Drinking Water Laboratory Certification

Division of Environmental Services

in cooperation with

Division of Drinking and Ground Water

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals
- THM/VOC's/HAA's

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals
- THM/VOC's/HAA's
- SOC's

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals
- THM/VOC's/HAA's
- SOC's
- Radiological

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals
- THM/VOC's/HAA's
- SOC's
- Radiological
- Microbiological

Ohio Environmental Protection Agency

Types of Certification

- Wet Chemistry
- Metals
- THM/VOC's/HAA's
- SOC's
- Radiological
- Microbiological
- Cyanotoxin

Ohio Environmental Protection Agency

Sources of Analytical Methods

- USEPA
- Standard Methods
- Ohio EPA
- Method specific ATP's as approved by USEPA

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes
- Titrations

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes
- Titrations
- Electro-Chemical Titrations

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes
- Titrations
- Electro-Chemical Titrations
- Spectroscopy

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes
- Titrations
- Electro-Chemical Titrations
- Spectroscopy
- Ion Chromatography

Ohio Environmental Protection Agency

Wet Chemistry Techniques

- Electro-Chemical Probes
- Titrations
- Electro-Chemical Titrations
- Spectroscopy
- Ion Chromatography
- Test-Specific Instruments

Ohio Environmental Protection Agency

Wet Chemistry Contaminates

- Primary Contaminates

Inorganic

  - Turbidity
  - Cyanide
  - Fluoride
  - Nitrate
  - Nitrite
  - Asbestos

Ohio Environmental Protection Agency

Wet Chemistry Contaminates

- Primary Contaminates

Inorganic

- Turbidity
- Cyanide
- Fluoride
- Nitrate
- Nitrite
- Asbestos

Disinfectants and Disinfection Byproducts

- Bromate
- Chloramines
- Chlorine
- Chlorine dioxide
- Chlorite

Ohio Environmental Protection Agency

Wet Chemistry Contaminates

- Secondary Contaminants
  - Chloride
  - pH
  - Sulfate
  - Total Dissolved Solids
  - Stability (Corrosivity)
  - Copper
  - Iron
  - Manganese

Ohio Environmental Protection Agency

Wet Chemistry Contaminates

- Secondary Contaminants
  - Chloride
  - pH
  - Sulfate
  - Total Dissolved Solids
  - Stability (Corrosivity)
  - Copper
  - Iron
  - Manganese

- Tests without MCL's
  - Alkalinity
  - Hardness
  - Phosphate

Ohio Environmental Protection Agency

Wet Chemistry Contaminates

- Other Analytes
  - Total Organic Carbon (TOC)
  - Dissolved Organic Carbon (DOC)
  - UV 254

Ohio Environmental Protection Agency

Metals Techniques

- Inductively Coupled Plasma – Atomic Emission (ICP)

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Metals Techniques

- Inductively Coupled Plasma – Atomic Emission (ICP)
- Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)

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Metals Techniques

- Inductively Coupled Plasma – Atomic Emission (ICP)
- Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)
- Cold Vapor Atomic Absorption Spectrometry

Ohio Environmental Protection Agency

Metals Techniques

- Inductively Coupled Plasma – Atomic Emission (ICP)
- Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)
- Cold Vapor Atomic Absorption Spectrometry
- Atomic Absorption Spectrometry
  - Graphite Furnace
  - Direct Flame

Ohio Environmental Protection Agency

Metal Contaminates

- Primary Contaminates
  - Antimony
  - Barium
  - Cadmium
  - Copper
  - Mercury
  - Selenium
  - Arsenic
  - Beryllium
  - Chromium
  - Lead
  - Nickel
  - Thallium

Ohio Environmental Protection Agency

Metal Contaminates

- Secondary Contaminates
  - Aluminum
  - Iron
  - Manganese
  - Silver
  - Zinc

Ohio Environmental Protection Agency

Metal Contaminates

- Others
  - Calcium
  - Magnesium
  - Silica
  - Sodium
  - Uranium

Ohio Environmental Protection Agency

Organic Analysis Techniques

- Gas Chromatography with
  - Nitrogen-Phosphorus Detector

Ohio Environmental Protection Agency

Organic Analysis Techniques

- Gas Chromatography with
  - Nitrogen-Phosphorus Detector
  - Electron Capture Detector

Ohio Environmental Protection Agency

Organic Analysis Techniques

- Gas Chromatography with
  - Nitrogen-Phosphorus Detector
  - Electron Capture Detector
  - Mass Spectrometry

Ohio Environmental Protection Agency

Organic Analysis Techniques

- Gas Chromatography with
  - Nitrogen-Phosphorus Detector
  - Electron Capture Detector
  - Mass Spectrometry

- High Performance Liquid Chromatography (HPLC)

Ohio Environmental Protection Agency

Organic Contaminates

- THM/VOC's/HAA's
  - Trihalomethanes (THM's)
    - 4 Contaminants
    - 3 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- THM/VOC's/HAA's
  - Trihalomethanes (THM's)
    - 4 Contaminants
    - 3 Analytical Techniques
  - Volatile Organic Chemicals (VOC's)
    - 20 Contaminants + Vinyl Chloride
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- THM/VOC's/HAA's
  - Trihalomethanes (THM's)
    - 4 Contaminants
    - 3 Analytical Techniques
  - Volatile Organic Chemicals (VOC's)
    - 20 Contaminants + Vinyl Chloride
    - 2 Analytical Techniques
  - Haloacetic Acids (HAA's)
    - 5 Contaminants
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Adipate/Phthalate Esters
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Adipate/Phthalate Esters
    - 2 Analytical Techniques
  - Carbamates
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Adipate/Phthalate Esters
    - 2 Analytical Techniques
  - Carbamates
    - 2 Analytical Techniques
  - Chlorinated Acid Pesticides
    - 4 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - EDB/DBCP
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - EDB/DBCP
    - 2 Analytical Techniques
  - Diquat
    - 1 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - EDB/DBCP
    - 2 Analytical Techniques
  - Diquat
    - 1 Analytical Techniques
  - Endothall
    - 1 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Glyphosate
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Glyphosate
    - 2 Analytical Techniques
  - Nitrogen/Phosphorus Pesticides
    - 4 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - Glyphosate
    - 2 Analytical Techniques
  - Nitrogen/Phosphorus Pesticides
    - 4 Analytical Techniques
  - Organohalide Pesticides
    - 4 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - PCB's
    - 3 Analytical Techniques

Ohio Environmental Protection Agency

Organic Contaminates

- SOC's 33 Contaminants
  - PCB's
    - 3 Analytical Techniques
  - PAH's
    - 2 Analytical Techniques

Ohio Environmental Protection Agency

Radiological Techniques

- Count activity of radioisotopes

Ohio Environmental Protection Agency

Radiological Contaminates

- Beta Particle
- Alpha Particle
- Radium 226
- Radium 228
- Uranium

Ohio Environmental Protection Agency

Radiological Contaminates

- Beta Particle
- Alpha Particle
- Radium 226
- Radium 228
- Uranium
- Strontium 89 & 90
- Cesium
- Iodine
- Tritium
- Gamma Emitting

Ohio Environmental Protection Agency

Microbiological testing

- Total Coliform
- E-Coli

2 Methods

Membrane Filtration

MMO-MUG

Ohio Environmental Protection Agency

Cyanotoxins and Cyanobateria

- Total Microcystins

  ELISA (Ohio EPA DES 701.0)

- Cyanotoxin Producing Genes

  qPCR (Ohio EPA DES705.0)

Ohio Environmental Protection Agency

Cryptosporidium

Ohio Environmental Protection Agency

Approval

- Analysts approval laboratory specific

Ohio Environmental Protection Agency

Approval

- Analysts approval laboratory specific
- Letter of Interim Authorization

Ohio Environmental Protection Agency

Approval

- Analysts approval laboratory specific
- Letter of Interim Authorization
- Certificates
  - Certified
  - Operationally Certified

Ohio Environmental Protection Agency

Interim Authorization

- Wet Chemistry Tests
- Approval to conduct
  - pH
  - Turbidity
  - Alkalinity
  - Stability
  - Hardness
  - Fluoride
  - Chlorine
  - Chlorine Dioxide
  - Chlorite
  - Chloride

Ohio Environmental Protection Agency

Interim Authorization

- Microbiological Tests
- Approval to conduct

MMO-MUG

Present/Absent

Quanti-Tray

Ohio Environmental Protection Agency

Certificates

Operationally Certified

- pH
- Turbidity
- Alkalinity
- Stability
- Hardness
- Fluoride
- Chlorine
- Chlorine Dioxide
- Chlorite
- Chloride

Ohio Environmental Protection Agency

Certificates

Certified

- pH
- Turbidity
- Alkalinity
- Stability
- Hardness
- Fluoride
- Chlorine
- Chloride
- Chlorine Dioxide
- Chlorite
- Nitrate
- Phosphate
- Manganese
- Copper
- Iron
- Other Plant Control Tests

Ohio Environmental Protection Agency

Certificates

- Trace Metals
- THM/VOC/HAA
- SOC
- Radiological

Ohio Environmental Protection Agency

Manuals

- Ohio EPA Laboratory Manual for Chemical Analyses of Public Drinking Water 2014

- Ohio EPA Laboratory Manual for Microbiological Analyses of Public Drinking Water 2014

Ohio Environmental Protection Agency

Types of Surveys

- Initial

Ohio Environmental Protection Agency

Types of Surveys

- Initial
- Renewal

Ohio Environmental Protection Agency

Types of Surveys

- Initial
- Renewal
- Add Analyst

Ohio Environmental Protection Agency

Types of Surveys

- Initial
- Renewal
- Add Analyst
- Add Test

Ohio Environmental Protection Agency

Types of Surveys

- Initial
- Renewal
- Add Analyst
- Add Test
- Unannounced

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests
- Check Historical Records

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests
- Check Historical Records
- Check Reagents

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests
- Check Historical Records
- Check Reagents
- Check Equipment

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests
- Check Historical Records
- Check Reagents
- Check Equipment
- Watch analysts perform tests

Ohio Environmental Protection Agency

Typical Survey Scheduled

- Confirm Tests
- Check Historical Records
- Check Reagents
- Check Equipment
- Watch analysts perform tests
- Give Analysts Unknowns for Analysis

Ohio Environmental Protection Agency

Typical Survey
Unannounced

- Confirm Tests
- Check Historical Records
- Check Reagents
- Check Equipment

Ohio Environmental Protection Agency

Reports

- Deviations
  - Typical
  - Serious

Ohio Environmental Protection Agency

Deviations
Typical

- General
  - Time spent in Laboratory
    - 3 days per month
    - QC at least once every 3 month

Ohio Environmental Protection Agency

Deviations
Typical

- General
  - Time spent in Laboratory
    - 3 days per month
    - QC at least once every 3 month
  - Practices in Laboratory
    - Received/Opened Dates
    - Proper Storage Conditions

Ohio Environmental Protection Agency

Deviations
Typical

- General
  - Records
    - Method Detection Limits (MDL's)
    - Initial Demonstrations of Capabilities (IDC's)
    - Intermittent gaps

Ohio Environmental Protection Agency

Deviations
Typical

- General
  - Records
    - Method Detection Limits (MDL's)
    - Initial Demonstrations of Capabilities (IDC's)
    - Intermittent gaps
  - Condition of Laboratory
    - General Cleanliness
    - Floors, Lighting, Cabinets

Ohio Environmental Protection Agency

Deviations
Typical

- Method Specific
  - Quality Control oversights
    - Slopes
    - Limits
    - Records
    - Frequency

Ohio Environmental Protection Agency

Deviations
Typical

- Method Specific
  - Quality Control oversights
    - Slopes
    - Limits
    - Records
    - Frequency
  - Method Modifications
    - Reagents
    - Equipment

Ohio Environmental Protection Agency

Deviations
Typical

- Method Specific
  - Proper End Points
    - Too Far
    - Not far enough

Ohio Environmental Protection Agency

Deviations
Typical

- Method Specific
  - Proper End Points
    - Too Far
    - Not far enough
  - Proper Techniques
    - Too fast
    - Too slow

Ohio Environmental Protection Agency

Deviations
Serious

- Quality Control
  - Not Performed
  - Out of compliance with no Corrective Action

Ohio Environmental Protection Agency

Deviations
Serious

- Quality Control
  - Not Performed
  - Out of compliance with no Corrective Action
- Records
  - A mess
  - Not Available

Ohio Environmental Protection Agency

Deviations
Serious

- Quality Control
  - Not Performed
  - Out of compliance with no Corrective Action
- Records
  - A mess
  - Not Available
- Analysts
  - Unapproved Analyst performing test
  - Gone

Ohio Environmental Protection Agency

Deviations
Serious

- Methods
  - Unapproved method used
  - Method not followed
  - No Standard Operating Procedure (SOP)

Ohio Environmental Protection Agency

Deviations
Serious

- Methods
  - Unapproved method used
  - Method not followed
  - No Standard Operating Procedure (SOP)
- Reporting

Ohio Environmental Protection Agency

Deviations
Serious

- Methods
  - Unapproved method used
  - Method not followed
  - No Standard Operating Procedure (SOP)
- Reporting

- Failure to respond
  - No Response to deviations in report
  - Chronic repeat deviations

Ohio Environmental Protection Agency

What Certification Achieves

- Checks Capability

Ohio Environmental Protection Agency

What Certification Achieves

- Checks Capability
- Limited Oversight

Ohio Environmental Protection Agency

What Certification Achieves

- Checks Capability
- Limited Oversight
- A sense of security

Ohio Environmental Protection Agency

What Certification Does Not Achieve

- Check of recorded or reported data

Ohio Environmental Protection Agency

What Certification Does Not Achieve

- Check of recorded or reported data
- Oversight Laboratory Operation

Ohio Environmental Protection Agency

NEW FAX Number

614-866-6314

Please update and let everyone know

Ohio Environmental Protection Agency

Questions

Clarifications

Observations

Ohio Environmental Protection Agency

- James Evans

  614-644-4222

  james.evans@epa.state.oh.us
- Todd Bidlack

  614-644-4067

  todd.bidlack@epa.state.oh.us
- James Dolfi

  614-644-4068

  james.dolfi@epa.state.oh.us
- Charles Vasulka

  614-644-4266

  charles.vasulka@epa.state.oh.us

Ohio Environmental Protection Agency

- Andrew Bair

  614-644-4222

  Andrew.bair@epa.ohio.gov
- Mark Tomasi

  614-644-4067

  Mark.Tomasi@epa.ohio.gov
- Charles Vasulka

  614-644-4266

  charles.vasulka@epa.ohio.gov
- Steve Roberts

  614-644-4225

  Steven.Roberts@epa.ohio.gov

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