION CERTIFICATE NUMBER: _____ from 07/14/2025 to 07/13/2026
 scope: - Waste Water, Solid_Drinking water

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

This report cannot be reproduced, except in full, without prior written permission of _____. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

Date Received : 01/14/2026 16:50

26.1.39469 Page 1 of 7

If your contracted laboratory send your facility sample to a subcontracted laboratory for analysis, the subcontracted laboratory lab report and COC must be provided with you self-monitoring report.

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 26010102

Date: 1/21/2026

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RptLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SDL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

B1 Target analyte detected in method blank at or above the method reporting limit.

LABORATORY TEST RESULTS

Job ID : 26010102

Date 1/21/2026

Client Name:

Attn:

Project Name:

Client Sample ID: C100204

Job Sample ID: 26010102.01

Date Collected: 01/14/26

Sample Matrix: Waste Water

Time Collected: 10:15

Other Information:

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
200.8	Metals by ICP-MS								
	Arsenic	BRL	mg/L	1	0.002			01/19/26 19:21	HS
	Cadmium	BRL	mg/L	1	0.002			01/19/26 19:21	HS
	Copper	0.215	mg/L	1	0.002			01/19/26 19:21	HS
	Lead	0.003	mg/L	1	0.002			01/19/26 19:21	HS
	Molybdenum	0.007	mg/L	1	0.002			01/19/26 19:21	HS
	Selenium	BRL	mg/L	1	0.002			01/19/26 19:21	HS
	Silver	BRL	mg/L	1	0.002			01/19/26 19:21	HS
	Zinc	0.333	mg/L	1	0.002			01/19/26 19:21	HS

QUALITY CONTROL CERTIFICATE

Job ID : 26010102

Date : 1/21/2026

Analysis : Metals by ICP-MS Method : 200.8 Reporting Units : mg/L
 QC Batch ID : Q026012003 Created Date : 01/20/26 Created By : [REDACTED]
 Samples in This QC Batch : 26010102.01
 Digestion : PB26011601 Prep Method : EPA 200.8 Prep Date : 01/16/26 09:00 Prep By : [REDACTED]

QC Type: Blank Result

QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit	Qual
Method Blank	Arsenic	7440-38-2T	BRL	mg/L	1	0.002	
Method Blank	Cadmium	7440-43-9	BRL	mg/L	1	0.002	
Method Blank	Copper	7440-50-8	BRL	mg/L	1	0.002	
Method Blank	Lead	7439-92-1T	BRL	mg/L	1	0.002	
Method Blank	Molybdenum	7439-98-7	BRL	mg/L	1	0.002	
Method Blank	Selenium	7782-49-2	BRL	mg/L	1	0.002	
Method Blank	Silver	7440-22-4	BRL	mg/L	1	0.002	
Method Blank	Zinc	7440-66-6T	0.002	mg/L	1	0.002	81

QC Type: LCS and LCSD

Parameter	LCS			LCSD			RPD	RPD CtrLimit	%Recovery CtrLimit	Qual
	Spk Added	Result	% Rec	Spk Added	Result	% Rec				
Arsenic	0.05	0.0448	89.6	0.05	0.0451	90.2	0.7	20	85-115	
Cadmium	0.05	0.0482	96.5	0.05	0.0485	97.0	0.5	20	85-115	
Copper	0.05	0.0471	94.2	0.05	0.0474	94.8	0.7	20	85-115	
Lead	0.05	0.0474	94.9	0.05	0.0467	93.4	1.6	20	85-115	
Molybdenum	0.05	0.0489	97.8	0.05	0.0493	98.6	0.8	20	85-115	
Selenium	0.05	0.0461	92.2	0.05	0.0457	91.4	0.8	20	85-115	
Silver	0.05	0.0459	91.9	0.05	0.0459	91.7	0.1	20	85-115	
Zinc	0.05	0.0462	92.4	0.05	0.0461	92.2	0.2	20	85-115	

QC Type: MS and MSD

QC Sample ID: 26010108.01

Parameter	Sample Result	MS		MSD		MSD Result	% Rec	RPD	RPD CtrLimit	%Rec CtrLimit	Qual
		Spk Added	Result	% Rec	Spk Added						
Arsenic	0.00625	0.1	0.101	94.9	0.1	0.102	95.7	0.8	20	70-130	
Cadmium	BRL	0.1	0.099	99	0.1	0.101	101	2.4	20	70-130	
Copper	0.164	0.1	0.259	94.7	0.1	0.262	97.8	1.2	20	70-130	
Lead	0.013	0.1	0.104	90.8	0.1	0.108	94.8	3.7	20	70-130	
Molybdenum	0.011	0.1	0.112	101	0.1	0.117	106	4.6	20	70-130	
Selenium	BRL	0.1	0.0952	95.2	0.1	0.0975	97.5	2.3	20	70-130	
Silver	BRL	0.1	0.09	90	0.1	0.0931	93.1	3.4	20	70-130	
Zinc	0.293	0.1	0.387	93.2	0.1	0.388	94.4	0.3	20	70-130	

Laboratory Analysis Report Total Number of Pages: 7

Job ID : 26011225


Client Project Name :
Semi Annual WW

Report To :	Client Name: [REDACTED] Attn: [REDACTED] Client Address: [REDACTED] City, State, Zip: [REDACTED]	P.O.#: Sample Collected By: Date Collected: 1/14/2026 10:15
-------------	---	---

[REDACTED] has analyzed the following samples...

Client Sample ID	Matrix	[REDACTED]
CJ00204	Waste Water	26011225.01

Released By: [REDACTED]
Title: Reporting Associate
Date: 01/21/2026

 This Laboratory is ADHS [REDACTED] accredited. Effective: 03/01/2024; Expires: 03/01/2026

This report cannot be reproduced, except in full, without prior written permission of [REDACTED]. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by the client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

Date Received : 01/16/2026 13:15

26.L31058 Page 1 of 7

If the subcontracted laboratory send your facility sample to another subcontracted laboratory for analysis, the subcontracted laboratory lab report and COC must be provided with you self-monitoring report.

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 26011225

Date: 1/21/2025

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SOL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

D1 Sample required dilution due to matrix effects.

LABORATORY TEST RESULTS									
Job ID: 26011225		Date: 1/21/2026							
Client Name:		Project Name:						Attn:	
Client Sample ID: CJ00204		Job Sample ID: 26011225.01							
Date Collected: 01/14/26		Sample Matrix: Waste Water							
Time Collected: 10:15		Other Information:							
Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
EPA 245.1	Total Metals - Mercury								
	Mercury	BRL	mg/L	4	0.0008		D1	01/19/26 12:17	DRS

Qualifier

D1: Sample required dilution due to matrix.

QUALITY CONTROL CERTIFICATE



Job ID : 26011225

Date : 1/21/2026

Analysis : Total Metals - Mercury Method : EPA 245.1 Reporting Units : mg/L
 QC Batch ID : Qb26011932 Created Date : 01/19/26 Created By :
 Samples in This QC Batch : 26011225.01
 Digestion : P826011922 Prep Method : EPA 245.1 Prep Date : 01/19/26 08:20 Prep By :

QC Type: Blank Result

QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit	Qual
Method Blank	Mercury	7439-97-67	BRL	mg/L	1	0.0002	

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD Ctr/Limit	%Recovery Ctr/Limit	Qual
Mercury	0.005	0.00494	98.8	0.005	0.00522	104	5.5	20	85-115	

QC Type: MS and MSD
QC Sample ID: 26011161.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD Ctr/Limit	%Rec Ctr/Limit	Qual
Mercury	BRL	0.005	0.00523	105						85-115	

QC Type: MS2 and MSD2
QC Sample ID: 26010720.01

Parameter	Sample Result	MS2 Spk Added	MS2 Result	MS2 % Rec	MSD2 Spk Added	MSD2 Result	MSD2 % Rec	RPD	RPD Ctr/Limit	%Rec Ctr/Limit	Qual
Mercury	BRL	0.005	0.00519	104						85-115	

Subcontract Chain of Custody

Lab Number: [Redacted]



Customer Contact: [Redacted]	Page: [Redacted] of [Redacted]	PO number: [Redacted]
Company Name: [Redacted]	Subcontract Lab: [Redacted]	
Address: [Redacted]	Project Manager: [Redacted]	
City, State, Zip: [Redacted]	Project Name: [Redacted]	

Sample Receipt		Turn Around Request									
Temperature: 1.2	Standard TAT: [Redacted]	5-7 business days									
Custody Seal: Yes [checked] No []	Rush TAT: (Surcharges apply)										
Custody Seal Intact: Yes [checked] No []	24 Hours	48 Hours	72 Hours								
Total # of Containers: 1	Requested Report Delivery Date: 1/21/26										
Sample Information											
Lab #	Date Collected	Time Collected	Sample Identification	Sample Matrix Type*	Preservative	Number of Containers	245.1 Hg				
0114 1	1/14/26	10:15	CJ00204	ww	HNO3	1	x				28010102.01
2											
3											
4											
5											
6											
7											
8											
9											
10											

* Job ID: 26011225

Elements: Al, As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Sb, Be, Co, Cu, Fe, Mn, Ni, Mo, Ti, V, Zn, Na, Ca, Mg, K, U, Tl, Li, Si,
 Special Requirements / Dilution NMT 4 to meet report limit requirements (0.001)
 Comments:

Matrix: S=Soil/Solid WW=Waste Water DW=Drinking Water GW=Groundwater A=Air O=Other SW=surface water

Date	Time	Samples Requisitioned By	Date	Time	Received By
1/15/26	1450	[Redacted]			
1/16/26	1015	[Redacted]	1/16/26	1015	[Redacted]

All services are performed subject to the [Redacted] Standard Terms & Conditions unless otherwise specified in advance.
 Please email a new COC to your project manager with any necessary changes. Verbal changes are not accepted.

Laboratory B

Laboratory Analysis Report

Total Number of Pages: 8

Job ID : 25050041



Client Project Name : Semi Annual Metals

Report To : Client Name: [Redacted]
Attn: [Redacted] P.O.#: [Redacted]
Client Address: [Redacted] Sample Collected By: [Redacted]
City, State, Zip: [Redacted] Date Collected: 05/07/25

A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	Sample ID
[Redacted] - 100	Waste Water	25050041.01

Released By: [Redacted]
Title: Customer service manager
Date: 5/16/2025

ADHS ACCREDITATION CERTIFICATE NUMBER: [Redacted] from 07/14/2024 to 07/13/2025
scope: Waste Water, Solid ,Drinking water

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically consistent with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

This report cannot be reproduced, except in full, without prior written permission of [Redacted]. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

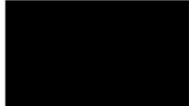
Date Received: 05/08/2025 12:53

25.1.1.24899

Page 1 of 8



Laboratory Report: Case Narrative



Job ID: 25050041

Date: 05/16/25

Client Name:	[REDACTED]	Attn:	[REDACTED]
Project Name:	Semi Annual Metals		
Date Received:	05/08/25		
Collected By:	[REDACTED]		

All analytical test results meet laboratory quality control requirements unless otherwise noted in this case narrative or properly qualified within the sample results. Data qualifiers in this report are in accordance with ADEQ Data Qualifiers.

Please do not hesitate to contact us with any questions or concerns regarding your laboratory report. [REDACTED] is pleased to be of service to you and we look forward to fulfilling all of your future analytical needs.



Released By: [REDACTED]

Title: Customer service manager

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 25050041

Date: 5/16/2025

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SDL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

LABORATORY TEST RESULTS

Job ID : 25050041

Date 5/16/2025

Client Name: [REDACTED] Attn: [REDACTED]
 Project Name: Semi Annual Metals

Client Sample ID: [REDACTED] Job Sample ID: 25050041.01
 Date Collected: 05/07/25 Sample Matrix: Waste Water
 Time Collected: 18:10
 Other Information:

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
200.8	Metals by ICP-MS								
	Arsenic	0.026	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Cadmium	0.010	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Chromium	2.83	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Copper	1.05	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Lead	0.186	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Molybdenum	0.041	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Nickel	0.611	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Selenium	0.006	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Silver	0.065	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Zinc	1.39	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]

Wastewater Permit Parameter Table

Parameter	Units	Minimum Sampling Frequency	Sampling Method	Daily Minimum		Daily Maximum			Monthly Average	
				FINAL Limit	Local Limit	FINAL Limit	PSNS Limit	Local Limit	FINAL Limit	PSNS Limit
Arsenic	mg/L	1 per 6-Months	Composite	-	-	0.13	-	0.13	-	-
BOD ²	mg/L	1 per Quarter	Composite	-	-	-	-	-	-	-
Cadmium	mg/L	1 per Quarter	Composite	-	-	0.047	0.11	0.047	0.07	0.07
Chromium	mg/L	1 per Month	Composite	-	-	2.77	2.77	-	1.71	1.71
Copper	mg/L	1 per Quarter	Composite	-	-	1.5	3.38	1.5	2.07	2.07
Cyanide (T)	mg/L	1 per Quarter	Grab	-	-	1.20	1.20	2.0	0.65	0.65
Lead	mg/L	1 per Quarter	Composite	-	-	0.41	0.69	0.41	0.43	0.43
Mercury	mg/L	1 per 6-Months	Composite	-	-	0.0023	-	0.0023	-	-
Molybdenum ¹	mg/L	1 per 6-Months	Composite	-	-	-	-	-	-	-
Nickel	mg/L	1 per Quarter	Composite	-	-	3.98	3.98	-	2.38	2.38
pH ¹	SU	1 per Week	Grab	5.0	5.0	10.5	-	10.5	-	-
Selenium	mg/L	1 per 6-Months	Composite	-	-	0.10	-	0.10	-	-
Silver	mg/L	1 per Quarter	Composite	-	-	0.43	0.43	1.2	0.24	0.24
TSS ³	mg/L	1 per Quarter	Composite	-	-	-	-	-	-	-
TTO - 433 ¹	µg/L	1 per 6-Months	Composite	-	-	2130	2130	-	-	-
Zinc	mg/L	1 per Month	Composite	-	-	2.61	2.61	3.5	1.48	1.48

1 See Sampling and Analysis Notes for Additional Information

2 Biological Oxygen Demand

3 Total Suspended Solids

QUALITY CONTROL CERTIFICATE



Job ID : 25050041

Date : 5/16/2025

Analysis : Metals by ICP-MS Method : 200.8 Reporting Units : mg/L

QC Batch ID : qb25051405 Created Date : 05/13/25 Created By : [Redacted]

Samples in This QC Batch : 25050041.01

Digestion : PB25051202 Prep Method : EPA 200.8 Prep Date : 05/12/25 12:00 Prep By : [Redacted]

QC Type: Blank Result

QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit	Qual
Method Blank	Arsenic	7440-38-2T	BRL	mg/L	1.00	0.002	
Method Blank	Cadmium	7440-43-9	BRL	mg/L	1.00	0.002	
Method Blank	Chromium	7440-47-3T	BRL	mg/L	1.00	0.002	
Method Blank	Copper	7440-50-8	BRL	mg/L	1.00	0.002	
Method Blank	Lead	7439-92-1T	BRL	mg/L	1.00	0.002	
Method Blank	Molybdenum	7439-98-7	BRL	mg/L	1.00	0.002	
Method Blank	Nickel	7440-02-0	BRL	mg/L	1.00	0.002	
Method Blank	Selenium	7782-49-2	BRL	mg/L	1.00	0.002	
Method Blank	Silver	7440-22-4	BRL	mg/L	1.00	0.002	
Method Blank	Zinc	7440-66-6T	BRL	mg/L	1.00	0.002	

QC Type: LCS and LCSD

Parameter	LCS			LCSD			RPD	RPD Ctr/Limit	%Recovery Ctr/Limit	Qual
	Spk Added	Result	% Rec	Spk Added	Result	% Rec				
Arsenic	0.1	0.0959	95.9	0.1	0.0961	96.1	0.2	20	85-115	
Cadmium	0.1	0.0957	95.7	0.1	0.0974	97.4	1.7	20	85-115	
Chromium	0.1	0.0966	96.6	0.1	0.0959	95.9	0.7	20	85-115	
Copper	0.1	0.0956	95.6	0.1	0.0962	96.2	0.7	20	85-115	
Lead	0.1	0.0938	93.8	0.1	0.0945	94.5	0.7	20	85-115	
Molybdenum	0.1	0.0983	98.3	0.1	0.0986	98.6	0.2	20	85-115	
Nickel	0.1	0.0954	95.4	0.1	0.0947	94.7	0.8	20	85-115	
Selenium	0.1	0.100	100.0	0.1	0.0988	98.8	1.2	20	85-115	
Silver	0.1	0.0960	96.0	0.1	0.0960	96.0	0.0	20	85-115	
Zinc	0.1	0.0958	95.8	0.1	0.0951	95.1	0.8	20	85-115	



Chain of Custody / Analysis Request

Lab Number:
25050041

Customer Contact: [Redacted] Page 1 of 1 PO number: [Redacted]
 Company Name: [Redacted] Sampler (Print): [Redacted]
 Address: [Redacted] Project Name: Semi Annual / weekly
 City, State, Zip: [Redacted] Project Number: [Redacted]

Phone: [Redacted] E-Mail Address: [Redacted]

Sample Receipt		Turn Around Request		Analytical Parameters and Methods Requested									
Temperature: 7.4 °C	Standard TAT: 5-7 business days	Rush TAT: (Surcharges apply)		200.8 - Cd, Cr, Pb, Cu, Ni, Zn, Ag, Mo, Se, As [Empty columns for other parameters]									
Custody Seals: Yes No	24 Hours 48 Hours 72 Hours	Requested Report Delivery Date:											
Custody Seals Intact: Yes No	Total # of Containers: 1												

Sample Information

Lab #	Date Collected	Time Collected	Sample Identification	Sample Matrix Type	Preservative	Number of Containers	200.8 - Cd, Cr, Pb, Cu, Ni, Zn, Ag, Mo, Se, As	Composite / Grab
1	5-7-25	10:10	[Redacted] - 100	ww	HNO3	1	x	Comp
2								
3								
4								
5								
6								
7								
8								
9								
10								

Elements: Al, As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Sb, Be, Co, Cu, Fe, Mn, Ni, Mo, Ti, V, Zn, Na, Ca, Mg, K, U, Ti, Li, Si.

Special Requirements /

Comments:

Matrix: S=Soil/Solid WW=WasteWater DW=Drinking Water GW=Groundwater A=Air O=Other

Date:	Time:	Sample Relinquished By:	Date:	Time:	Received By:
5-8-25	12:46	[Redacted]	5/8/25	12:53	[Redacted]

All services are performed subject to the [Redacted] Standard Terms & Conditions unless otherwise specified in advance. Please email a new COC to your project manager with any necessary changes. Verbal changes are not accepted.

Sample Condition Checklist

JobID :	25050041	Date Received :	05/08/2025	Time Received :	12:53PM							
Client Name :	[REDACTED]											
Temperature :	2.4°C	Sample pH :	< 2									
Thermometer ID :	IR T 01	pH Paper ID :	na									
Preservative :	Lot# :											
	Check Points				Yes	No	N/A					
1.	Cooler Seal present and signed.						X					
2.	Sample(s) in a cooler.				X							
3.	If yes, ice in cooler.				X							
4.	Sample(s) received with chain-of-custody.				X							
5.	C-O-C signed and dated.				X							
6.	Sample(s) received with signed sample custody seal.						X					
7.	Sample containers arrived intact. (If No comment)				X							
8.	Matrix:	Water	Soil	Liquid	Sludge	Solid	Cassette	Tube	Bulk	Badge	Food	Other
9.	Samples were received in appropriate container(s)				X							
10.	Sample(s) were received with Proper preservative				X							
11.	All samples were tagged or labeled.				X							
12.	Sample ID labels match C-O-C ID's.				X							
13.	Bottle count on C-O-C matches bottles found.				X							
14.	Sample volume is sufficient for analyses requested.				X							
15.	Samples were received with in the hold time.				X							
16.	VOA vials completely filled.											X
17.	Sample accepted.				X							
18.	Has client been contacted about sub-out											X
Comments : Include actions taken to resolve discrepancies/problems:												
[REDACTED]												

Brought by : [REDACTED]
 Received by : [REDACTED] Check in by/date : [REDACTED] [REDACTED]

Laboratory C

ANALYTICAL REPORT

PREPARED FOR

Attn: [REDACTED]

Generated 8/8/2024 2:01:51 PM

JOB DESCRIPTION

CN BATCH

JOB NUMBER

550-221597-1

See page two for job notes and contact information.

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ProjectSite: CN BATCH

Laboratory Job ID: 550-221597-1

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Definitions/Glossary

Client: [REDACTED] Job ID: 550-221597-1
 Project/Site: CN BATCH

Qualifiers

Qualifier	Qualifier Description
L4	The associated blank spike recovery was below method acceptance limits.
N7	Additional analysis was not performed based on the "Total" result which was below the requested analyte's MCL/Action level/Trigger level.
Q7	Sample inadequately dechlorinated.
T5	Laboratory not licensed for this parameter

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
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
DI Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL, if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RR	Relative Error Ratio (Radiochemistry)
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)
TNTC	Too Numerous to Count

Page 4 of 16 8/8/2024

Qualifiers:

L4 - The associated blank spike recovery was below method acceptance limits.

N7 - Additional analysis was not performed based on the "Total" result which was below the requested analyte's MCL/Action level/Trigger level.

Q7 - Sample inadequately dechlorinated.

T5 - Laboratory not licensed for this parameter

Case Narrative

Client: [REDACTED]
Project: CN BATCH

Job ID: 550-221597-1

Job ID: 550-221597-1

**Job Narrative
550-221597-1**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The sample was received on 7/31/2024 8:40 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.5°C.

General Chemistry

Method 4500_CN_E: The laboratory control sample duplicate (LCSD) associated with preparation batch 550-324333 and analytical batch 550-324361 was outside acceptance criteria. The batch laboratory control sample (LCS) and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within acceptance limits and may be used to evaluate matrix performance and batch accuracy. Relative percent differences (RPD) for both LCS/LCSD and MS/MSD were acceptable and demonstrate batch precision. Thus, the data has been flagged with L4 flags and reported.

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

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Sample Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-221597-1	CN BATCH	Water	07/31/24 07:00	07/31/24 08:40

- 1
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Client Sample Results

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Client Sample ID: CN BATCH **Lab Sample ID: 550-221597-1**
Date Collected: 07/31/24 07:00 Matrix: Water
Date Received: 07/31/24 08:40

General Chemistry									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil	Fac
Cyanide, Total (SM 4500 CN E)	ND	L4 Q7	0.050	mg/L		08/01/24 14:23	08/01/24 16:27	1	
Cyanide, Amenable (SM 4500 CN G)	ND	L4 N7	0.050	mg/L		08/05/24 19:00		1	
Cyanide, Non-amenable (SM 4500 CN G)	ND	N7 Q7 T5	0.050	mg/L		08/01/24 14:23	08/01/24 16:27	1	

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QC Sample Results

Client: [REDACTED] Job ID: 550-221597-1
 Project/Site: CN BATCH

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 550-324333/1-A		Client Sample ID: Method Blank					
Matrix: Water		Prep Type: Total/NA					
Analysis Batch: 324361		Prep Batch: 324333					
Analyte	MB MB Result Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND	0.050	mg/L		08/01/24 14:23	08/01/24 16:27	1

Lab Sample ID: LCS 550-324333/2-A		Client Sample ID: Lab Control Sample				
Matrix: Water		Prep Type: Total/NA				
Analysis Batch: 324361		Prep Batch: 324333				
Analyte	Spike Added	LCS LCS Result Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.0926	mg/L		93	90 - 110

Lab Sample ID: LCSD 550-324333/3-A		Client Sample ID: Lab Control Sample Dup						
Matrix: Water		Prep Type: Total/NA						
Analysis Batch: 324361		Prep Batch: 324333						
Analyte	Spike Added	LCSD LCSD Result Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Total	0.100	0.0877 L4	mg/L		88	90 - 110	5	20

Lab Sample ID: 550-221420-B-1-B MS		Client Sample ID: Matrix Spike						
Matrix: Water		Prep Type: Total/NA						
Analysis Batch: 324361		Prep Batch: 324333						
Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS Result Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	ND	L4	0.100	0.0864	mg/L		86	80 - 120

Lab Sample ID: 550-221420-B-1-C MSD		Client Sample ID: Matrix Spike Duplicate								
Matrix: Water		Prep Type: Total/NA								
Analysis Batch: 324361		Prep Batch: 324333								
Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD Result Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Total	ND	L4	0.100	0.0911	mg/L		91	80 - 120	5	20

Method: SM 4500 CN G - Cyanide, Amenable

Lab Sample ID: MB 550-324483/1		Client Sample ID: Method Blank					
Matrix: Water		Prep Type: Total/NA					
Analysis Batch: 324483							
Analyte	MB MB Result Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Amenable	ND	0.050	mg/L			08/06/24 19:00	1

Lab Sample ID: LCS 550-324483/2		Client Sample ID: Lab Control Sample				
Matrix: Water		Prep Type: Total/NA				
Analysis Batch: 324483						
Analyte	Spike Added	LCS LCS Result Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Amenable	0.100	0.0926	mg/L		93	90 - 110

QC Sample Results

Client: XXXXXXXXXX
 Project/Site: CN BATCH

Job ID: 550-221597-1

Method: SM 4500 CN G - Cyanide, Amenable (Continued)

Lab Sample ID: LCSD 550-324483/3
 Matrix: Water
 Analysis Batch: 324483

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
Cyanide, Amenable	0.100	0.0877	L4	mg/L		88	90 - 110	5	20

Lab Sample ID: 550-221420-B-1 MS
 Matrix: Water
 Analysis Batch: 324483

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	RPD	RPD Limit
Cyanide, Amenable	ND	L4 N7	0.100	0.0864		mg/L		86	80 - 120		

Lab Sample ID: 550-221420-B-1 MSD
 Matrix: Water
 Analysis Batch: 324483

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
Cyanide, Amenable	ND	L4 N7	0.100	0.0911		mg/L		91	80 - 120	5	20

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QC Association Summary

Client: XXXXXXXXXX
 Project/Site: CN BATCH

Job ID: 550-221597-1

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General Chemistry

Prep Batch: 324333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN C	
MB 550-324333/1-A	Method Blank	Total/NA	Water	SM 4500 CN C	
LCS 550-324333/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN C	
LCSD 550-324333/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN C	
550-221420-B-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN C	
550-221420-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN C	

Analysis Batch: 324361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN E	324333
MB 550-324333/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	324333
LCS 550-324333/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	324333
LCSD 550-324333/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN E	324333
550-221420-B-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	324333
550-221420-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	324333

Analysis Batch: 324465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN G	324333

Analysis Batch: 324483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN G	
MB 550-324483/1	Method Blank	Total/NA	Water	SM 4500 CN G	
LCS 550-324483/2	Lab Control Sample	Total/NA	Water	SM 4500 CN G	
LCSD 550-324483/3	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN G	
550-221420-B-1 MS	Matrix Spike	Total/NA	Water	SM 4500 CN G	
550-221420-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN G	

Lab Chronicle

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Client Sample ID: CN BATCH
Date Collected: 07/31/24 07:00
Date Received: 07/31/24 08:40

Lab Sample ID: 550-221597-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	SM 4500 CN C			324333	[REDACTED]	[REDACTED]	08/01/24 14:23
Total/NA	Analysis	SM 4500 CN E		1	324361	[REDACTED]	[REDACTED]	08/01/24 16:27
Total/NA	Prep	SM 4500 CN C			324333	[REDACTED]	[REDACTED]	08/01/24 14:23
Total/NA	Analysis	SM 4500 CN G		1	324465	[REDACTED]	[REDACTED]	08/01/24 16:27
Total/NA	Analysis	SM 4500 CN G		1	324483	[REDACTED]	[REDACTED]	08/06/24 19:00

Laboratory References:

[REDACTED]

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Accreditation/Certification Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Laboratory: [REDACTED]

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Arizona	State	[REDACTED]	06-10-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 4500 CN G	SM 4500 CN C	Water	Cyanide, Non-amenable

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Method Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

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Method	Method Description	Protocol	Laboratory
SM 4500 CN E	Cyanide, Total	SM	[REDACTED]
SM 4500 CN G	Cyanide, Amenable	SM	[REDACTED]
SM 4500 CN C	Cyanide, Distillation	SM	[REDACTED]

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

[REDACTED]

Login Sample Receipt Checklist

Client: [REDACTED]

Job Number: 550-221597-1
SDG Number:

Login Number: 221597

List Source: [REDACTED]

List Number: 1

Creator: [REDACTED]

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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 (excluding tests with immediate HTs)	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 NS/MSDs.	True	
Containers requiring zero headspace have no headspace or bubble is <math>< 8\text{mm (1/4")}</math>.	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.

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[REDACTED]

Laboratory D

Definitions/Glossary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Qualifiers

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
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.
K6	Glucose/glutamic acid BOD was below method acceptance criteria.
L4	The associated blank spike recovery was below method acceptance limits.
R12	RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
s	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
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)
TNTC	Too Numerous To Count

Qualifiers:

D2 - Sample required dilution due to high concentration of analyte.

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.

K6 - Glucose/glutamic acid BOD was below method acceptance criteria.

L4 - The associated blank spike recovery was below method acceptance limits.

R12 - RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL.

Most common qualifiers you will encounter:

D1 - Sample required dilution due to matrix.

D2 - Sample required dilution due to high concentration of analyte.

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

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

Case Narrative

Client: [REDACTED]
Project: 07182024_5

Job ID: 550-221040-1

Job ID: 550-221040-1

Job Narrative
550-221040-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The sample was received on 7/18/2024 10:10 AM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.4°C.

HPLC/IC

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

Metals

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

General Chemistry

Method SM5210B_Calc: The samples associated with analytical batch 550-323765 failed quality control criteria for method SM 5210B Biochemical Oxygen Demand (BOD); the laboratory control sample (LCS) - Glucose Glutamic Acid (GGA) result was below the method specified range of 198 (+/-) 30 mg/L. Therefore, the associated sample data has been compromised due to the failing QC and shall only be reported at the request of the user for internal purposes. The method holding time had exceeded, therefore the analysis was not repeated. As such, data have been reported and qualified. (LCS 550-323765/2)

Method SM5210B_Calc: The sample duplicate (DU) precision for the following sample associated with 550-323765 was outside control limits for Biochemical Oxygen Demand (BOD): (550-220999-A-1) and (550-220999-A-1 DU). Non-homogeneity of the sample matrix was suspected.

Method SM5210B_Calc: All the dilution bottles prepared for Biochemical Oxygen Demand (BOD) failed to deplete the method-required 2.00 mg/L of dissolved oxygen for the following sample: 07182024_5 (550-221040-1). Only a "less than" result could be calculated from the least dilute preparation which was less than the reporting limit (RL). As such, the result has been reported and qualified with K1, D1 and D5 flags.

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

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Sample Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-221040-1	07182024_5	Water	07/18/24 08:20	07/18/24 10:10

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Detection Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Client Sample ID: 07182024_5

Lab Sample ID: 550-221040-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.7		0.40	mg/L	1		300.0	Total/NA
Copper	0.12		0.010	mg/L	1		200.7 Rev 4.4	Total/NA
Total Suspended Solids	280		10	mg/L	1		SM 2540D	Total/NA

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Client Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Client Sample ID: 07182024_5

Lab Sample ID: 550-221040-1

Date Collected: 07/18/24 06:20

Matrix: Water

Date Received: 07/18/24 10:10

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.7		0.40	mg/L			07/24/24 13:23	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	mg/L		07/23/24 09:00	07/24/24 21:03	1
Cadmium	ND		0.0030	mg/L		07/23/24 09:00	07/24/24 21:03	1
Copper	0.12		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Lead	ND		0.015	mg/L		07/23/24 09:00	07/24/24 21:03	1
Molybdenum	ND		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Selenium	ND		0.10	mg/L		07/23/24 09:00	07/24/24 21:03	1
Silver	ND		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Zinc	ND		0.050	mg/L		07/23/24 09:00	07/24/24 21:03	1

Method: EPA 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	mg/L		07/26/24 12:44	07/26/24 15:38	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (SM 2540D)	260		10	mg/L			07/23/24 18:37	1
Cyanide, Total (SM 4500 CN E)	ND		0.0080	mg/L		07/25/24 16:43	07/26/24 19:53	1
Biochemical Oxygen Demand (SM 5210B)	ND	D2 D5 K1 K6 L4	10	mg/L			07/18/24 15:00	2

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QC Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-323970/2 Client Sample ID: Method Blank
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323970

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L		07/24/24 11:51		1

Lab Sample ID: LCS 550-323970/5 Client Sample ID: Lab Control Sample
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323970

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Fluoride	4.00	4.10		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-323970/6 Client Sample ID: Lab Control Sample Dup
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323970

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Fluoride	4.00	4.10		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-221040-1 MS Client Sample ID: 07182024_5
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323970

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Fluoride	1.7		4.00	5.03		mg/L		84	80 - 120

Lab Sample ID: 550-221040-1 MSD Client Sample ID: 07182024_5
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323970

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Fluoride	1.7		4.00	5.01		mg/L		84	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-323908/1-A Client Sample ID: Method Blank
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 324025

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	mg/L		07/23/24 09:00	07/24/24 20:42	1
Cadmium	ND		0.0030	mg/L		07/23/24 09:00	07/24/24 20:42	1
Copper	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Lead	ND		0.015	mg/L		07/23/24 09:00	07/24/24 20:42	1
Molybdenum	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Selenium	ND		0.10	mg/L		07/23/24 09:00	07/24/24 20:42	1
Silver	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Zinc	ND		0.050	mg/L		07/23/24 09:00	07/24/24 20:42	1

QC Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-323908/2-A Matrix: Water Analysis Batch: 324025		Client Sample ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 323908						
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
Arsenic	1.00	1.07		mg/L		107	85 - 115	
Cadmium	1.00	1.05		mg/L		105	85 - 115	
Copper	1.00	0.998		mg/L		99	85 - 115	
Lead	1.00	1.08		mg/L		108	85 - 115	
Molybdenum	1.00	1.08		mg/L		108	85 - 115	
Selenium	1.00	1.07		mg/L		107	85 - 115	
Silver	0.0750	0.0734		mg/L		98	85 - 115	
Zinc	1.00	1.08		mg/L		108	85 - 115	

Lab Sample ID: LCS 550-323908/3-A Matrix: Water Analysis Batch: 324025		Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 323908							
Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	1.00	1.08		mg/L		108	85 - 115	0	20
Cadmium	1.00	1.08		mg/L		108	85 - 115	1	20
Copper	1.00	0.998		mg/L		100	85 - 115	1	20
Lead	1.00	1.07		mg/L		107	85 - 115	1	20
Molybdenum	1.00	1.10		mg/L		110	85 - 115	2	20
Selenium	1.00	1.09		mg/L		109	85 - 115	2	20
Silver	0.0750	0.0744		mg/L		99	85 - 115	1	20
Zinc	1.00	1.09		mg/L		109	85 - 115	1	20

Lab Sample ID: 550-221039-D-1-A MS Matrix: Water Analysis Batch: 324025		Client Sample ID: Matrix Spike Prep Type: Total/NA Prep Batch: 323908							
Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND		1.00	1.09		mg/L		109	70 - 130
Cadmium	ND		1.00	1.08		mg/L		108	70 - 130
Copper	0.074		1.00	1.09		mg/L		101	70 - 130
Lead	ND		1.00	1.03		mg/L		103	70 - 130
Molybdenum	ND		1.00	1.08		mg/L		108	70 - 130
Selenium	ND		1.00	1.07		mg/L		107	70 - 130
Silver	ND		0.0750	0.0760		mg/L		100	70 - 130
Zinc	ND		1.00	1.08		mg/L		108	70 - 130

Lab Sample ID: 550-221039-D-1-B MSD Matrix: Water Analysis Batch: 324025		Client Sample ID: Matrix Spike Duplicate Prep Type: Total/NA Prep Batch: 323908									
Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	ND		1.00	1.10		mg/L		110	70 - 130	1	20
Cadmium	ND		1.00	1.07		mg/L		107	70 - 130	1	20
Copper	0.074		1.00	1.09		mg/L		102	70 - 130	0	20
Lead	ND		1.00	1.04		mg/L		104	70 - 130	1	20
Molybdenum	ND		1.00	1.07		mg/L		107	70 - 130	1	20
Selenium	ND		1.00	1.08		mg/L		108	70 - 130	1	20
Silver	ND		0.0750	0.0753		mg/L		100	70 - 130	0	20

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QC Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-221039-D-1-B MSD				Client Sample ID: Matrix Spike Duplicate							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 324025				Prep Batch: 323908							
Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Zinc	ND		1.00	1.09		mg/L		109	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-324097/1-A				Client Sample ID: Method Blank			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 324113				Prep Batch: 324097			

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	mg/L		07/26/24 12:44	07/26/24 15:22	1

Lab Sample ID: LCS 550-324097/2-A				Client Sample ID: Lab Control Sample			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 324113				Prep Batch: 324097			

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00500	0.00480		mg/L		96	85 - 115

Lab Sample ID: LCSD 550-324097/3-A				Client Sample ID: Lab Control Sample Dup			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 324113				Prep Batch: 324097			

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.00500	0.00481		mg/L		96	85 - 115	0	20

Lab Sample ID: 550-221040-1 MS				Client Sample ID: 07182024_5			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 324113				Prep Batch: 324097			

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	ND		0.00500	0.00582		mg/L		116	70 - 130

Lab Sample ID: 550-221040-1 MSD				Client Sample ID: 07182024_5			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 324113				Prep Batch: 324097			

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	ND		0.00500	0.00566		mg/L		113	70 - 130	3	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 550-323943/1				Client Sample ID: Method Blank			
Matrix: Water				Prep Type: Total/NA			
Analysis Batch: 323943							

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		10	mg/L			07/23/24 18:37	1

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QC Sample Results

Client: ██████████ Job ID: 550-221040-1
 Project/Site: 07182024_5 SDG: 07182024_5

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Method: SM 2540D - Solids, Total Suspended (TSS) (Continued)

Lab Sample ID: LCS 550-323943/2 Client Sample ID: Lab Control Sample
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323943

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	200	197		mg/L		99	90 - 110

Lab Sample ID: LCSD 550-323943/3 Client Sample ID: Lab Control Sample Dup
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323943

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Suspended Solids	200	199		mg/L		100	90 - 110	1	10

Lab Sample ID: 550-221030-A-1 DU Client Sample ID: Duplicate
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 323943

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Suspended Solids	57		54.0		mg/L				5	10

Method: SM 4500 CN E - Cyanide, Total (Low Level)

Lab Sample ID: MB 550-324066/1-A Client Sample ID: Method Blank
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 324124

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.0080	mg/L		07/25/24 16:43	07/26/24 16:53	1

Lab Sample ID: LCS 550-324066/2-A Client Sample ID: Lab Control Sample
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 324124

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.0921		mg/L		92	90 - 110

Lab Sample ID: LCSD 550-324066/3-A Client Sample ID: Lab Control Sample Dup
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 324124

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Total	0.100	0.102		mg/L		102	90 - 110	10	20

Lab Sample ID: 550-221039-A-2-B MS Client Sample ID: Matrix Spike
 Matrix: Water Prep Type: Total/NA
 Analysis Batch: 324124

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	ND		0.100	0.0972		mg/L		97	90 - 120

QC Sample Results

Client: XXXXXXXXXX
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: SM 4500 CN E - Cyanide, Total (Low Level) (Continued)

Lab Sample ID: 550-221039-A-2-C MSD
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Matrix Spike Duplicate
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cyanide, Total	ND		0.100	0.0887		mg/L		89	80 - 120	9	20

Method: SM 5210B - BOD, 5-Day

Lab Sample ID: MB 550-323765/1
 Matrix: Water
 Analysis Batch: 323765

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	ND		5.0	mg/L			07/18/24 15:00	1

Lab Sample ID: LCS 550-323765/2
 Matrix: Water
 Analysis Batch: 323765

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Biochemical Oxygen Demand	198	135	K6 L4	mg/L		68	84.6 - 115.4

Lab Sample ID: 550-220999-A-1 DU
 Matrix: Water
 Analysis Batch: 323765

Client Sample ID: Duplicate
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Biochemical Oxygen Demand	<14.57	D2 K6 K1 L4	<23.57	D2 K1 K6 L4 R12	mg/L		NC	20

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QC Association Summary

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

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HPLC/IC

Analysis Batch: 323970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	300.0	
MB 550-323970/2	Method Blank	Total/NA	Water	300.0	
LCS 550-323970/5	Lab Control Sample	Total/NA	Water	300.0	
LCS0 550-323970/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-221040-1 MS	07182024_5	Total/NA	Water	300.0	
550-221040-1 MSD	07182024_5	Total/NA	Water	300.0	

Metals

Prep Batch: 323908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	200.7	
MB 550-323908/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-323908/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCS0 550-323908/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-221039-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-221039-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 324025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	200.7 Rev 4.4	323908
MB 550-323908/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	323908
LCS 550-323908/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	323908
LCS0 550-323908/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	323908
550-221039-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	323908
550-221039-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	323908

Prep Batch: 324097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	245.1	
MB 550-324097/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-324097/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCS0 550-324097/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-221040-1 MS	07182024_5	Total/NA	Water	245.1	
550-221040-1 MSD	07182024_5	Total/NA	Water	245.1	

Analysis Batch: 324113

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	245.1	324097
MB 550-324097/1-A	Method Blank	Total/NA	Water	245.1	324097
LCS 550-324097/2-A	Lab Control Sample	Total/NA	Water	245.1	324097
LCS0 550-324097/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	324097
550-221040-1 MS	07182024_5	Total/NA	Water	245.1	324097
550-221040-1 MSD	07182024_5	Total/NA	Water	245.1	324097

General Chemistry

Analysis Batch: 323765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	SM 52108	
MB 550-323765/1	Method Blank	Total/NA	Water	SM 52108	
LCS 550-323765/2	Lab Control Sample	Total/NA	Water	SM 52108	

Lab Chronicle

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Client Sample ID: 07182024_5
 Date Collected: 07/18/24 06:20
 Date Received: 07/18/24 10:10

Lab Sample ID: 550-221040-1
 Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	323970	[REDACTED]	[REDACTED]	07/24/24 13:23
Total/NA	Prep	200.7			323908	[REDACTED]	[REDACTED]	07/23/24 09:00
Total/NA	Analysis	200.7 Rev 4.4		1	324025	[REDACTED]	[REDACTED]	07/24/24 21:03
Total/NA	Prep	245.1			324097	[REDACTED]	[REDACTED]	07/26/24 12:44
Total/NA	Analysis	245.1		1	324113	[REDACTED]	[REDACTED]	07/26/24 15:38
Total/NA	Analysis	SM 2540D		1	323943	[REDACTED]	[REDACTED]	07/23/24 18:37 - 07/25/24 16:34
Total/NA	Prep	SM 4500 CN C			324066	[REDACTED]	[REDACTED]	07/25/24 16:43
Total/NA	Analysis	SM 4500 CN E		1	324124	[REDACTED]	[REDACTED]	07/26/24 19:53
Total/NA	Analysis	SM 5210B		2	323765	[REDACTED]	[REDACTED]	07/18/24 15:00 - 07/23/24 11:31

* This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:
 [REDACTED]

Method Summary

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	[REDACTED]
200.7 Rev 4.4	Metals (ICP)	EPA	[REDACTED]
245.1	Mercury (CVAA)	EPA	[REDACTED]
SM 2540D	Solids, Total Suspended (TSS)	SM	[REDACTED]
SM 4500 CN E	Cyanide, Total (Low Level)	SM	[REDACTED]
SM 5210B	BOD, 5-Day	SM	[REDACTED]
200.7	Preparation, Total Metals	EPA	[REDACTED]
245.1	Preparation, Mercury	EPA	[REDACTED]
SM 4500 CN C	Cyanide, Distillation	SM	[REDACTED]

Protocol References:
 EPA = US Environmental Protection Agency
 SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:
 [REDACTED]

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Accreditation/Certification Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Laboratory: [REDACTED]

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	[REDACTED]	06-10-25

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CHAIN OF CUSTODY FORM

7/29/2024

221040

Project Number: 07182024_5 -01 Project Manager: Matrix: Waste Water Sampler:

Date Time	Container	Bottles	Analysis Method	Sampling Method	Preservatives	Analysis Required	Unit	TAT	Notes
7/14/24 6:20 am	250 ml Poly	1	EPA 200.7	Grab	4C, HNO3	Arsenic, Cadmium, Copper, Lead, Molybdenum, Selenium, Silver, Zinc	mg/L		
	250 ml Poly	1	M5210B	Grab	4C	Biochemical Oxygen Demand	mg/L		
	500 ml Poly	1	SMA4500-CN-C,E	Grab	4C, NaOH	Cyanide (T)	mg/L		
	500 ml Poly	1	EPA 300.0	Grab	4C	Fluoride	mg/L		
	250 ml Poly	1	EPA 245.1	Grab	4C, HNO3	Mercury	mg/L		
	250 ml Poly	1	M2540	Grab	4C	Total Suspended Solids	mg/L		

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Relinquished By	Date Time	Received By	Date Time	Sample Integrity Check	Temperature Upon Receipt
[Redacted]	[Redacted]	[Redacted]	[Redacted]		6:40 11C E LPO

Login Sample Receipt Checklist

Client: [REDACTED]

Job Number: 550-221040-1

SDG Number: 07182024_5

Login Number: 221040

List Source: [REDACTED]

List Number: 1

Creator: [REDACTED]

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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 (excluding tests with immediate HTs)	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 <math><6\text{mm}</math> (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.

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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; BOD₅ = Biochemical/Biological Oxygen Demand; TSS = total suspended solids; VOCs = volatile organic compounds; SVOCs = semivolatle organic compounds; Pest & PCBs = pesticides and polychlorinated biphenyls
 NL = Not Listed *Call for pricing

Notes: Price list updated in 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. 16-3

ARTICLE 1. DIRECT ACCESS TESTS AND LABORATORY STANDING ORDERS

R9-14-617. Laboratory Records and Reports

A licensee or applicant shall ensure that:

8. A 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.

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

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

Bonus: What if your lab report shows a value of <0.05 mg/L? Is this compliant?



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

*Bonus: What if your lab report shows a value
of <1.0 mg/L? Is this compliant?*



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 5.0 08/23/2024**
- **Periodic Table of Elements**



Questions or Comments

Please take the survey and tell us how we did!

Laboratory Report Examples

LABORATORY REPORT

Client: [REDACTED]

Date Submitted: 01/14/26

Date Reported: 01/30/26

Attn: [REDACTED]

Project: WW Monitoring

RESULTS

Client ID: Parshall Flume
ACT Lab No.: CJ00204

Sample Type: FWC
Sample Time: 01/14/26 10:15

Parameter	Analysis Date		Method No.	Result	Unit
	Start	End			
Biochemical Oxygen Demand	01/15/26	01/20/26	SM5210 B	4090	mg/L
Arsenic, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Cadmium, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Copper, Total	01/19/26	01/19/26	200.8	0.215 *	mg/L
Lead, Total	01/19/26	01/19/26	200.8	0.003 *	mg/L
Mercury, Total	01/19/26	01/19/26	245.1	<0.0008 *	mg/L
Molybdenum, Total	01/19/26	01/19/26	200.8	0.007 *	mg/L
Selenium, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Silver, Total	01/19/26	01/19/26	200.8	<0.002 *	mg/L
Zinc, Total	01/19/26	01/19/26	200.8	0.333 *	mg/L
Total Suspended Solids	01/21/26	01/23/26	SM2540 D	712	mg/L

Client ID: Parshall Flume
ACT Lab No.: CJ00205

Sample Type: WW Grab
Sample Time: 01/14/26 10:15

Parameter	Analysis Date		Method No.	Result	Unit
	Start	End			
Cyanide, Total	01/14/26	01/21/26	SM4500CN CE	<0.01	mg/L

* Analysis performed by [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-10679 QC ID: CJ00299 Samples: CJ00204							
Biochemical Oxygen Demand	<3		99	<3	0.0		
Batch ID: CN-10689 QC ID: CJ00207 Samples: CJ00205							
Cyanide, Total	<0.01		100.	0.092	5.59	0.087	87.0
Batch ID: TSS-10705 QC ID: CJ00408 Samples: CJ00204							
Total Suspended Solids	10600			9900	6.83		

Laboratory Analysis Report

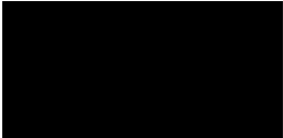
Total Number of Pages: 7

Job ID : 26010102



Client Project Name :
[Redacted] Semi Annual WW

Report To : Client Name:
Attn:
Client Address:
City, State, Zip:



P.O.#.:
Sample Collected By:
Date Collected: 01/14/26

[Redacted] has analyzed the following samples...

Client Sample ID	Matrix	[Redacted]
CJ00204	Waste Water	26010102.01



Released By: [Redacted]
Title: Customer service manager
Date: 01/21/2026

ADHS ACCREDITATION CERTIFICATE NUMBER:- [Redacted] from 07/14/2025 to 07/13/2026

scope:- Waste Water, Solid ,Drinking water

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

This report cannot be reproduced, except in full, without prior written permission of [Redacted]. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

Date Received : 01/14/2026 16:50



Laboratory Report: Case Narrative

[REDACTED] ID: 26010102

Date: 01/21/26

Client Name: [REDACTED]

Project Name: [REDACTED]

Date Received: 01/14/26

Collected By:

Attn: [REDACTED]

All analytical test results meet laboratory quality control requirements unless otherwise noted in this case narrative or properly qualified within the sample results. Data qualifiers in this report are in accordance with ADEQ Data Qualifiers.

Please do not hesitate to contact us with any questions or concerns regarding your laboratory report. [REDACTED]

[REDACTED] is pleased to be of service to you and we look forward to fulfilling all of your future analytical needs.

Released By: [REDACTED]

Title: Customer service manager

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 26010102

Date: 1/21/2026

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SDL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

B1 Target analyte detected in method blank at or above the method reporting limit.

LABORATORY TEST RESULTS

Job ID : 26010102

Date 1/21/2026

Client Name:

Attn:

Project Name:

Client Sample ID: CJ00204

Job Sample ID: 26010102.01

Date Collected: 01/14/26

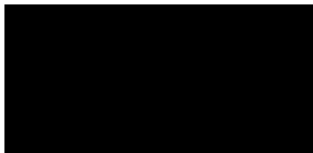
Sample Matrix Waste Water

Time Collected: 10:15

Other Information:

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
200.8	Metals by ICP-MS								
	Arsenic	BRL	mg/L	1	0.002			01/19/26 19:21	
	Cadmium	BRL	mg/L	1	0.002			01/19/26 19:21	
	Copper	0.215	mg/L	1	0.002			01/19/26 19:21	
	Lead	0.003	mg/L	1	0.002			01/19/26 19:21	
	Molybdenum	0.007	mg/L	1	0.002			01/19/26 19:21	
	Selenium	BRL	mg/L	1	0.002			01/19/26 19:21	
	Silver	BRL	mg/L	1	0.002			01/19/26 19:21	
	Zinc	0.333	mg/L	1	0.002			01/19/26 19:21	

QUALITY CONTROL CERTIFICATE



Job ID : 26010102

Date : 1/21/2026

Analysis : Metals by ICP-MS **Method :** 200.8 **Reporting Units :** mg/L

QC Batch ID : Qb26012003 **Created Date :** 01/20/26 **Created By :** [Redacted]

Samples in This QC Batch : 26010102.01

Digestion : PB26011601 **Prep Method :** EPA 200.8 **Prep Date :** 01/16/26 09:00 **Prep By :** [Redacted]

QC Type: Blank Result								
QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Method Blank	Arsenic	7440-38-2T	BRL	mg/L	1	0.002		
Method Blank	Cadmium	7440-43-9	BRL	mg/L	1	0.002		
Method Blank	Copper	7440-50-8	BRL	mg/L	1	0.002		
Method Blank	Lead	7439-92-1T	BRL	mg/L	1	0.002		
Method Blank	Molybdenum	7439-98-7	BRL	mg/L	1	0.002		
Method Blank	Selenium	7782-49-2	BRL	mg/L	1	0.002		
Method Blank	Silver	7440-22-4	BRL	mg/L	1	0.002		
Method Blank	Zinc	7440-66-6T	0.002	mg/L	1	0.002		B1

QC Type: LCS and LCSD										
Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Arsenic	0.05	0.0448	89.6	0.05	0.0451	90.2	0.7	20	85-115	
Cadmium	0.05	0.0482	96.5	0.05	0.0485	97.0	0.5	20	85-115	
Copper	0.05	0.0471	94.2	0.05	0.0474	94.8	0.7	20	85-115	
Lead	0.05	0.0474	94.9	0.05	0.0467	93.4	1.6	20	85-115	
Molybdenum	0.05	0.0489	97.8	0.05	0.0493	98.6	0.8	20	85-115	
Selenium	0.05	0.0461	92.2	0.05	0.0457	91.4	0.8	20	85-115	
Silver	0.05	0.0459	91.9	0.05	0.0459	91.7	0.1	20	85-115	
Zinc	0.05	0.0462	92.4	0.05	0.0461	92.2	0.2	20	85-115	

QC Type: MS and MSD											
QC Sample ID: 26010108.01											
Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Arsenic	0.00625	0.1	0.101	94.9	0.1	0.102	95.7	0.8	20	70-130	
Cadmium	BRL	0.1	0.099	99	0.1	0.101	101	2.4	20	70-130	
Copper	0.164	0.1	0.259	94.7	0.1	0.262	97.8	1.2	20	70-130	
Lead	0.013	0.1	0.104	90.8	0.1	0.108	94.8	3.7	20	70-130	
Molybdenum	0.011	0.1	0.112	101	0.1	0.117	106	4.6	20	70-130	
Selenium	BRL	0.1	0.0952	95.2	0.1	0.0975	97.5	2.3	20	70-130	
Silver	BRL	0.1	0.09	90	0.1	0.0931	93.1	3.4	20	70-130	
Zinc	0.293	0.1	0.387	93.2	0.1	0.388	94.4	0.3	20	70-130	

Refer to the Definition page for terms.

Sample Condition Checklist

A&B JobID : 26010102	Date Received : 01/14/2026	Time Received : 4:50PM		
Client Name : [REDACTED]				
Temperature : 3.4°C	Sample pH : < 2	Perservative :		
Thermometer ID : IR T 01	pH Paper ID : na	Lot# :		
Check Points		Yes	No	N/A
1. Cooler Seal present and signed.				N/A
2. Sample(s) in a cooler.		X		
3. If yes, ice in cooler.		X		
4. Sample(s) received with chain-of-custody.		X		
5. C-O-C signed and dated.		X		
6. Sample(s) received with signed sample custody seal.				N/A
7. Sample containers arrived intact. (If No comment)		X		
8. Matrix:	<input type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Liquid <input type="checkbox"/> Sludge <input type="checkbox"/> Solid <input type="checkbox"/> Cassette <input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Badge <input type="checkbox"/> Cansiter <input type="checkbox"/> Tedlar <input type="checkbox"/> Other			
9. Samples were received in appropriate container(s)		X		
10. Sample(s) were received with Proper preservative		X		
11. All samples were tagged or labeled.		X		
12. Sample ID labels match C-O-C ID's.		X		
13. Bottle count on C-O-C matches bottles found.		X		
14. Sample volume is sufficient for analyses requested.		X		
15. Samples were received with in the hold time.		X		
16. VOA vials completely filled.				N/A
17. Sample accepted.		X		
18. Has client been contacted about sub-out				N/A
Comments : Include actions taken to resolve discrepancies/problem: <div style="border: 1px solid black; height: 20px; width: 100%;"></div>				

Brought by :

Check in by/date :

Received by :

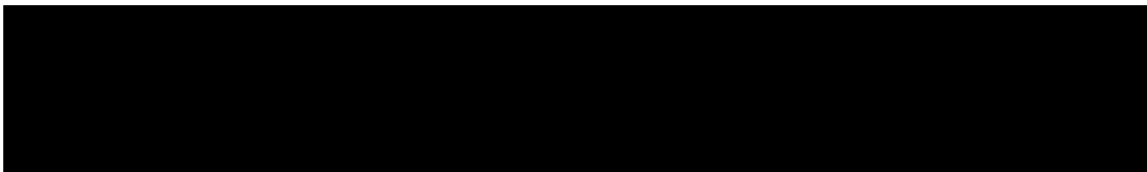
Verified by/date :

Phone :

Laboratory Analysis Report

Total Number of Pages: 7

Job ID : 26011225



Client Project Name :
[Redacted] Semi Annual WW

Report To : Client Name: [Redacted]
Attn: [Redacted]
Client Address: [Redacted]
City, State, Zip: [Redacted]

P.O.#.:
Sample Collected By:
Date Collected: 1/14/2026 10:15

[Redacted] has analyzed the following samples...

Client Sample ID	Matrix	[Redacted]
CJ00204	Waste Water	26011225.01

Released By: [Redacted]
Title: Reporting Associate
Date: 01/21/2026



This Laboratory is ADHS [Redacted] accredited. Effective:03/01/2024; Expires: 03/01/2026

This report cannot be reproduced, except in full, without prior written permission of [Redacted]. Results shown relate only to the items tested. Results apply to the sample as received. Samples are assumed to be in acceptable condition unless otherwise noted. Blank correction is not made unless otherwise noted. Air concentrations reported are based on field sampling information provided by the client. Soil samples are reported on a wet weight basis unless otherwise noted. Uncertainty estimates are available on request.

Date Received : 01/16/2026 10:15



LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 26011225

Date: 1/21/2026

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SDL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

D1 Sample required dilution due to matrix effects.

LABORATORY TEST RESULTS

Job ID : 26011225

Date 1/21/2026

Client Name: [Redacted] Attn: [Redacted]
Project Name: [Redacted]

Client Sample ID: CJ00204 Job Sample ID: 26011225.01
Date Collected: 01/14/26 Sample Matrix: Waste Water
Time Collected: 10:15
Other Information:

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
EPA 245.1	Total Metals - Mercury								
	Mercury	BRL	mg/L	4	0.0008		D1	01/19/26 12:17	[Redacted]



QUALITY CONTROL CERTIFICATE



Job ID : 26011225

Date : 1/21/2026

Analysis : Total Metals - Mercury Method : EPA 245.1 Reporting Units : mg/L

QC Batch ID : Qb26011932 Created Date : 01/19/26 Created By : [Redacted]

Samples in This QC Batch : 26011225.01

Digestion : PB26011922 Prep Method : EPA 245.1 Prep Date : 01/19/26 08:20 Prep By : [Redacted]

QC Type: Blank Result

QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit	Qual
Method Blank	Mercury	7439-97-6T	BRL	mg/L	1	0.0002	

QC Type: LCS and LCSD

Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Mercury	0.005	0.00494	98.8	0.005	0.00522	104	5.5	20	85-115	

QC Type: MS and MSD
QC Sample ID: 26011161.01

Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	BRL	0.005	0.00523	105						85-115	

QC Type: MS2 and MSD2
QC Sample ID: 26010720.01

Parameter	Sample Result	MS2 Spk Added	MS2 Result	MS2 % Rec	MSD2 Spk Added	MSD2 Result	MSD2 % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Mercury	BRL	0.005	0.00519	104						85-115	

Refer to the Definition page for terms.



Lab Number:

Subcontract Chain of Custody

[Redacted]

Customer Contact: [Redacted] Page of [Redacted]
 Company Name: [Redacted] Subcontract Lab: [Redacted]
 Address: [Redacted] Project Manager: [Redacted]
 City, State, Zip: [Redacted] Project Name: [Redacted]

Sample Receipt		Turn Around Request		Sample Matrix Type*	Preservative	Number of Containers	245.1 Hg
Temperature °C	Standard TAT	Standard TAT	S. 7 business days				
1.2				ww	HNO3	1	x
Custody Seals Yes No		Rush TAT: (Surcharges apply)					
Custody Seals Intact Yes No		24 Hours 48 Hours 72 Hours					
Total # of Containers		Requested Report Delivery Date					
189 KG		1/21/26					
Sample Information							
Lab #	Date Collected	Time Collected	Sample Identification				
1	1/14/26	10:15	C-J00204				
2							
3							
4							
5							
6							
7							
8							
9							
10							

* Job ID: 26011225



Elements: Al, As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Sb, Be, Co, Cu, Fe, Mn, Ni, Mo, Ti, V, Zn, Na, Ca, Mg, K, U, Ti, Li, Si,
 Special Requirements / Dilution NMT 4 to meet report limit requirements (0.001)
 Comments:

Date	Time	Samples Relinquished By	Date	Time	Received By
1/15/26	1450	[Redacted]	1/16/26	1015	[Redacted]
1/16/26	1015	[Redacted]			

All services are performed subject to the [Redacted] Standard Terms & Conditions unless otherwise specified in advance.
 Please email a new COC to your project manager with any necessary changes. Verbal changes are not accepted.

Sample Condition Checklist

A&B JobID : 26011225	Date Received : 01/16/2026	Time Received : 10:15AM		
Client Name : [REDACTED]				
Temperature : 1.2°C	Sample pH : <2 Metals	Preservative :		
Thermometer ID : IR10	pH Paper ID : LT131481	Lot# : LT		
Check Points		Yes	No	N/A
1. Cooler Seal present and signed.			X	
2. Sample(s) received with signed sample custody seal.			X	
3. Sample(s) in a cooler.		X		
4. If yes, ice in cooler.		X		
5. Sample(s) received with chain-of-custody.		X		
6. C-O-C signed and dated.		X		
7. Sample containers arrived intact. (If No comment)		X		
8. Matrix:				
	Water <input checked="" type="checkbox"/> Soil <input type="checkbox"/> Liquid <input type="checkbox"/> Sludge <input type="checkbox"/> Solid <input type="checkbox"/> Cassette <input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Badge <input type="checkbox"/> Canister <input type="checkbox"/> Tedlar <input type="checkbox"/> Paint Chips <input type="checkbox"/> Other <input type="checkbox"/>			
9. Container Type:				
	4oz <input type="checkbox"/> 8oz <input type="checkbox"/> 16oz <input type="checkbox"/> 32oz <input type="checkbox"/> 40ml <input type="checkbox"/> 120ml <input checked="" type="checkbox"/> 250ml <input type="checkbox"/> 500ml <input type="checkbox"/> 1000ml <input type="checkbox"/> Oil(20ml) <input type="checkbox"/>			
10. Samples were received in appropriate container(s)		X		
11. Sample(s) were received with Proper preservative		X		
12. All samples were tagged or labeled.		X		
13. Sample ID labels match C-O-C ID's.		X		
14. Bottle count on C-O-C matches bottles found.		X		
15. Sample volume is sufficient for analyses requested.		X		
16. Samples were received within the hold time.		X		
17. VOA vials completely filled.				N/A
18. Sample accepted.		X		
19. Has client been contacted about sub-out				N/A
20. For NAVSEA samples analyzed by NIOSH Method 1403, were all samples received at a temperature below 4°C				N/A
21. For NAVSEA samples analyzed by EPA TO11A, were all samples received at a temperature below 4°C				N/A
22. For NAVSEA samples, are the canister temperature and pressure recorded upon receipt?				N/A
Comments : Include actions taken to resolve discrepancies/problem:				

Brought by : [REDACTED]
 Received by : [REDACTED]

Check in by/date : [REDACTED]
 Verified by/date : [REDACTED]

Phone : [REDACTED]

LAB I.D. NUMBER

DATE: January 14, 2026 PAGE 1 OF 1

Sample Identification	Date	Time	Type	Lab ID	BOD/TSS	Total Metals (Cu, Pb)	Total Metals (As, Cd, Hg, Mo, Se, Ag, Zn)	Cyanide	Automated Sample Collection	Number/Containers
Parshall Flume	14-Jan-26	10:15	FWC	CJ00204	X	X	X		X	2
Parshall Flume	14-Jan-26	10:15	Grab	205				X		1

Sample Receipt

Project Name: **Semi-Annual WW**

Project ID: [Redacted]

No. Containers: 3

Custody Seals: Received Intact: Yes No

Received Cold: Yes No

Temperature: 50C

Field Measurements: **Blue**

RELINQUISHED BY:

Signature: [Redacted] Time: 11:50

Printed Name: [Redacted] Date: 1/14/2026

Company: [Redacted]

SAMPLED RECEIVED BY:

Signature: [Redacted] Time: 11:50

Printed Name: [Redacted] Date: 1-14-26

Company: [Redacted]

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Laboratory Analysis Report

Total Number of Pages: 8

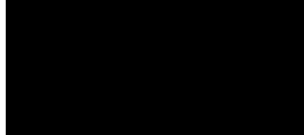
Job ID : 25050041



Client Project Name :
Semi Annual Metals

Report To :

Client Name:
Attn:
Client Address:
City, State, Zip:



P.O.#.:
Sample Collected By:
Date Collected: 05/07/25



A&B Labs has analyzed the following samples...

Client Sample ID	Matrix	Sample ID
- 100	Waste Water	25050041.01



Released By:
Title: Customer service manager
Date: 5/16/2025

ADHS ACCREDITATION CERTIFICATE NUMBER:- from 07/14/2024 to 07/13/2025
scope:- Waste Water, Solid ,Drinking water

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted in the attached exception reports. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been identified in the Laboratory Review Checklist, and that no information or data have been knowingly withheld that would affect the quality of the data.

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Date Received : 05/08/2025 12:53



Laboratory Report: Case Narrative

Job ID: 25050041

Date: 05/16/25

Client Name: [REDACTED]

Attn: [REDACTED]

Project Name: Semi Annual Metals

Date Received: 05/08/25

Collected By: [REDACTED]

All analytical test results meet laboratory quality control requirements unless otherwise noted in this case narrative or properly qualified within the sample results. Data qualifiers in this report are in accordance with ADEQ Data Qualifiers.

Please do not hesitate to contact us with any questions or concerns regarding your laboratory report. [REDACTED] is pleased to be of service to you and we look forward to fulfilling all of your future analytical needs.

Released By: [REDACTED]

Title: Customer service manager

LABORATORY TERM AND QUALIFIER DEFINITION REPORT

Job ID : 25050041

Date: 5/16/2025

General Term Definition

BRL	Below Reporting Limit	MQL	Unadjusted Minimum Quantitation Limit
cfu	colony-forming units	ppm	parts per million
Conc.	Concentration	Q	Qualifier
D.F.	Dilution Factor	RegLimit	Regulatory Limit
LCS	Laboratory Check Standard	RPD	Relative Percent Difference
LCSD	Laboratory Check Standard Duplicate	RptLimit	Reporting Limit
LOD	Limit of detection + DF	SDL	Sample Detection Limit
LOQ	Limit of Quantitation + DF	surr	Surrogate
MS	Matrix Spike	T	Time
MSD	Matrix Spike Duplicate	TNTC	Too numerous to count
MW	Molecular Weight	UQL	Unadjusted Upper Quantitation Limit

Qualifier Definition

LABORATORY TEST RESULTS

Job ID : 25050041

Date 5/16/2025

Client Name: [REDACTED]

Attn: [REDACTED]

Project Name: Semi Annual Metals

Client Sample ID: [REDACTED]

Job Sample ID: 25050041.01

Date Collected: 05/07/25

Sample Matrix Waste Water

Time Collected: 18:10

Other Information:

Test Method	Parameter/Test Description	Result	Units	DF	Rpt Limit	Reg Limit	Q	Date Time	Analyst
200.8	Metals by ICP-MS								
	Arsenic	0.026	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Cadmium	0.010	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Chromium	2.83	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Copper	1.05	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Lead	0.186	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Molybdenum	0.041	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Nickel	0.611	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]
	Selenium	0.006	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Silver	0.065	mg/L	1.00	0.002			05/15/25 14:06	[REDACTED]
	Zinc	1.39	mg/L	200.00	0.4			05/15/25 14:10	[REDACTED]

QUALITY CONTROL CERTIFICATE

Job ID : 25050041

Date : 5/16/2025

Analysis : Metals by ICP-MS **Method :** 200.8 **Reporting Units :** mg/L

QC Batch ID : Qb25051405 **Created Date :** 05/13/25 **Created By :** [REDACTED]

Samples in This QC Batch : 25050041.01

Digestion : PB25051202 **Prep Method :** EPA 200.8 **Prep Date :** 05/12/25 12:00 **Prep By :** [REDACTED]

QC Type: Blank Result								
QCType	Parameter	CAS #	Result	Units	D.F.	RptLimit		Qual
Method Blank	Arsenic	7440-38-2T	BRL	mg/L	1.00	0.002		
Method Blank	Cadmium	7440-43-9	BRL	mg/L	1.00	0.002		
Method Blank	Chromium	7440-47-3T	BRL	mg/L	1.00	0.002		
Method Blank	Copper	7440-50-8	BRL	mg/L	1.00	0.002		
Method Blank	Lead	7439-92-1T	BRL	mg/L	1.00	0.002		
Method Blank	Molybdenum	7439-98-7	BRL	mg/L	1.00	0.002		
Method Blank	Nickel	7440-02-0	BRL	mg/L	1.00	0.002		
Method Blank	Selenium	7782-49-2	BRL	mg/L	1.00	0.002		
Method Blank	Silver	7440-22-4	BRL	mg/L	1.00	0.002		
Method Blank	Zinc	7440-66-6T	BRL	mg/L	1.00	0.002		

QC Type: LCS and LCSD										
Parameter	LCS Spk Added	LCS Result	LCS % Rec	LCSD Spk Added	LCSD Result	LCSD % Rec	RPD	RPD CtrlLimit	%Recovery CtrlLimit	Qual
Arsenic	0.1	0.0959	95.9	0.1	0.0961	96.1	0.2	20	85-115	
Cadmium	0.1	0.0957	95.7	0.1	0.0974	97.4	1.7	20	85-115	
Chromium	0.1	0.0966	96.6	0.1	0.0959	95.9	0.7	20	85-115	
Copper	0.1	0.0956	95.6	0.1	0.0962	96.2	0.7	20	85-115	
Lead	0.1	0.0938	93.8	0.1	0.0945	94.5	0.7	20	85-115	
Molybdenum	0.1	0.0983	98.3	0.1	0.0986	98.6	0.2	20	85-115	
Nickel	0.1	0.0954	95.4	0.1	0.0947	94.7	0.8	20	85-115	
Selenium	0.1	0.100	100.0	0.1	0.0988	98.8	1.2	20	85-115	
Silver	0.1	0.0960	96.0	0.1	0.0960	96.0	0.0	20	85-115	
Zinc	0.1	0.0958	95.8	0.1	0.0951	95.1	0.8	20	85-115	

QC Type: MS and MSD											
QC Sample ID: 25050046.01											
Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Arsenic	0.00748	0.1	0.112	105	0.1	0.111	103	1.2	20	70-130	
Cadmium	BRL	0.1	0.0927	92.7	0.1	0.0932	93.2	0.5	20	70-130	
Chromium	0.00736	0.1	0.107	100	0.1	0.108	100	0.2	20	70-130	
Copper	0.0106	0.1	0.108	97.7	0.1	0.105	94.8	2.8	20	70-130	
Lead	BRL	0.1	0.0894	89.4	0.1	0.0886	88.6	0.9	20	70-130	
Molybdenum	0.00371	0.1	0.106	102	0.1	0.106	103	0.7	20	70-130	
Nickel	0.0512	0.1	0.147	95.7	0.1	0.147	96	0.2	20	70-130	
Selenium	0.00801	0.1	0.121	113	0.1	0.120	112	0.5	20	70-130	

Refer to the Definition page for terms.

QUALITY CONTROL CERTIFICATE



Job ID : 25050041

Date : 5/16/2025

Analysis : Metals by ICP-MS

Method : 200.8

Reporting Units : mg/L

QC Batch ID : Qb25051405

Created Date : 05/13/25

Created By :

Samples in This QC Batch : 25050041.01

QC Type: MS and MSD											
QC Sample ID: 25050046.01											
Parameter	Sample Result	MS Spk Added	MS Result	MS % Rec	MSD Spk Added	MSD Result	MSD % Rec	RPD	RPD CtrlLimit	%Rec CtrlLimit	Qual
Silver	BRL	0.1	0.0910	91	0.1	0.0906	90.6	0.5	20	70-130	
Zinc	0.0551	0.1	0.147	91.5	0.1	0.148	93.1	1.1	20	70-130	

Chain of Custody / Analysis Request

Lab Number:

25050041

Customer Contact:	Page 1 of 1
Company Name:	PO number:
Address:	Sampler (Print):
City, State, Zip:	Project Name: <i>Semi Annual / weekly</i>
	Project Number:

Phone: [Redacted] E-Mail Address: [Redacted]

Sample Receipt	Turn Around Request	Analytical Parameters and Methods Requested
Temperature <u>24</u> °C	Standard TAT: <u>7</u> 5-7 business days	200.8 - Cd, Cr, Pb, Cu, Ni, Zn, Ag, Mo, Se, As
Custody Seals: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Rush TAT: (Surcharges apply)	
Custody Seals Intact: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/> 72 Hours <input type="checkbox"/>	
Total # of Containers: <u>1</u>	Requested Report Delivery Date:	

Sample Information				Sample Matrix Type*	Preservative	Number of Containers	Analytical Parameters and Methods Requested										Composite / Grab			
Lab #	Date Collected	Time Collected	Sample Identification																	
1	5-7-25	18:10	[Redacted] - 100	ww	HNO3	1	x													
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Elements: Al, As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Sb, Be, Co, Cu, Fe, Mn, Ni, Mo, Ti, V, Zn, Na, Ca, Mg, K, U, Ti, Li, Si,

Special Requirements / Comments:

Matrix* S=Soil/Solid WW=WasteWater DW=Drinking Water GW=Groundwater A=Air O=Other

Date:	Time:	Samples Relinquished By:	Date:	Time:	Received By:
5-8-25	12:45	[Redacted]	5/8/25	12:53	[Redacted]

All services are performed subject to the [Redacted] Standard Terms & Conditions unless otherwise specified in advance. Please email a new COC to your project manager with any necessary changes. Verbal changes are not accepted.



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ANALYTICAL REPORT

PREPARED FOR

Attn: [Redacted]



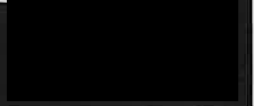
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JOB DESCRIPTION

CN BATCH

JOB NUMBER

550-221597-1



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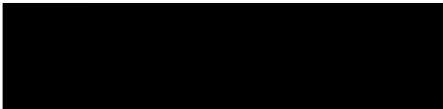


Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the [REDACTED] Project Manager.

Authorization



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Authorized for release by

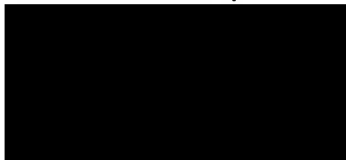


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Definitions/Glossary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1



Qualifiers

General Chemistry

Qualifier	Qualifier Description
L4	The associated blank spike recovery was below method acceptance limits.
N7	Additional analysis was not performed based on the "Total" result which was below the requested analyte's MCL/Action level/Trigger level.
Q7	Sample inadequately dechlorinated.
T5	Laboratory not licensed for this parameter

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
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)
TNTC	Too Numerous To Count



Case Narrative

Client: [REDACTED]
Project: CN BATCH

Job ID: 550-221597-1

Job ID: 550-221597-1

Job Narrative 550-221597-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The sample was received on 7/31/2024 8:40 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.5°C.

General Chemistry

Method 4500_CN_E: The laboratory control sample duplicate (LCSD) associated with preparation batch 550-324333 and analytical batch 550-324361 was outside acceptance criteria. The batch laboratory control sample (LCS) and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within acceptance limits and may be used to evaluate matrix performance and batch accuracy. Relative percent differences (RPD) for both LCS/LCSD and MS/MSD were acceptable and demonstrate batch precision. Thus, the data has been flagged with L4 flags and reported.

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



Sample Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

<u>Lab Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Collected</u>	<u>Received</u>
550-221597-1	CN BATCH	Water	07/31/24 07:00	07/31/24 08:40

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Detection Summary

Client: [REDACTED]

Job ID: 550-221597-1

Project/Site: CN BATCH

Client Sample ID: CN BATCH

Lab Sample ID: 550-221597-1

No Detections.

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This Detection Summary does not include radiochemical test results.



Client Sample Results

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Client Sample ID: CN BATCH

Lab Sample ID: 550-221597-1

Date Collected: 07/31/24 07:00

Matrix: Water

Date Received: 07/31/24 08:40

General Chemistry									
Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil	Fac
Cyanide, Total (SM 4500 CN E)	ND	L4 Q7	0.050	mg/L		08/01/24 14:23	08/01/24 16:27		1
Cyanide, Amenable (SM 4500 CN G)	ND	L4 N7	0.050	mg/L			08/06/24 19:00		1
Cyanide, Non-amenable (SM 4500 CN G)	ND	N7 Q7 T5	0.050	mg/L		08/01/24 14:23	08/01/24 16:27		1



QC Sample Results

Client: XXXXXXXXXX
 Project/Site: CN BATCH

Job ID: 550-221597-1

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 550-324333/1-A
 Matrix: Water
 Analysis Batch: 324361

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 324333

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.050	mg/L		08/01/24 14:23	08/01/24 16:27	1

Lab Sample ID: LCS 550-324333/2-A
 Matrix: Water
 Analysis Batch: 324361

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 324333

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.0926		mg/L		93	90 - 110

Lab Sample ID: LCSD 550-324333/3-A
 Matrix: Water
 Analysis Batch: 324361

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 324333

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Cyanide, Total	0.100	0.0877	L4	mg/L		88	90 - 110	5	20

Lab Sample ID: 550-221420-B-1-B MS
 Matrix: Water
 Analysis Batch: 324361

Client Sample ID: Matrix Spike
 Prep Type: Total/NA
 Prep Batch: 324333

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	ND	L4	0.100	0.0864		mg/L		86	80 - 120

Lab Sample ID: 550-221420-B-1-C MSD
 Matrix: Water
 Analysis Batch: 324361

Client Sample ID: Matrix Spike Duplicate
 Prep Type: Total/NA
 Prep Batch: 324333

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Cyanide, Total	ND	L4	0.100	0.0911		mg/L		91	80 - 120	5	20

Method: SM 4500 CN G - Cyanide, Amenable

Lab Sample ID: MB 550-324483/1
 Matrix: Water
 Analysis Batch: 324483

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Amenable	ND		0.050	mg/L			08/06/24 19:00	1

Lab Sample ID: LCS 550-324483/2
 Matrix: Water
 Analysis Batch: 324483

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Amenable	0.100	0.0926		mg/L		93	90 - 110



QC Sample Results

Client: XXXXXXXXXX
 Project/Site: CN BATCH

Job ID: 550-221597-1

Method: SM 4500 CN G - Cyanide, Amenable (Continued)

Lab Sample ID: LCSD 550-324483/3				Client Sample ID: Lab Control Sample Dup						
Matrix: Water				Prep Type: Total/NA						
Analysis Batch: 324483										
Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit	
Cyanide, Amenable	0.100	0.0877	L4	mg/L		88	90 - 110	5	20	

Lab Sample ID: 550-221420-B-1 MS				Client Sample ID: Matrix Spike						
Matrix: Water				Prep Type: Total/NA						
Analysis Batch: 324483										
Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	
Cyanide, Amenable	ND	L4 N7	0.100	0.0864		mg/L		86	80 - 120	

Lab Sample ID: 550-221420-B-1 MSD				Client Sample ID: Matrix Spike Duplicate							
Matrix: Water				Prep Type: Total/NA							
Analysis Batch: 324483											
Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Amenable	ND	L4 N7	0.100	0.0911		mg/L		91	80 - 120	5	20

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QC Association Summary

Client: XXXXXXXXXX
 Project/Site: CN BATCH

Job ID: 550-221597-1

General Chemistry

Prep Batch: 324333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN C	
MB 550-324333/1-A	Method Blank	Total/NA	Water	SM 4500 CN C	
LCS 550-324333/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN C	
LCSD 550-324333/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN C	
550-221420-B-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN C	
550-221420-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN C	

Analysis Batch: 324361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN E	324333
MB 550-324333/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	324333
LCS 550-324333/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	324333
LCSD 550-324333/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN E	324333
550-221420-B-1-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	324333
550-221420-B-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	324333

Analysis Batch: 324465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN G	324333

Analysis Batch: 324483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221597-1	CN BATCH	Total/NA	Water	SM 4500 CN G	
MB 550-324483/1	Method Blank	Total/NA	Water	SM 4500 CN G	
LCS 550-324483/2	Lab Control Sample	Total/NA	Water	SM 4500 CN G	
LCSD 550-324483/3	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN G	
550-221420-B-1 MS	Matrix Spike	Total/NA	Water	SM 4500 CN G	
550-221420-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN G	

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Lab Chronicle

Client: [REDACTED]

Job ID: 550-221597-1

Project/Site: CN BATCH

Client Sample ID: CN BATCH

Lab Sample ID: 550-221597-1

Date Collected: 07/31/24 07:00

Matrix: Water

Date Received: 07/31/24 08:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	SM 4500 CN C			324333	[REDACTED]	[REDACTED]	08/01/24 14:23
Total/NA	Analysis	SM 4500 CN E		1	324361	[REDACTED]	[REDACTED]	08/01/24 16:27
Total/NA	Prep	SM 4500 CN C			324333	[REDACTED]	[REDACTED]	08/01/24 14:23
Total/NA	Analysis	SM 4500 CN G		1	324465	[REDACTED]	[REDACTED]	08/01/24 16:27
Total/NA	Analysis	SM 4500 CN G		1	324483	[REDACTED]	[REDACTED]	08/06/24 19:00

Laboratory References:

[REDACTED]

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[REDACTED]

Accreditation/Certification Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Laboratory: [REDACTED]

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Arizona	State	[REDACTED]	06-10-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 4500 CN G	SM 4500 CN C	Water	Cyanide, Non-amenable

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Method Summary

Client: [REDACTED]
Project/Site: CN BATCH

Job ID: 550-221597-1

Method	Method Description	Protocol	Laboratory
SM 4500 CN E	Cyanide, Total	SM	[REDACTED]
SM 4500 CN G	Cyanide, Amenable	SM	[REDACTED]
SM 4500 CN C	Cyanide, Distillation	SM	[REDACTED]

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

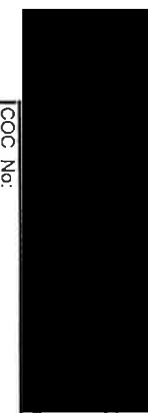
[REDACTED]

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[REDACTED]

Chain of Custody Record

221597



Regulatory Program: DW NPDES RCRA Other:

Project Manager:

Email:

Tel/Fax:

Analysis Turnaround Time

CALENDAR DAYS

WORKING DAYS

TAT if different from Below

2 weeks

1 week

2 days

1 day

Company Name: [Redacted]
 Address: [Redacted]
 City/State/Zip: [Redacted]
 Phone: [Redacted]
 FAX: [Redacted]
 Project Name: CN BATCH
 Site: [Redacted]
 P O #:

Sample Identification

CN BATCH -01

Sample Date

Sample Time

Sample Type (c=Comp, g=Grab)

G

Matrix

WV

of Cont.

1

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

X CN TOTAL/FRE

Site Contact:

Date:

Carrier:

COC No:

of COCs

TALS Project #:

Sampler:

For Lab Use Only:

Walk-in Client:

Lab Sampling:

Job / SDG No.:

Sample Specific Notes:



Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months

Custody Seals Intact: Yes No

Relinquished by:

Custody Seal No.:

Date/Time:

Received by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Received in Laboratory by:

Company:

Date/Time:

3,5'c-c DO-ice

Login Sample Receipt Checklist

Client: [REDACTED]

Job Number: 550-221597-1
SDG Number:

Login Number: 221597

List Number: 1

Creator: [REDACTED]

List Source: [REDACTED]

Question	Answer	Comment
Radioactivity wasn't checked or is \leq 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 (excluding tests with immediate HTs)	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 $<6\text{mm}$ (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.

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ANALYTICAL REPORT

PREPARED FOR

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JOB DESCRIPTION

07182024_5
07182024_5

JOB NUMBER

550-221040-1



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Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the [REDACTED] Project Manager.

Authorization

[REDACTED]

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Definitions/Glossary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Qualifiers

General Chemistry

Qualifier	Qualifier Description
D2	Sample required dilution due to high concentration of analyte.
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.
K6	Glucose/glutamic acid BOD was below method acceptance criteria.
L4	The associated blank spike recovery was below method acceptance limits.
R12	RPD/RSD exceeded the method acceptance limit. Result less than 5 times the PQL..

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
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
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)
TNTC	Too Numerous To Count

Case Narrative

Client: [REDACTED]
Project: 07182024_5

Job ID: 550-221040-1

Job ID: 550-221040-1

Job Narrative 550-221040-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The sample was received on 7/18/2024 10:10 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.4°C.

HPLC/IC

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

Metals

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

General Chemistry

Method SM5210B_Calc: The samples associated with analytical batch 550-323765 failed quality control criteria for method SM 5210B Biochemical Oxygen Demand (BOD); the laboratory control sample (LCS) - Glucose Glutamic Acid (GGA) result was below the method specified range of 198 (+/-) 30 mg/L. Therefore, the associated sample data has been compromised due to the failing QC and shall only be reported at the request of the user for internal purposes. The method holding time had exceeded, therefore the analysis was not repeated. As such, data have been reported and qualified. (LCS 550-323765/2)

Method SM5210B_Calc: The sample duplicate (DU) precision for the following sample associated with 550-323765 was outside control limits for Biochemical Oxygen Demand (BOD): (550-220999-A-1) and (550-220999-A-1 DU). Non-homogeneity of the sample matrix was suspected.

Method SM5210B_Calc: All the dilution bottles prepared for Biochemical Oxygen Demand (BOD) failed to deplete the method-required 2.00 mg/L of dissolved oxygen for the following sample: 07182024_5 (550-221040-1). Only a "less than" result could be calculated from the least dilute preparation which was less than the reporting limit (RL). As such, the result has been reported and qualified with K1, D1 and D5 flags.

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

Sample Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-221040-1	07182024_5	Water	07/18/24 06:20	07/18/24 10:10

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Detection Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Client Sample ID: 07182024_5

Lab Sample ID: 550-221040-1

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	1.7		0.40	mg/L	1		300.0	Total/NA
Copper	0.12		0.010	mg/L	1		200.7 Rev 4.4	Total/NA
Total Suspended Solids	260		10	mg/L	1		SM 2540D	Total/NA

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This Detection Summary does not include radiochemical test results.



Client Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Client Sample ID: 07182024_5
 Date Collected: 07/18/24 06:20
 Date Received: 07/18/24 10:10

Lab Sample ID: 550-221040-1
 Matrix: Water

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.7		0.40	mg/L			07/24/24 13:23	1

Method: EPA 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	mg/L		07/23/24 09:00	07/24/24 21:03	1
Cadmium	ND		0.0030	mg/L		07/23/24 09:00	07/24/24 21:03	1
Copper	0.12		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Lead	ND		0.015	mg/L		07/23/24 09:00	07/24/24 21:03	1
Molybdenum	ND		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Selenium	ND		0.10	mg/L		07/23/24 09:00	07/24/24 21:03	1
Silver	ND		0.010	mg/L		07/23/24 09:00	07/24/24 21:03	1
Zinc	ND		0.050	mg/L		07/23/24 09:00	07/24/24 21:03	1

Method: EPA 245.1 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	mg/L		07/26/24 12:44	07/26/24 15:38	1

General Chemistry

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids (SM 2540D)	260		10	mg/L			07/23/24 18:37	1
Cyanide, Total (SM 4500 CN E)	ND		0.0080	mg/L		07/25/24 16:43	07/26/24 19:53	1
Biochemical Oxygen Demand (SM 5210B)	ND	D2 D5 K1 K6 L4	10	mg/L			07/18/24 15:00	2



QC Sample Results

Client: XXXXXXXXXX
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 550-323970/2
 Matrix: Water
 Analysis Batch: 323970

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.40	mg/L			07/24/24 11:51	1

Lab Sample ID: LCS 550-323970/5
 Matrix: Water
 Analysis Batch: 323970

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	4.00	4.10		mg/L		103	90 - 110

Lab Sample ID: LCSD 550-323970/6
 Matrix: Water
 Analysis Batch: 323970

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
Fluoride	4.00	4.10		mg/L		103	90 - 110	0	20

Lab Sample ID: 550-221040-1 MS
 Matrix: Water
 Analysis Batch: 323970

Client Sample ID: 07182024_5
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	1.7		4.00	5.03		mg/L		84	80 - 120

Lab Sample ID: 550-221040-1 MSD
 Matrix: Water
 Analysis Batch: 323970

Client Sample ID: 07182024_5
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Fluoride	1.7		4.00	5.01		mg/L		84	80 - 120	0	20

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 550-323908/1-A
 Matrix: Water
 Analysis Batch: 324025

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 323908

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	mg/L		07/23/24 09:00	07/24/24 20:42	1
Cadmium	ND		0.0030	mg/L		07/23/24 09:00	07/24/24 20:42	1
Copper	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Lead	ND		0.015	mg/L		07/23/24 09:00	07/24/24 20:42	1
Molybdenum	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Selenium	ND		0.10	mg/L		07/23/24 09:00	07/24/24 20:42	1
Silver	ND		0.010	mg/L		07/23/24 09:00	07/24/24 20:42	1
Zinc	ND		0.050	mg/L		07/23/24 09:00	07/24/24 20:42	1

QC Sample Results

Client: XXXXXXXXXX
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 550-323908/2-A
Matrix: Water
Analysis Batch: 324025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 323908

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.00	1.07		mg/L		107	85 - 115
Cadmium	1.00	1.05		mg/L		105	85 - 115
Copper	1.00	0.986		mg/L		99	85 - 115
Lead	1.00	1.06		mg/L		106	85 - 115
Molybdenum	1.00	1.08		mg/L		108	85 - 115
Selenium	1.00	1.07		mg/L		107	85 - 115
Silver	0.0750	0.0734		mg/L		98	85 - 115
Zinc	1.00	1.08		mg/L		108	85 - 115

Lab Sample ID: LCSD 550-323908/3-A
Matrix: Water
Analysis Batch: 324025

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 323908

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	1.00	1.06		mg/L		106	85 - 115	0	20
Cadmium	1.00	1.06		mg/L		106	85 - 115	1	20
Copper	1.00	0.998		mg/L		100	85 - 115	1	20
Lead	1.00	1.07		mg/L		107	85 - 115	1	20
Molybdenum	1.00	1.10		mg/L		110	85 - 115	2	20
Selenium	1.00	1.09		mg/L		109	85 - 115	2	20
Silver	0.0750	0.0744		mg/L		99	85 - 115	1	20
Zinc	1.00	1.09		mg/L		109	85 - 115	1	20

Lab Sample ID: 550-221039-D-1-A MS
Matrix: Water
Analysis Batch: 324025

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 323908

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	ND		1.00	1.09		mg/L		109	70 - 130
Cadmium	ND		1.00	1.06		mg/L		106	70 - 130
Copper	0.074		1.00	1.09		mg/L		101	70 - 130
Lead	ND		1.00	1.03		mg/L		103	70 - 130
Molybdenum	ND		1.00	1.06		mg/L		106	70 - 130
Selenium	ND		1.00	1.07		mg/L		107	70 - 130
Silver	ND		0.0750	0.0750		mg/L		100	70 - 130
Zinc	ND		1.00	1.08		mg/L		108	70 - 130

Lab Sample ID: 550-221039-D-1-B MSD
Matrix: Water
Analysis Batch: 324025

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 323908

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	ND		1.00	1.10		mg/L		110	70 - 130	1	20
Cadmium	ND		1.00	1.07		mg/L		107	70 - 130	1	20
Copper	0.074		1.00	1.09		mg/L		102	70 - 130	0	20
Lead	ND		1.00	1.04		mg/L		104	70 - 130	1	20
Molybdenum	ND		1.00	1.07		mg/L		107	70 - 130	1	20
Selenium	ND		1.00	1.08		mg/L		108	70 - 130	1	20
Silver	ND		0.0750	0.0753		mg/L		100	70 - 130	0	20

QC Sample Results

Client: XXXXXXXXXX
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 550-221039-D-1-B MSD
 Matrix: Water
 Analysis Batch: 324025

Client Sample ID: Matrix Spike Duplicate
 Prep Type: Total/NA
 Prep Batch: 323908

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Zinc	ND		1.00	1.09		mg/L		109	70 - 130	1	20

Method: 245.1 - Mercury (CVAA)

Lab Sample ID: MB 550-324097/1-A
 Matrix: Water
 Analysis Batch: 324113

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 324097

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00020	mg/L		07/26/24 12:44	07/26/24 15:22	1

Lab Sample ID: LCS 550-324097/2-A
 Matrix: Water
 Analysis Batch: 324113

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 324097

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00500	0.00480		mg/L		96	85 - 115

Lab Sample ID: LCSD 550-324097/3-A
 Matrix: Water
 Analysis Batch: 324113

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 324097

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00500	0.00481		mg/L		96	85 - 115	0	20

Lab Sample ID: 550-221040-1 MS
 Matrix: Water
 Analysis Batch: 324113

Client Sample ID: 07182024_5
 Prep Type: Total/NA
 Prep Batch: 324097

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.00500	0.00582		mg/L		116	70 - 130

Lab Sample ID: 550-221040-1 MSD
 Matrix: Water
 Analysis Batch: 324113

Client Sample ID: 07182024_5
 Prep Type: Total/NA
 Prep Batch: 324097

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	ND		0.00500	0.00565		mg/L		113	70 - 130	3	20

Method: SM 2540D - Solids, Total Suspended (TSS)

Lab Sample ID: MB 550-323943/1
 Matrix: Water
 Analysis Batch: 323943

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	ND		10	mg/L			07/23/24 18:37	1

QC Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: SM 2540D - Solids, Total Suspended (TSS) (Continued)

Lab Sample ID: LCS 550-323943/2
 Matrix: Water
 Analysis Batch: 323943

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	200	197		mg/L		99	90 - 110

Lab Sample ID: LCSD 550-323943/3
 Matrix: Water
 Analysis Batch: 323943

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
Total Suspended Solids	200	199		mg/L		100	90 - 110	1	10

Lab Sample ID: 550-221030-A-1 DU
 Matrix: Water
 Analysis Batch: 323943

Client Sample ID: Duplicate
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Suspended Solids	57		54.0		mg/L		5	10

Method: SM 4500 CN E - Cyanide, Total (Low Level)

Lab Sample ID: MB 550-324066/1-A
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.0080	mg/L		07/25/24 16:43	07/26/24 19:53	1

Lab Sample ID: LCS 550-324066/2-A
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.0921		mg/L		92	90 - 110

Lab Sample ID: LCSD 550-324066/3-A
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Total	0.100	0.102		mg/L		102	90 - 110	10	20

Lab Sample ID: 550-221039-A-2-B MS
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Matrix Spike
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	ND		0.100	0.0972		mg/L		97	80 - 120

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QC Sample Results

Client: [REDACTED]
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

Method: SM 4500 CN E - Cyanide, Total (Low Level) (Continued)

Lab Sample ID: 550-221039-A-2-C MSD
 Matrix: Water
 Analysis Batch: 324124

Client Sample ID: Matrix Spike Duplicate
 Prep Type: Total/NA
 Prep Batch: 324066

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cyanide, Total	ND		0.100	0.0887		mg/L		89	80 - 120	9	20

Method: SM 5210B - BOD, 5-Day

Lab Sample ID: MB 550-323765/1
 Matrix: Water
 Analysis Batch: 323765

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

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Biochemical Oxygen Demand	ND		5.0	mg/L			07/18/24 15:00	1

Lab Sample ID: LCS 550-323765/2
 Matrix: Water
 Analysis Batch: 323765

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Biochemical Oxygen Demand	198	135	K6 L4	mg/L		68	84.6 - 115.4

Lab Sample ID: 550-220999-A-1 DU
 Matrix: Water
 Analysis Batch: 323765

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	<14.57	D2 K6 K1 L4	<23.57	D2 K1 K6 L4 R12	mg/L		NC	20



QC Association Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

HPLC/IC

Analysis Batch: 323970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	300.0	
MB 550-323970/2	Method Blank	Total/NA	Water	300.0	
LCS 550-323970/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 550-323970/6	Lab Control Sample Dup	Total/NA	Water	300.0	
550-221040-1 MS	07182024_5	Total/NA	Water	300.0	
550-221040-1 MSD	07182024_5	Total/NA	Water	300.0	

Metals

Prep Batch: 323908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	200.7	
MB 550-323908/1-A	Method Blank	Total/NA	Water	200.7	
LCS 550-323908/2-A	Lab Control Sample	Total/NA	Water	200.7	
LCSD 550-323908/3-A	Lab Control Sample Dup	Total/NA	Water	200.7	
550-221039-D-1-A MS	Matrix Spike	Total/NA	Water	200.7	
550-221039-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7	

Analysis Batch: 324025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	200.7 Rev 4.4	323908
MB 550-323908/1-A	Method Blank	Total/NA	Water	200.7 Rev 4.4	323908
LCS 550-323908/2-A	Lab Control Sample	Total/NA	Water	200.7 Rev 4.4	323908
LCSD 550-323908/3-A	Lab Control Sample Dup	Total/NA	Water	200.7 Rev 4.4	323908
550-221039-D-1-A MS	Matrix Spike	Total/NA	Water	200.7 Rev 4.4	323908
550-221039-D-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	200.7 Rev 4.4	323908

Prep Batch: 324097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	245.1	
MB 550-324097/1-A	Method Blank	Total/NA	Water	245.1	
LCS 550-324097/2-A	Lab Control Sample	Total/NA	Water	245.1	
LCSD 550-324097/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	
550-221040-1 MS	07182024_5	Total/NA	Water	245.1	
550-221040-1 MSD	07182024_5	Total/NA	Water	245.1	

Analysis Batch: 324113

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	245.1	324097
MB 550-324097/1-A	Method Blank	Total/NA	Water	245.1	324097
LCS 550-324097/2-A	Lab Control Sample	Total/NA	Water	245.1	324097
LCSD 550-324097/3-A	Lab Control Sample Dup	Total/NA	Water	245.1	324097
550-221040-1 MS	07182024_5	Total/NA	Water	245.1	324097
550-221040-1 MSD	07182024_5	Total/NA	Water	245.1	324097

General Chemistry

Analysis Batch: 323765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	SM 5210B	
MB 550-323765/1	Method Blank	Total/NA	Water	SM 5210B	
LCS 550-323765/2	Lab Control Sample	Total/NA	Water	SM 5210B	

QC Association Summary

Client: XXXXXXXXXX
 Project/Site: 07182024_5

Job ID: 550-221040-1
 SDG: 07182024_5

General Chemistry (Continued)

Analysis Batch: 323765 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-220999-A-1 DU	Duplicate	Total/NA	Water	SM 5210B	

Analysis Batch: 323943

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	SM 2540D	
MB 550-323943/1	Method Blank	Total/NA	Water	SM 2540D	
LCS 550-323943/2	Lab Control Sample	Total/NA	Water	SM 2540D	
LCSD 550-323943/3	Lab Control Sample Dup	Total/NA	Water	SM 2540D	
550-221030-A-1 DU	Duplicate	Total/NA	Water	SM 2540D	

Prep Batch: 324066

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	SM 4500 CN C	
MB 550-324066/1-A	Method Blank	Total/NA	Water	SM 4500 CN C	
LCS 550-324066/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN C	
LCSD 550-324066/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN C	
550-221039-A-2-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN C	
550-221039-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN C	

Analysis Batch: 324124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-221040-1	07182024_5	Total/NA	Water	SM 4500 CN E	324066
MB 550-324066/1-A	Method Blank	Total/NA	Water	SM 4500 CN E	324066
LCS 550-324066/2-A	Lab Control Sample	Total/NA	Water	SM 4500 CN E	324066
LCSD 550-324066/3-A	Lab Control Sample Dup	Total/NA	Water	SM 4500 CN E	324066
550-221039-A-2-B MS	Matrix Spike	Total/NA	Water	SM 4500 CN E	324066
550-221039-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 CN E	324066

Lab Chronicle

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Client Sample ID: 07182024_5
Date Collected: 07/18/24 06:20
Date Received: 07/18/24 10:10

Lab Sample ID: 550-221040-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	323970	[REDACTED]	[REDACTED]	07/24/24 13:23
Total/NA	Prep	200.7			323908	[REDACTED]	[REDACTED]	07/23/24 09:00
Total/NA	Analysis	200.7 Rev 4.4		1	324025	[REDACTED]	[REDACTED]	07/24/24 21:03
Total/NA	Prep	245.1			324097	[REDACTED]	[REDACTED]	07/26/24 12:44
Total/NA	Analysis	245.1		1	324113	[REDACTED]	[REDACTED]	07/26/24 15:38
Total/NA	Analysis	SM 2540D		1	323943	[REDACTED]	[REDACTED]	07/23/24 18:37 - 07/25/24 16:34 ¹
Total/NA	Prep	SM 4500 CN C			324066	[REDACTED]	[REDACTED]	07/25/24 16:43
Total/NA	Analysis	SM 4500 CN E		1	324124	[REDACTED]	[REDACTED]	07/26/24 19:53
Total/NA	Analysis	SM 5210B		2	323765	[REDACTED]	[REDACTED]	07/18/24 15:00 - 07/23/24 11:31 ¹

¹ This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

[REDACTED]



Accreditation/Certification Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Laboratory: [REDACTED]

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arizona	State	[REDACTED]	06-10-25

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[REDACTED]

Method Summary

Client: [REDACTED]
Project/Site: 07182024_5

Job ID: 550-221040-1
SDG: 07182024_5

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	[REDACTED]
200.7 Rev 4.4	Metals (ICP)	EPA	[REDACTED]
245.1	Mercury (CVAA)	EPA	[REDACTED]
SM 2540D	Solids, Total Suspended (TSS)	SM	[REDACTED]
SM 4500 CN E	Cyanide, Total (Low Level)	SM	[REDACTED]
SM 5210B	BOD, 5-Day	SM	[REDACTED]
200.7	Preparation, Total Metals	EPA	[REDACTED]
245.1	Preparation, Mercury	EPA	[REDACTED]
SM 4500 CN C	Cyanide, Distillation	SM	[REDACTED]

Protocol References:

- EPA = US Environmental Protection Agency
- SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

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CHAIN OF CUSTODY FORM

221840

7/29/2024

Project Number: 07182024_5 -01 Project Manager: [Redacted] Matrix: Waste Water Sampler: [Redacted]

Date Time	Container	Bottles	Analysis Method	Sampling Method	Preservatives	Analysis Required	Unit	TAT	Notes
7/19/24 C: 20 am	250 ml Poly	1	EPA 200.7	Grab	4C, HNO3	Arsenic, Cadmium, Copper, Lead, Molybdenum, Selenium, Silver, Zinc	mg/L		
	250 ml Poly	1	M5210B	Grab	4C	Biochemical Oxygen Demand	mg/L		
	500 ml Poly	1	SMA4500-CN-C,E	Grab	4C, NaOH	Cyanide (T)	mg/L		
	500 ml Poly	1	EPA 300.0	Grab	4C	Fluoride	mg/L		
	250 ml Poly	1	EPA 245.1	Grab	4C, HNO3	Mercury	mg/L		
	250 ml Poly	1	M2540	Grab	4C	Total Suspended Solids	mg/L		



Relinquished By	Date Time	Received By	Date Time	Sample Integrity Check	Temperature Upon Receipt
[Redacted]		[Redacted]			0.4°C ICE CP 0
[Redacted]		[Redacted]			
[Redacted]		[Redacted]			

Login Sample Receipt Checklist

Client: [REDACTED]

Job Number: 550-221040-1
SDG Number: 07182024_5

Login Number: 221040

List Number: 1

Creator: [REDACTED]

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.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	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.

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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

CH ₄	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 ₂ S	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 one 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,

GLOSSARY

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 biochemical oxidation of organic matter under standard laboratory procedure, five (5) days at 20^o 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.

GLOSSARY

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*).

GLOSSARY

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 Wastestream 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.

GLOSSARY

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 given 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 be 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 one of the two criteria: 1) it has one of the following four characteristics – ignitability, 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 be analyzed in the laboratory in accordance with standard preservation, storage and analytical procedures.

Hydrogen Sulfide (H₂S) – 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. H₂S 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 – Equivalent 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.

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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.

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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

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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^o 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.

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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 Suspended 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

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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^o.

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

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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.

PRETREATMENT POINT SOURCE CATEGORIES

Pretreatment Point Source Categories

EPA has developed regulations for over twenty industrial categories which are based on the wastewater effluent quality that can be achieved using established treatment technologies. Specific regulations and effluent limitations are set for each industrial category. The following categories are currently regulated; however, the EPA may add or delete categories in the future. Further information regarding a specific category's regulations can be obtained by contacting the Environmental Services Division Industrial Pretreatment Program (IPP) Section.

1. Aluminum Forming (40 CFR 467): EPA defines aluminum forming as "the deformation of aluminum or aluminum alloys into specific shapes by hot or cold working such as rolling, extrusion, forging, and drawing." Surface treatment and heat treatment of aluminum parts that are formed at the same plant site are subject to the Aluminum Forming Regulations and are not covered by the Electroplating and Metal Finishing regulations (**40 CFR 413 & 433**). Casting of aluminum that is subsequently formed at the same plant site is also subject to the Aluminum Forming Regulations. Discharge from the forming operation is not required to be subject to this regulation.

2. Battery Manufacturing (40 CFR 461): Battery manufacturing encompasses the production of modular electric power sources where all or part of the fuel is contained within the unit and electric power is generated directly from a chemical reaction rather than indirectly through a heat cycle engine.

3. Carbon Black Manufacturing (40 CFR 458): This category consists of facilities which manufacture carbon black by the furnace, thermal, channel or lamp processes. Only facilities which have been constructed or significantly modified since May 18, 1976 are regulated.

4. Centralized Waste Treatment (40 CFR 437): This category consists of facilities that receive wastes from off-site for treatment.

5. Coil Coating (40 CFR 465): EPA regulations state that "Coil coating consists of that sequence or combination of steps or operations which clean, surface or conversion coat, and apply an organic (paint) coating to a long thin strip or coil of metal."

6. Can Making (40 CFR 465): This classification is a subcategory of coil coating and has been defined to be "the process or processes used to manufacture a can from a base metal, including aluminum and steel." This category applies to seamless cans only.

7. Copper Forming (40 CFR 468): This category regulates discharges resulting from the manufacture of formed copper and copper alloy products. The forming operations covered are hot rolling, cold rolling, drawing, extrusion, and forging. Ancillary operations which include surface treatment (pickling, tumbling, burnishing, alkaline cleaning, and surface milling), heat treatment, hydrotesting, sawing, and surface coating with molten metal are also covered by this regulation. Discharge from the forming operation is not required to be subject to this regulation.

8. Electrical and Electronic Components (40 CFR 469): This category consists of all operations associated with the manufacturing of semiconductors, electronic crystals, cathode ray tubes, and luminescent materials except for sputtering, electroplating, and vapor plating operations.

9. Electroplating (40 CFR 413): This category consists of electroplating, anodizing, conversion coating, electroless plating, chemical etching and milling, and the manufacturing of printed circuit boards. This category applies to existing job shops only.

10. Fertilizer Manufacturing (40 CFR 418): This category applies to discharges from the manufacture of sulfuric acid, nitric acid (in concentrations up to 68%), ammonium sulfate by the synthetic process or by coke oven byproduct recovery, and mixed and blend fertilizers. It is only applicable to sulfuric and nitric acid manufacturing processes that have been constructed or significantly modified since December 7, 1973 and ammonium sulfate and mixed and blend fertilizer manufacturing processes that have been constructed or significantly modified since October 7, 1974.

11. Glass Manufacturing (40 CFR 426): This category consists of manufacturers of glass containers, television picture tubes, incandescent lamp envelopes, and hand pressed and blown glass. Only facilities which have been constructed or significantly modified since August 21, 1974 are regulated.

12. Ink Formulating (40 CFR 447): This category applies to discharges resulting from the formulation of oil-base ink where the tank washing system uses solvents. It is only applicable to processes that have been constructed or significantly modified since February 26, 1975.

13. Inorganic Chemicals Manufacturing (40 CFR 415): This category includes facilities involved in the manufacture of basic inorganic chemicals including alkalis and chlorine, industrial gases, and inorganic pigments.

14. Iron and Steel (40 CFR 420): This category covers steel works, blast furnaces (including coke ovens), rolling mills, electrometallurgical products, steel wire drawing and facilities which produce steel nails and spikes, and steel pipes and tubes. This category does not include coil coating operations.

15. Leather Tanning and Finishing (40 CFR 425): This category consists of the tanning, currying, and finishing of hides and skins into leather.

16. Metal Finishing (40 CFR 433): This category consists of electroplating, anodizing, conversion coating, electroless plating, chemical etching and milling, and the manufacturing of printed circuit boards. This category applies to captive shops (owns 50 percent or more of the surface area finished), and all new source electroplating and metal finishing operations (those which began construction after August 31, 1982).

17. **Metal Molding and Casting (40 CFR 464)**: This category consists of the pouring or injection of molten metal into a mold with the cavity of the mold representing, within close tolerances, the dimensions the final product. This category includes aluminum, copper, ferrous, and zinc casting.

18. **Nonferrous Metals Manufacturing (40 CFR 421)**: This category consists of plants that process nonferrous ore concentrates (primary) and scrap metals (secondary) to recover and increase the metal purity contained in these materials.

19. **Nonferrous Metals Forming (40 CFR 471)**: This category consists of the deformation of a metal (other than iron) or metal alloy (other than iron as the major component by weight) into specific shapes by hot or cold working, drawing, cladding and tube reducing.

20. **Organic Chemicals, Plastics, and Synthetic Fibers (40 CFR 414)**: This category consists of facilities which manufacture organic chemicals, plastics, or synthetic fibers. Companies which simply formulate or package these materials are excluded.

21. **Paint Formulating (40 CFR 446)**: This category applies to discharges resulting from the formulation of oil- base paint where the tank cleaning is performed using solvents. It is only applicable to processes that have been constructed or significantly modified since February 26, 1975.

22. **Paving and Roofing Materials (40 CFR 443)**: This category consists of producers of asphalt paving and roofing emulsions, asphalt concrete, asphalt roofing materials, and linoleum and asphalt felt floor coverings. It is only applicable to facilities that have been constructed or significantly modified since January 10, 1975.

23. **Pesticide Chemicals (40 CFR 455)**: This category includes the manufacturing, formulating, packaging, and repackaging of pesticides.

24. **Petroleum Refining (40 CFR 419)**: This category includes operations which produce gasoline, kerosene, distillate fuel oils, residual fuel oils and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking or other processes.

25. **Pharmaceutical Manufacturing (40 CFR 439)**: This category includes pharmaceutical manufacturing facilities which may use fermentation, extraction, chemical synthesis, mixing/compounding and formulation, or may conduct research.

26. **Porcelain Enameling (40 CFR 466)**: EPA defines porcelain enameling as "that sequence or combination of steps or operations which prepare the metal surface and apply a porcelain or fused silicate coating to the metal basis material."

27. **Pulp, Paper, and Paperboard and the Builders' Paper and Board Mills (40 CFR 430)**: This category includes pulp mills, paper mills, paperboard mills, and building paper and building board mills.

28. Rubber Manufacturing (40 CFR 428): This category consists of manufacturers that reclaim rubber or mold, extrude, or fabricate rubber products, including latex products. It is only applicable to facilities that have been constructed or significantly modified since August 23, 1974.

29. Soap and Detergent Manufacturing (40 CFR 417): This category consists of facilities which blend or package liquid detergents or manufacture dry detergents by spray drying, drum drying, or dry blending. Only facilities which have been constructed or significantly modified since December 26, 1973 are regulated.

30. Steam Electric Power Generation (40 CFR 423): This category is composed of facilities that are engaged in the generation of electricity for distribution and sale, and use either fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle that has a steam/water thermodynamic medium.

31. Textile Mills (40 CFR 410): This category applies to the fiber preparation and manufacturing/process of the textile industry.

32. Timber Products (40 CFR 429): This category consists of a diverse group of manufacturing plants whose primary raw material is wood and whose products range from finished products to hardboard and preserved wood.

40 CFR 121-124 – These are the Federal storm water regulations for the permitting of municipalities and industries. Regulation defines storm water terms, permitting, inspection, and sampling requirements.

40 CFR 136 – These are the regulations for sampling preservation, sample containers, and analytical methods for water, wastewater, and solid waste.

40 CFR 403 – These are the Federal regulations defining the elements of a pretreatment program, prohibited discharges, and approval process for establishing a pretreatment program.

40 CFR 136.3 TABLE IB - INORGANICS

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-AI 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 ₃ B-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 ₃ C-1997		
	Electrode		4500-NH ₃ D-1997 or E-1997	D1426-08 (B)	
	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH ₃ F-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 ₃ G-1997 4500-NH ₃ H-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-CI D-2000	D1253-08	
	Amperometric direct (low level)		4500-CI E-2000		
	DPD-FAS		4500-CI F-2000		
	Spectrophotometric, DPD		4500-CI 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 ₃ B-1997	D3590-02(06) (A)	I-4515-91. ⁴⁵
	Titration		4500-NH ₃ C-1997		973.48. ³
	Nesslerization			D1426-	

Parameter	Methodology ⁵⁸	EPA ⁵²	Standard methods	ASTM	USGS/AOAC/Other
				08 (A)	
	Electrode		4500-NH ₃ D-1997 or E-1997	D1426-08 (B)	
	Semi-automated phenate	350.1 Rev 2.0 1993	4500-NH ₃ G-1997. 4500-NH ₃ H-1997		
	Manual phenate, salicylate, or other substituted phenols in Berthelot reaction based methods		4500-NH ₃ F-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 digester 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 digester (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 ₂ C-1997	D859-05	I-1700-85. ²
	Automated (Molybdosilicate)		4500-SiO ₂ E-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 (CBOD₅) must not be confused with the traditional BOD₅ test method which measures "total BOD." The addition of the nitrification inhibitor is not a procedural option, but must be included to report the CBOD₅ parameter. A discharger whose permit requires reporting the traditional BOD₅ may not use a nitrification inhibitor in the procedure for reporting the results. Only when a discharger's permit specifically states CBOD₅ 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 Chromatography*, 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 $\text{Na}_2\text{S}_2\text{O}_3$ 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 I_2 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 aluminum 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 BOD₅ and cBOD₅, 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.

**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 <i>E. coli</i>	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O ₃ ⁵	8 hours. ^{22 23}
6. Fecal streptococci	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O ₃ ⁵	8 hours. ²²
7. Enterococci	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O ₃ ⁵	8 hours. ²²
8. <i>Salmonella</i>	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O 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 ₂ SO 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 ₂ SO 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 ₂ SO 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 ₂ SO 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 ₂ SO 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 ₂ SO ₄ to pH <2	28 days.
42. Organic Carbon	P, FP, G	Cool to ≤6 °C ¹⁸ , HCl, H ₂ SO ₄ , or H ₃ PO 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 ₂ SO 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 ₂ SO 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 ₂ S ₂ O ₃ ⁵	14 days.
6, 57, 106. Purgeable aromatic hydrocarbons	G, FP-lined septum	Cool, ≤6 °C ¹⁸ , 0.008% Na ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ S ₂ O 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 ₂ SO ₄ to pH <2	28 days until extraction, 40 days after extraction.
119. Adsorbable Organic Halides (AOX)	G	Cool, <6 °C, 0.008% Na ₂ S ₂ O ₃ HNO ₃ to pH <2	Hold <i>at least</i> 3 days, but not more than 6 months.
120. Chlorinated Phenolics		Cool, <6 °C, 0.008% Na ₂ S ₂ O ₃ H ₂ SO 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. <i>E. coli</i>	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O ₃ ⁵	8 hours. ²²
2. Enterococci	PA, G	Cool, <10 °C, 0.0008% Na ₂ S ₂ O ₃ ⁵	8 hours. ²²
Table IH—Protozoan Tests:			

Parameter number/name	Container ¹	Preservation ^{2 3}	Maximum holding time ⁴
8. <i>Cryptosporidium</i>	LDPE; field filtration	1-10 °C	96 hours. ²¹
9. <i>Giardia</i>	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.

²Except 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).

³When 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 (HNO₃) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H₂SO₄) 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).

⁴Samples 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.

⁵ASTM 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.

⁶Sampling, 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.

⁷For 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.

⁸Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific compounds.

⁹If the sample is not adjusted to pH 2, then the sample must be analyzed within seven days of sampling.

¹⁰The 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.

¹¹When 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).

¹²If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0 ± 0.2 to prevent rearrangement to benzidine.

¹³Extracts may be stored up to 30 days at < 0 °C.

¹⁴For the analysis of diphenylnitrosamine, add 0.008% $\text{Na}_2\text{S}_2\text{O}_3$ and adjust pH to 7-10 with NaOH within 24 hours of sampling.

¹⁵The 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% $\text{Na}_2\text{S}_2\text{O}_3$.

¹⁶Place 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.

¹⁷Samples 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.

¹⁸Aqueous 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).

¹⁹An 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.

²⁰To 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.

²¹Holding 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.

²²Sample analysis should begin as soon as possible after receipt; sample incubation must be started no later than 8 hours from time of collection.

²³For 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.

²⁴The 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.

ADHS DATA QUALIFIERS

Arizona Data Qualifiers

Revision 5.0

Effective Date: August 23, 2024

Developed by the Sub-committee of the Arizona Environmental Laboratory Advisory Committee

This is an updated list of the Rev. 4.0 Arizona Data Qualifiers dated 9/5/2012, with some new qualifiers added. 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 usable, 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 08/23/24, AZ Drinking Water Data Qualifiers Revision 4.0 will be discontinued. Please use Arizona Data Qualifiers Revision 5.0 dated 08/23/24.

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.

A9 = The microbiological samples were received with ice formation. Any reported results are invalid and cannot be used for compliance purposes.

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 triggers level or MCL.
- B6 = Target analyte detected in calibration blank at or above the method reporting limit, but below triggers 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 non-detect 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 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.

N8 = Insufficient required sample volume received.

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. Re-extraction 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.

T10 = Certification is not available for analysis under the requested matrix. Drinking water methods were utilized so as to meet the reporting levels required for certain parameters.

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)(8), 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:

<https://www.azdhs.gov/documents/preparedness/state-laboratory/lab-licensure-certification/technical-resources/additional-resources/alt-default-limit.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 qualifiers 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 qualifiers 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 qualifiers 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 this [link](#).

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 PCBs 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 this [link](#).

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:

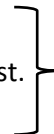
Appropriate qualifiers must be applied to all affected analytes in any samples associated with the calibration verification.

Calibration:

None.

Unacceptable AZ data qualifiers Drinking Water data list (based on Arizona Data Qualifiers Revision 5.0)

- A6 – Target organism not detected in associated positive control.
- A9 – The microbiological samples were received with ice formation. Any reported results are invalid and cannot be used for compliance purposes.
- B3 – Target analyte detected in calibration blank at or above method reporting limit.
- B6 – Target analyte detected in calibration blank at or above the method reporting limit, but below trigger level or MCL.
- C1 – Confirmatory analysis not performed as required by method.
- C5 – Confirmatory analysis was past holding time. Original result not confirmed.
- E6 – Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.
- H1 – Sample analysis performed 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.
- L4 – The associated blank spike recovery was below method acceptance limits.
- N6 – Data suspect due to quality control failure, reported per data user’s request.
- N8 – Insufficient required sample volume received.
- Q1 – Sample integrity was not maintained.
- Q2*- Sample received with head space. *This qualifier is unacceptable for VOC and TTHM samples only.*
- Q7 – Sample inadequately dechlorinated.
- 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.



ADHS will consider approving new methods upon request from licensed labs.

Unacceptable AZ data qualifiers Drinking Water data list *(based on Arizona Data Qualifiers Revision 5.0)*

- T5 – Laboratory not licensed for this parameter.
- T6 – The reported results cannot be used for compliance purposes.
- T8 – Method used not listed in 40 CFR 136; alternative method chosen as acceptable per permit. (May be acceptable for non-drinking water data)
- 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.
- T10 – Certification is not available for analysis under the requested matrix. Drinking water methods were utilized so as to meet the reporting levels required for certain parameters. **If this flag appears on drinking water data, it should raise questions.*
- V9 – CCV recovery was below method acceptance limits.

Arizona Data Qualifier Rev. 5.0 ADEQ Drinking Water Acceptance Matrix

A	B	C	D	E	H	K	L	M	N	Q	R	S	T	V
A1	B1	C1	D1	E1	H1	K1	L1	M1	N1	Q1	R1	S1	T1*	V1
A2	B2		D2	E2	H2	K2	L2	M2	N2	Q2*	R2		T2*	V2
A3	B3	C3		E3	H3		L3	M3		Q3*		S3	T3*	V3
A4	B4	C4	D4	E4	H4		L4	M4	N4	Q4	R4	S4	T4	
A5	B5	C5	D5	E5	H5	K5	L5	M5	N5	Q5	R5	S5	T5	V5
A6	B6		D6	E6	H6	K6		M6	N6	Q6	R6	S6	T6	V6
A7*	B7		D7*	E7		K7		M7	N7	Q7	R7	S7	T7	
A8	B8*	C8		E8		K8			N8	Q8	R8	S8	T8	
A9						K9				Q9	R9		T9	V9
Acceptable/Lab Discretion						K10				Q10		S10	T10	
Acceptable if ND						K11				Q11	R11	S11		
Acceptable if > MCL											R12	S12		
Not Acceptable											R13			
Qualifier Deleted														

*A7- Must transfer to sterile container to homogenize.
 *B8 - Subtract Travel blank result from sample result prior to reporting
 *D7 - MRL must < MCL
 *Q2 - not acceptable for VOC or TTHM
 *Q3 - only acceptable if preserved within 24 hrs of sampling.
 *T1, T2, T3 - ADHS will consider approving new methods upon requests from licensed

PERIODIC TABLE OF ELEMENTS



City of Phoenix

Water Services Department
Environmental & Safety Division
www.phoenix.gov/ESD

602-262-1859 (Front Desk)
602-261-8000 (WSD After Hours Emergency Contact)