

How to Rock your Lab Audit!

Steps to Help Pass your next MDEQ
Lab Audit

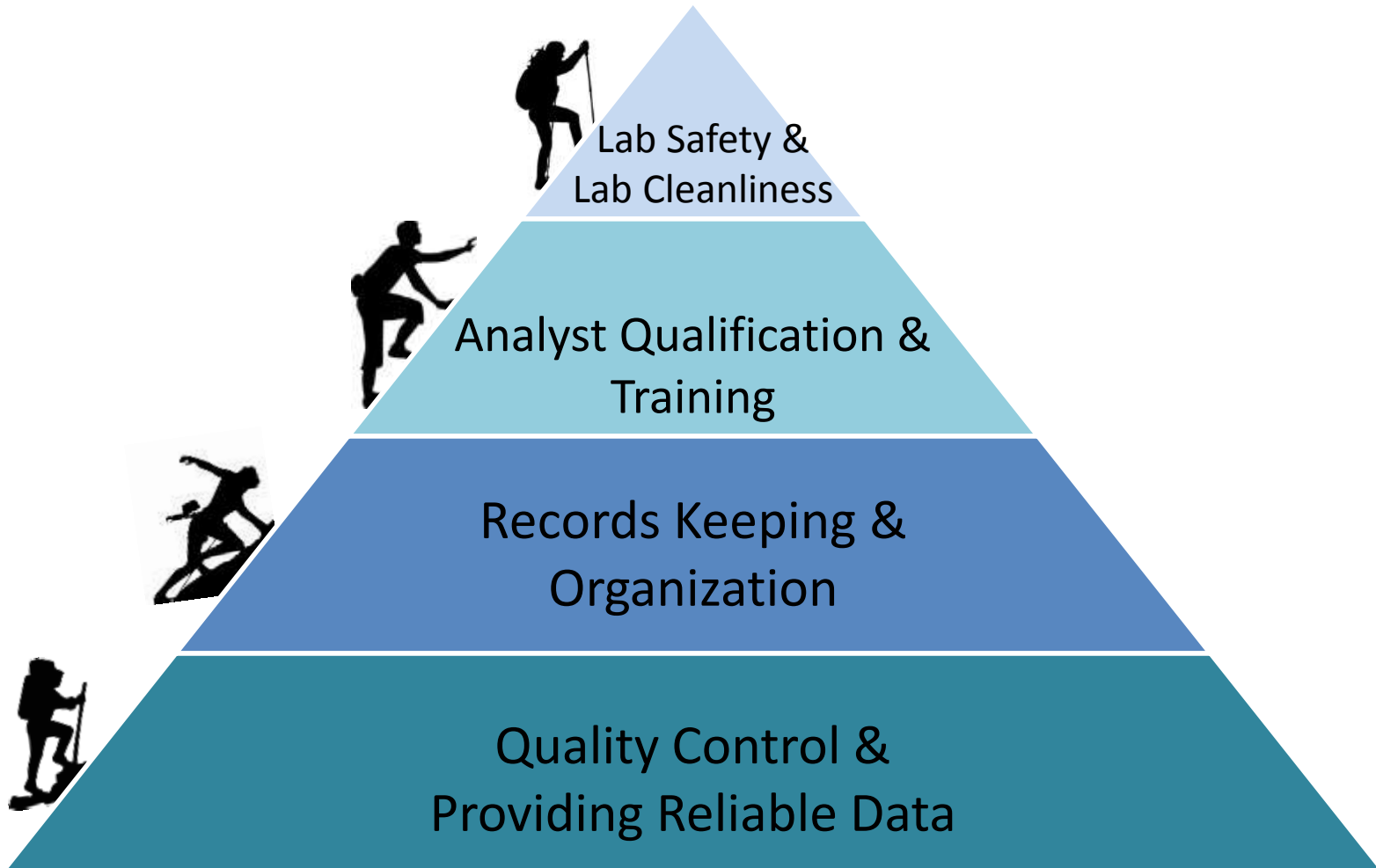


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Building Blocks for Success

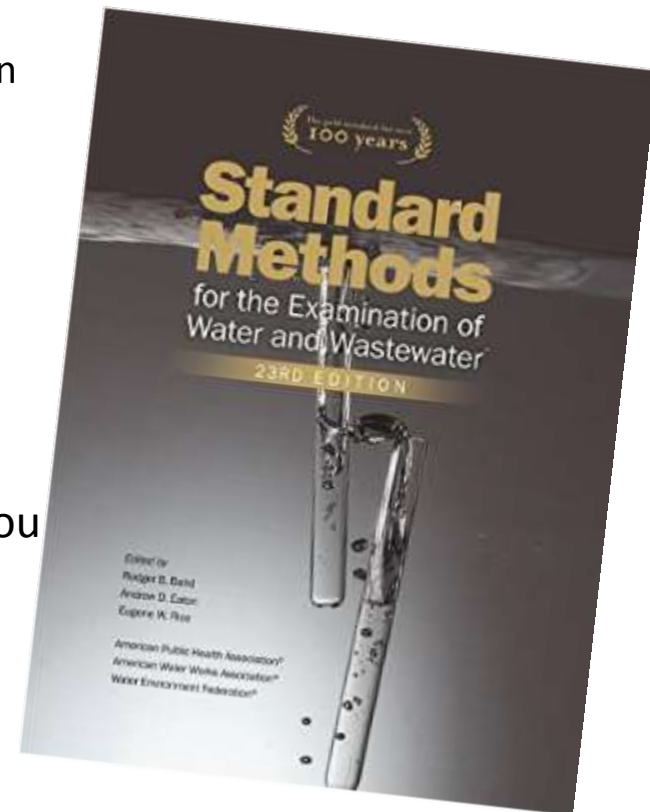
Creating a **Audit Proof** Program



Quality Control & Providing Reliable Data

▲ Review Analytical Methods & Existing QC Program

- ▲ Is your lab using EPA approved methods or approved Standard Methods?
 - Standard Methods 23rd edition is now available
- ▲ Do methods used reflect the updates included in the 2017 Clean Water Act MUR? Effective September 27th 2017.
 - Approve methods listed in MUR; Table IA- IH on pages 40847- 40868.
- ▲ Lab SOP's are updated with approved methods.
- ▲ Include QC/QA procedures for each parameter.
- ▲ Follow method QA/QC recommendations when developing your QC program. This will help ensure you are producing accurate and reliable results.



Quality Control & Providing Reliable Data

▲ Developing, Updating and Implementing QC Program

Basic QC 101

▲ Calibration is KEY!

- Calibrate instruments according to SM and manufacturer recommendations.
- Standards are made properly.
- Ensure buffers and standards are not expired.
- Make sure they are stored properly.

▲ Drift checks CCV (Continuing Calibration Value)

- CCV every 10 samples.
- Drift check after calibration.

▲ Duplicates and Spiked sample every 10 samples.

- Checks for accuracy (spikes) and precision (duplicates).

▲ Secondary Checks – SCCV

- Outside QC source to verify accuracy of run.

▲ Blanks

- All required analyses need blanks to verify there isn't any interference or contamination causing altered results.

Quality Control & Providing Reliable Data

▲ Developing, Updating and Implementing QC Program Cont.

- ▲ All methods used, if applicable should have basic QC procedures implemented. As well as individual sample QC's.

There's no such thing as "Too much QC"

[QC in Action](#)

- ▲ Tertiary Effluent (Monitored for NPDES permit) has a duplicate and spike in every parameter tested where available.

Examples of TEF QC

- Ammonia (duplicate/spike)
- Total Phosphorus (duplicate/spike)

[TEF QC in Action](#)

- CBOD (duplicate)
- Solids (duplicate)

[TEF QC in Action](#)

- pH & Residual Chlorine (duplicate)

Quality Control & Providing Reliable Data

▲ Developing, Updating and Implementing QC Program Cont.

QC Wrap Up: Data Approval

▲ Review bench sheets

- Passed QC ?
 - Blanks ✓
 - duplicate calculations ✓
 - spike recovery calculations ✓
 - SCCV & CCV passed ✓
- Dilutions are correct? ✓
- Sample Dates are correct? ✓
- Data is properly entered in database? ✓
- Excel spreadsheets uploaded properly? ✓
- Are results reported using appropriate significant figures? ✓

Quality Control & Providing Reliable Data

▲ Developing, Updating and Implementing QC Program Cont.

“So why is this important for an audit?”

Without a good QA/QC program, data produced and used for operational decision making and NPDES permit cannot be proven accurate.

- ▲ Auditor will want to review your QA/QC program and see examples on bench sheets and QC charts.
- ▲ Auditor will also ask to list analytical methods used.
- ▲ Corrective Action Plan
 - Methods are in place for addressing the cause of QA/QC data falling outside of control limits.



Good records keeping and organization can make you or break you during an audit.



- ▲ Before the audit begins make data files and record books easily accessible. This will save you time and unnecessary worry.
- ▲ Auditors will most likely ask to see a bench sheet to ensure data collected matches data reported.



THIS IS WHY WE ALWAYS REVIEW AND DOUBLE CHECK DATA!!

- ▲ Bench sheets should have the following included for every parameter:
 - Exact place, date, time of measurement or sample collection
 - Person(s) who performed the measurement or sample collection
 - Dates analyses were performed
 - Person(s) who performed the analyses
 - Analytical techniques or methods used
 - Date of and person responsible for equipment calibration
 - Results of all required analyses

Records Keeping & Organization Cont.

- ▲ Record books used in lab should be kept neat and legible.
- ▲ Lab record books should always be kept updated.
- ▲ Auditor may ask to review your log books... **So what are they looking for?**

Equipment Temperature Log

- Sample refrigerator and composite sampler 0-6°C
- BOD incubator 20°C ±1
- Fecal coliform incubator 44.5°C ±0.2
- Drying oven 103-105°C ±1
- Muffle furnace 550°C ±50

Chemical Log

- Document when new reagents are made and who made the reagent.
- Document newly made standards used for calibration and checks and who made them.
- Include date made and expiration date.

Records Keeping & Organization Cont.

Equipment Maintenance Log

- This includes equipment cleanings or repairs. Any troubleshooting issues and results. Conversations with manufactures etc.
- ▲ Maintenance records should be maintained and kept near equipment.
- ▲ Maintenance record books should always be kept updated.
- ▲ Explanations for missing records, for example if the drying oven is being serviced and temperature reading is missed, analyst should make a note for missing data point.

The more details included in records the better.

Whether that's field notes from samplers or troubleshooting issues in the lab, it will help provide explanation for any potential issues that may arise.

Auditors love a neat, efficient records keeping system



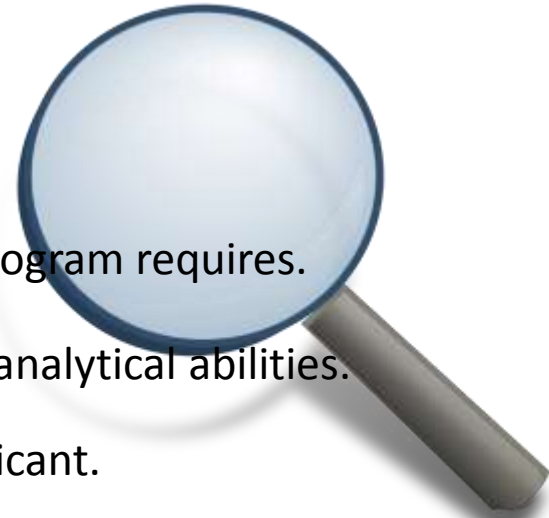
Analyst Qualification & Training

▲ Analyst Qualification

- ▲ You may have a high tech lab with the most efficient equipment and the best QA/QC program ever but with a poorly trained or unqualified analyst your program will not be successful.

How do I find qualified people?

- ▲ First figure out the level of skill and experience your lab program requires.
- ▲ Make the examination comparable to the desired level of analytical abilities.
 - If it's too technical you may miss a trainable applicant.
 - If it's too simple, an unqualified candidate could compromise the quality of overall laboratory operations.
- ▲ When selecting a candidate think about how this person can contribute to your program.



KNOW WHAT YOU WANT/NEED

Analyst Qualification & Training

▲ Setting up a Successful Training Program

▲ SOP- Standard Operating Procedure

- A document that provides step by step instructions using approved EPA or Standard Methods for a specific analysis.

▲ General SOP Setup

- Purpose and Scope
- Precautions
- Definitions
- Procedure
- Equipment Used
- Reagents & Preparation of Standards/Solutions
- Sample analysis
- Data Reporting

- ▲ SOPs should be provided and available to all lab technicians. Only have the most recent copies printed.

Analyst Qualification & Training

▲ Setting up a Successful Training Program Cont.

- ▲ SOPs should be reviewed and updated frequently.

Update SOPs when...

- ▲ Changes to methods.
- ▲ New legislative requirements are rolled out.
- ▲ New methods are approved.
- ▲ ANY CHANGES.

- ▲ Set up your training program to be efficient and flexible with a realistic training schedule.

Example of a basic training process

- Provide SOPs – have employee read through SOP.
- Run through the analysis step by step while employee watches.
- Supervise employee while they run the analysis.
- Run initial analysis qualifications, MDL's and a QC.

- ▲ Once employee passes they are officially trained on the procedure.



Lab Safety & Lab Cleanliness

▲ Lab Safety

LAB SAFETY IS CRUCIAL!

- ▲ Make sure your lab is following MIOSHA safety guidelines and that you are providing employees with a safe working environment.

- Eye washes, showers
- Ventilation hoods
- Spill Kits
- Chemical burn neutralizer
- First Aid Kit
- Fire Extinguishers
- Proper PPE

- ▲ [Safety Checklist](#) – monthly

- ▲ Emergency equipment inspected and maintained – monthly

- If an emergency happens and the safety equipment isn't maintained there will be major problems with serious consequences.

- ▲ Accident Reporting – know the procedure for reporting accidents at your facility.

We cannot prevent something from happening if it's not reported.



Lab Safety & Lab Cleanliness

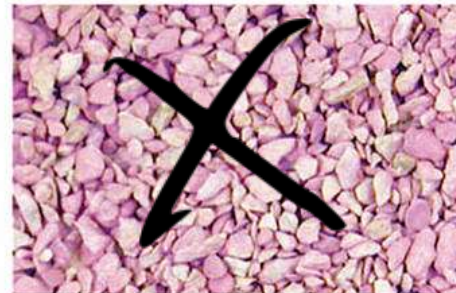
▲ Lab Cleanliness

▲ CLEAN UP BEFORE AN AUDIT!

▲ Labs can be messy but if you know you're going to be audited do a little housekeeping beforehand.

- Wipe down counters
- Clean balances
- Make sure all instrumentation is wiped down
- Reduce clutter

▲ Things an auditor may look for... old desiccant or old probe storage solution these are just a few examples of good laboratory practices.



Review

Building Blocks for Success



MDEQ does provide a NPDES Compliance Self Checklist on their website.

You Did It!!



Questions?

Thank you to MWEA & LPC for Hosting!

References

“Standard Methods for the Examination of Water and Wastewater, 23rd Edition”, 1020 Quality Assurance, pages 1-6, 1-24; American Public Health Association, American Water Works Association and the Water Environment Federation, Laura L. Bridgewater, Managing Editor, Washington, D.C. (2017)

“Laboratory Training Manual For Wastewater Treatment Plant Operators”, page 90-1; State of Michigan Department of Environmental Quality, Environmental Monitoring and Support Laboratory, Lansing, MI (2010)

“Handbook for Analytical Quality Control in Water and Wastewater Laboratories”, United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH (March 1979) EPA 600/4-79-019.

2017 Clean Water Act Method Update Rule

<https://www.federalregister.gov/documents/2017/08/28/2017-17271/clean-water-act-methods-update-rule-for-the-analysis-of-effluent>

MIDEQ NPDES Compliance Self Checklist

http://www.michigan.gov/documents/deq/wrd-NPDES-Compliance-SelfChecklist_554719_7.pdf