Field Sampling Audit Procedures

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Field Sampling Audits

- Independent, non-biased comparison of the sampling and monitoring procedures being performed to the actual method and project requirements
  - Sampling being performed correctly
  - Sampling being performed consistently

"The word 'audit' comes from 'auditory' which means 'to hear bad news coming'."

Why Audit

- QA/QC is an integral part of sample analysis but it is just as important in the field as it is in the laboratory
  - Sample quality cannot be improved after the sample is collected
- Field auditing is becoming a popular tool for evaluating the performance of field teams and looking at how their performance can affect data quality

Why Audit

- Prevent or identify actions that can negatively affect data quality
- Provide a defense if field procedures are ever called into question
- Find opportunities for continued improvement
- Identify ways to reduce sampling costs
- Ensure safety of field team members

Who to Audit

- Anyone who collects samples, handles samples, or transports samples from the field to the laboratory
  - Internal staff
  - Contractors and consultants

When to Audit

- Routinely
- Evaluating new hires or new procedures
- Troubleshooting
  - Suspicious sample results
  - Results inconsistent between samplers

How to Audit

- Choose the right audit to meet your needs
  - Full scale vs. focused
  - Inquiry vs. performance based
  - Individual vs. group
  - First party vs. third party

How to Audit

	First Party	Third Party
Pros	• Flexible • Direct Involvement • Less formal/threatening • Immediate Response	• Objective • Greater experience & knowledge • Potential for better corrective actions
Cons	• Limited by experience & knowledge • Biased • Easier to procrastinate	• Greater cost • Stressful/intimidating • Missed training opportunities

How to Audit

- Prepare
  - Inform auditees that an audit will take place
  - Meet with auditor
  - Review any relevant documentation including Standard Operating Procedures (SOPs), EPA methods, and QA/QC requirements

How to Audit

- Useful References
  - OEPA Surface Water Field Sampling Manual
  - US EPA Quick Guide to Drinking Water Sample Collection
  - US EPA Industrial Stormwater Monitoring and Sampling Guide
  - Method 1669 – Sampling Ambient Water for Trace Metals
  - Analytical methods

How to Audit

- Determine what to audit
  - Dependent on site and project scope
    - Site location
    - Sampling being performed
    - Field testing being performed

What to Audit

- Record keeping
- Safety
- Sampling equipment
- Sampling
- Sample handling
- Field testing

Record Keeping

- Standard Operating Procedures
- Training records
- Sample Chain of Custodies
- Bottle labels
- Field log books

Field Training

Employee Name: John Doe

	Date Trained	Trainer Initials	IDOC Performed	Form to QA
pH measurement	11/15/15	ELH	11/17/15	11/17/15
Chlorine measurements	11/15/15	ELH		

	Read SOP	Completed Form	Form to QA
010 Field Sampler Cleaning	11/10/15	11/10/15	11/17/15
012 Grab Sampling	11/5/15	11/5/15	11/17/15
013 Field Safety Management	11/10/15	11/10/15	11/17/15
1669 Low Level Hg Sampling			
4500 H+B pH	11/15/15		
4501 Chlorine			

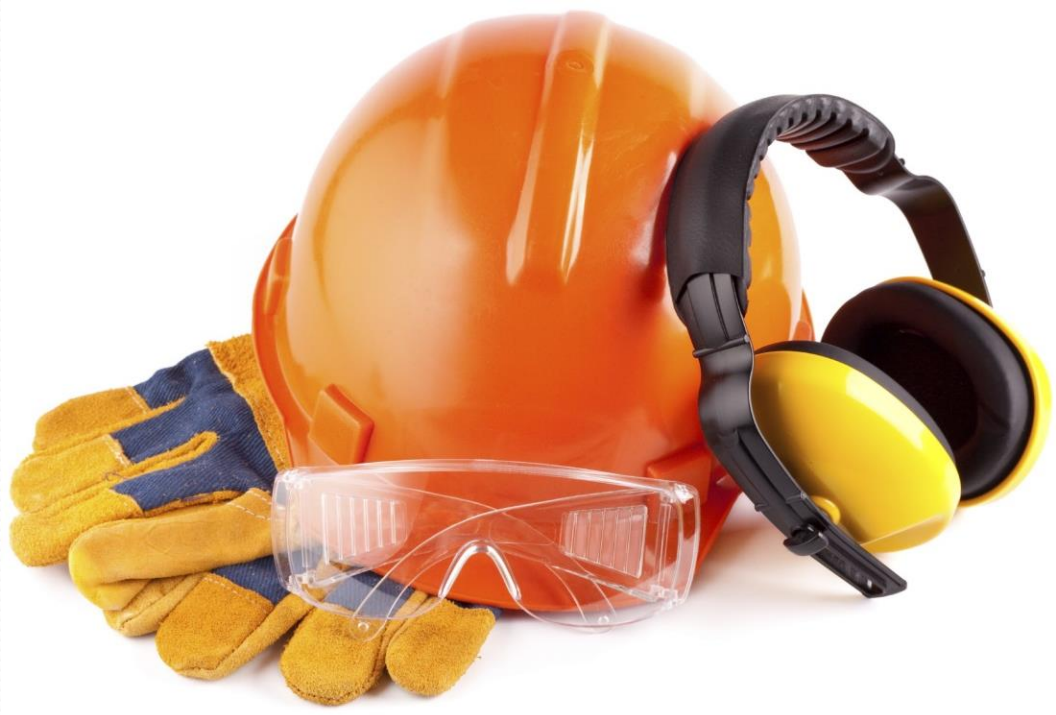
Trainee: _____ Date: _____

Supervisor Review: _____ Date: _____

Form 5617-4

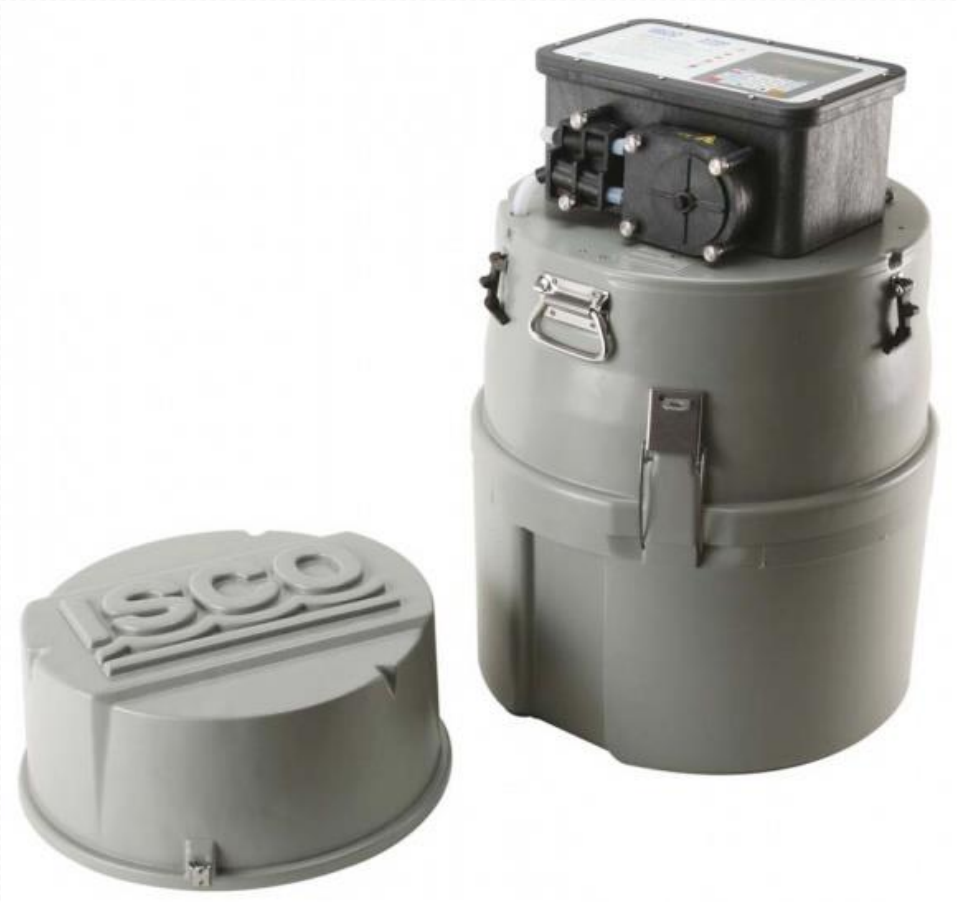
Safety

- Personal protective equipment
- Specific safety procedures (i.e.- confined space entry, fall prevention, roadside sampling, etc.)
- Vehicle safety



Sampling Equipment

- Equipment type and composition
- Equipment cleaning and maintenance
- Equipment blanks

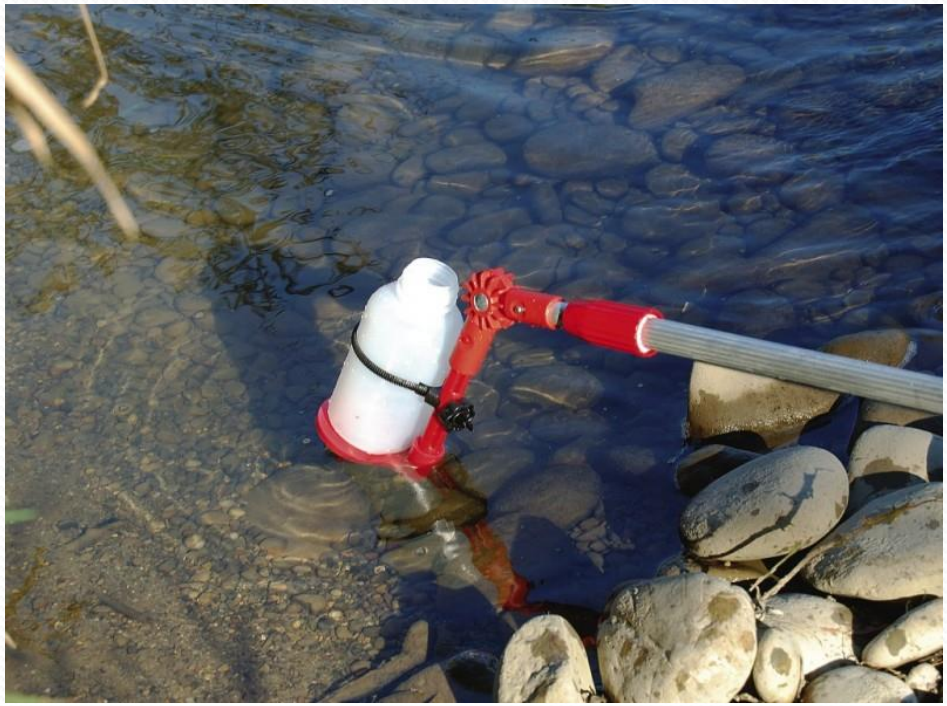


Sampling

- General sampling procedures
  - Grab vs. composite sampling
  - Surface vs. ground water sampling
- Specific sampling procedures
  - Microbiological
  - Oil and grease
  - Low level metals
  - Volatile organics

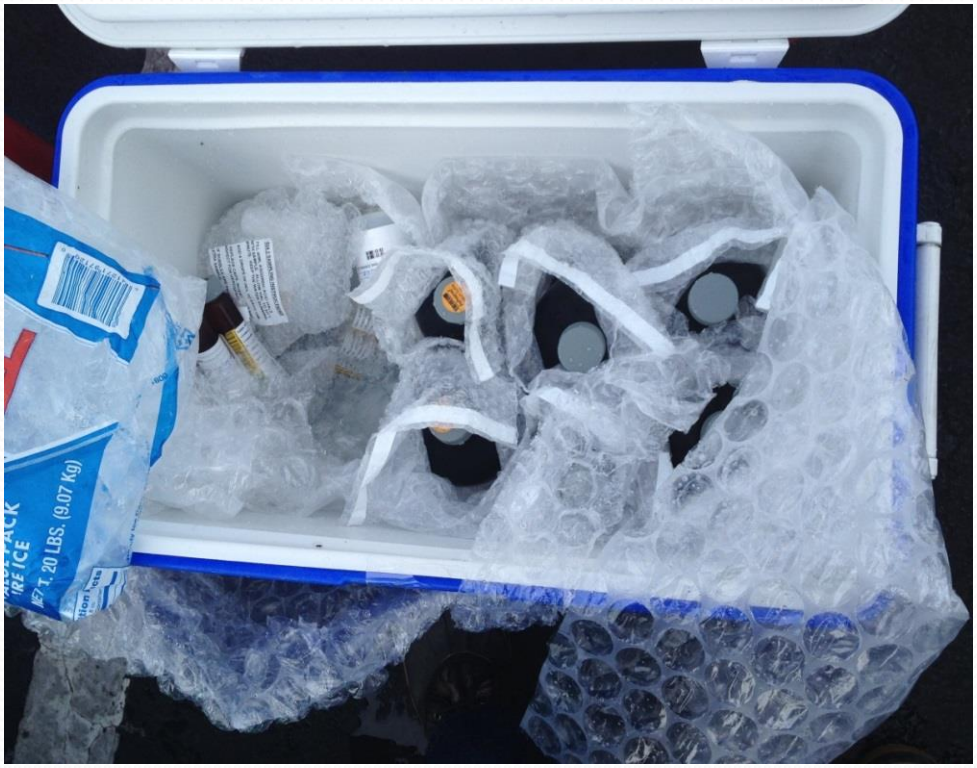
Sampling

- Sample bottle type and preservation
- Sampling procedures
- Contamination prevention



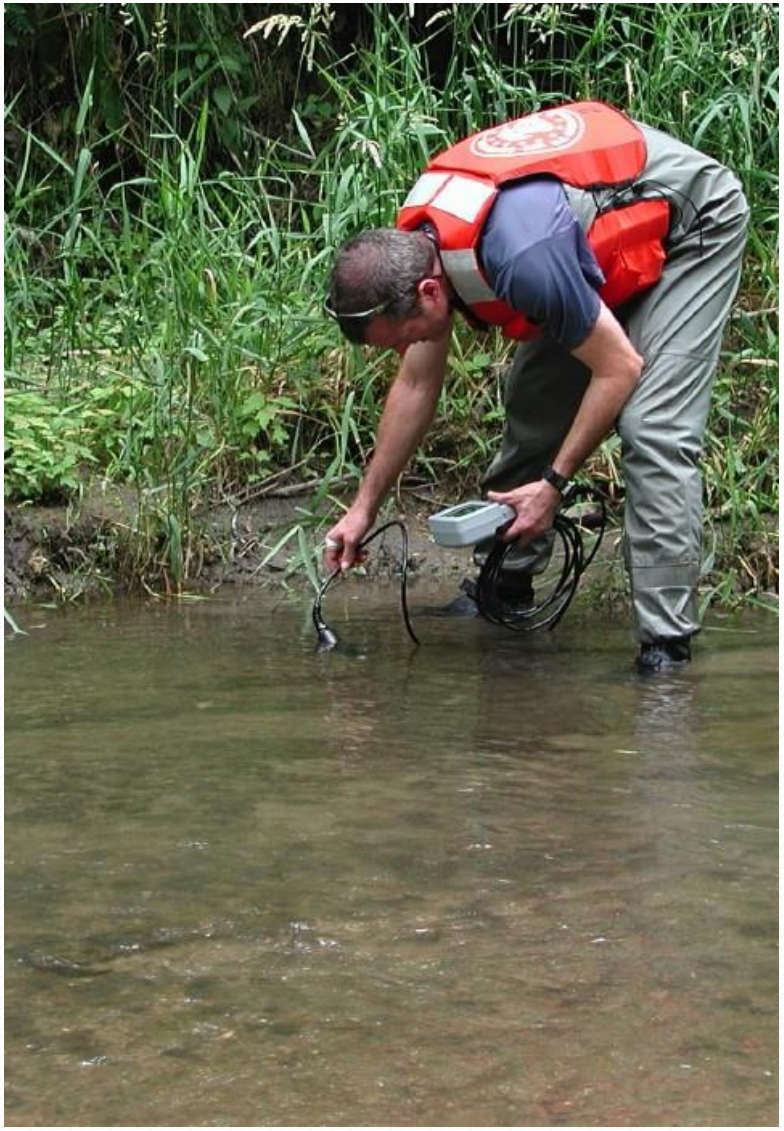
Sample Handling

- Sample handling after collection
- Field filtration
- Sample storage
- Sample transportation
- Sample disposal



Field Testing

- pH
- Turbidity
- Conductivity
- Chlorine
- Odor
- Color
- Temperature
- Dissolved Oxygen



Field Testing

- Instrument calibration and maintenance
- Instrument log books
- Field reagents
- Field data sheets

Audit Checklist

Employee Name	Date	Name and Affiliation of Auditor

Item to be Evaluated	Y	N	N/A	Comments
Part 3: Sampling Equipment				
Is the correct sampling equipment being used for the project?				
Is the sampling equipment inspected before use and repaired/replaced when needed?				
Is the sampling equipment properly cleaned before each use?				
Is the sampling equipment properly stored when not in use?				

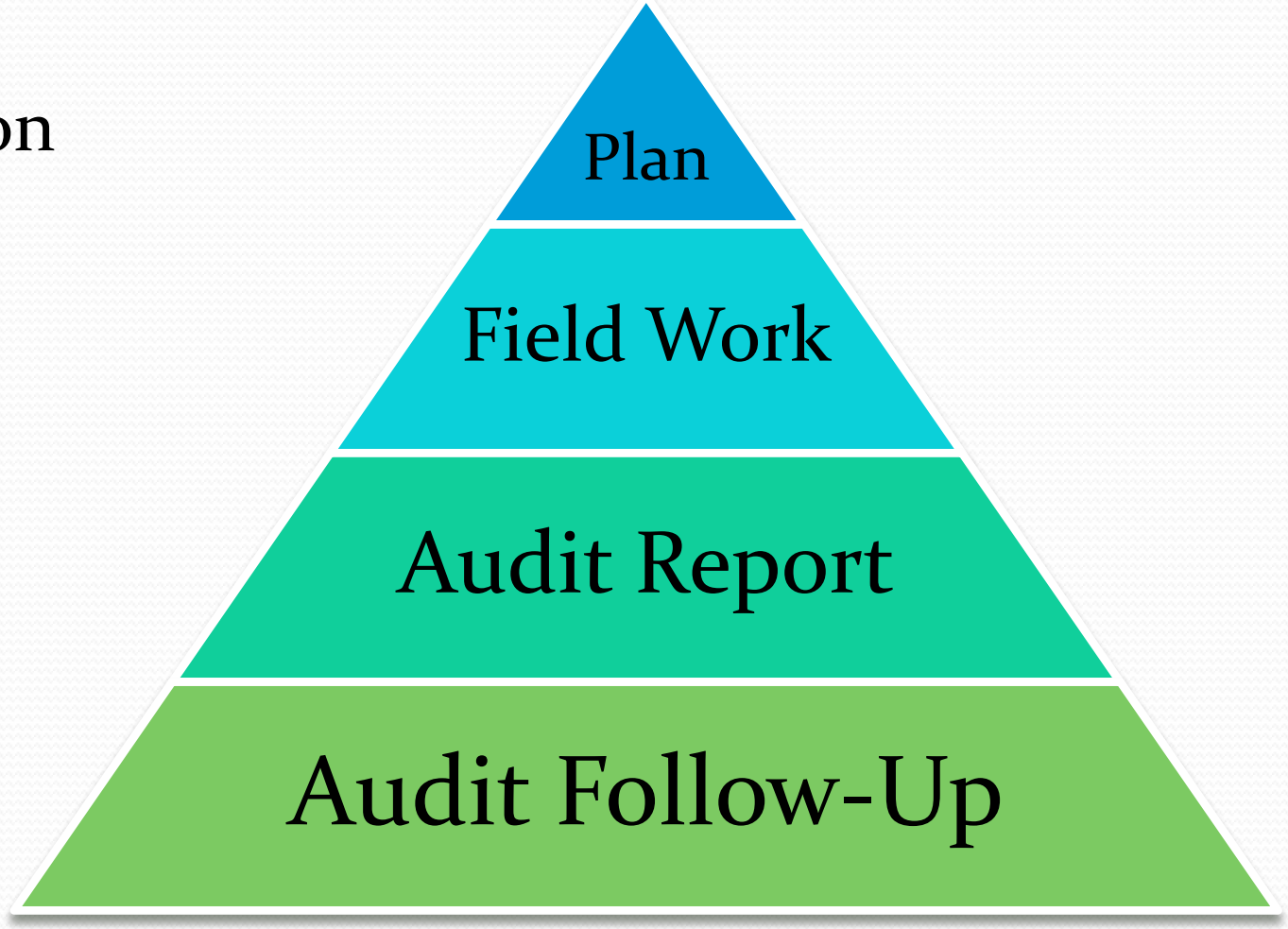
Audit Checklist

Sampling Contractor	Employee Name	Date	Name of Auditor

Item to be Evaluated	Observations	Deviations		
		Yes	No	N/A
Part 3: Sampling Equipment				
What sampling equipment is being used for the project?				
How often is the sampling equipment inspected and/or replaced?				
What procedure is used for cleaning the sampling equipment and how often is it cleaned?				
How is the sampling equipment stored when not in use?				

Audit Process

- Field Work
- Documentation
- Evaluation
- Follow-up



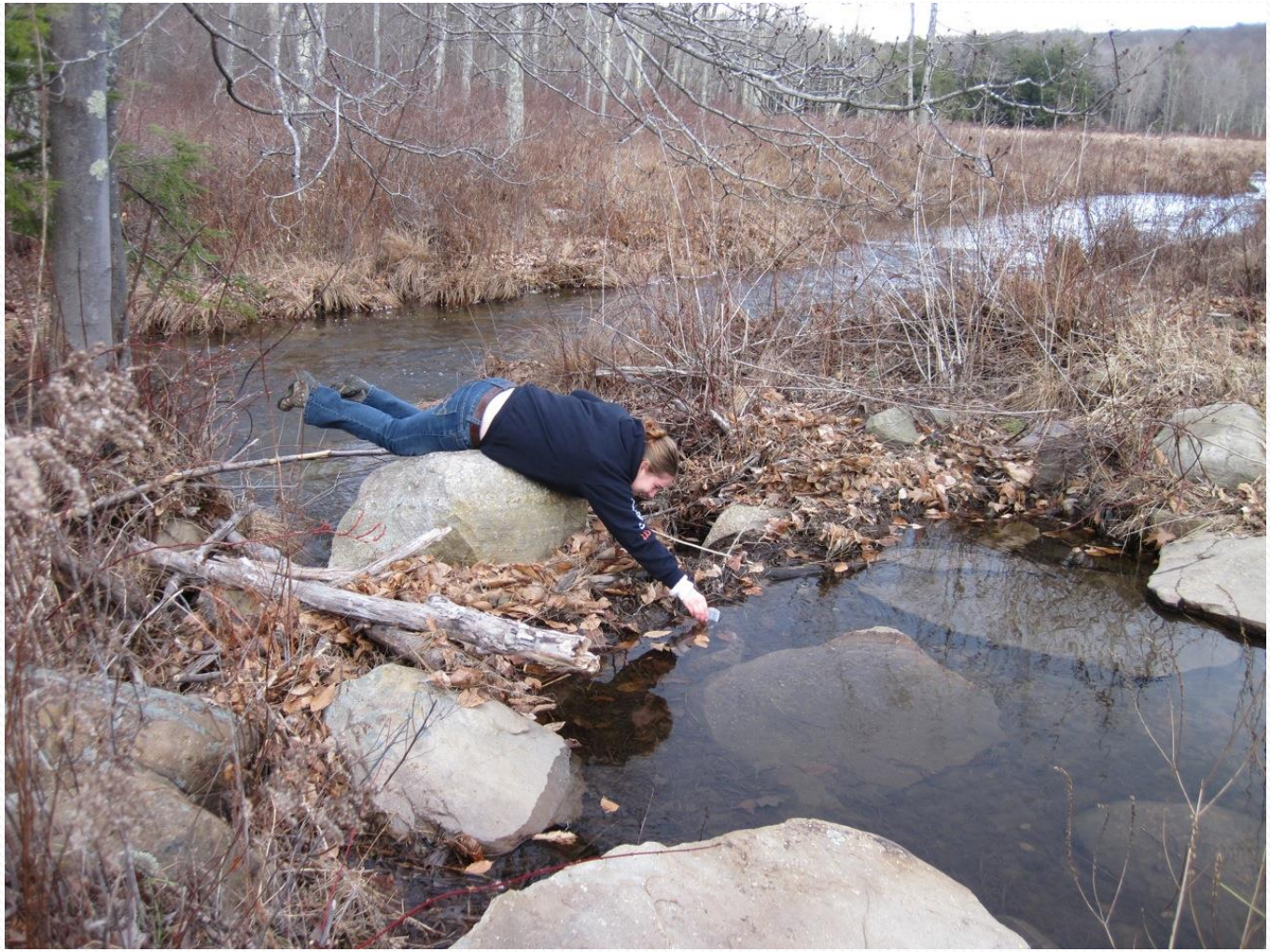
Field Work

- Meet with each staff member and reviews SOPs, training files, and other documents
- Observe procedures as they would occur on any normal work day
- Ask questions if procedures cannot be observed
  - Record any questions that come up that aren't on the audit checklist
  - Record any questions that employee is not able to answer

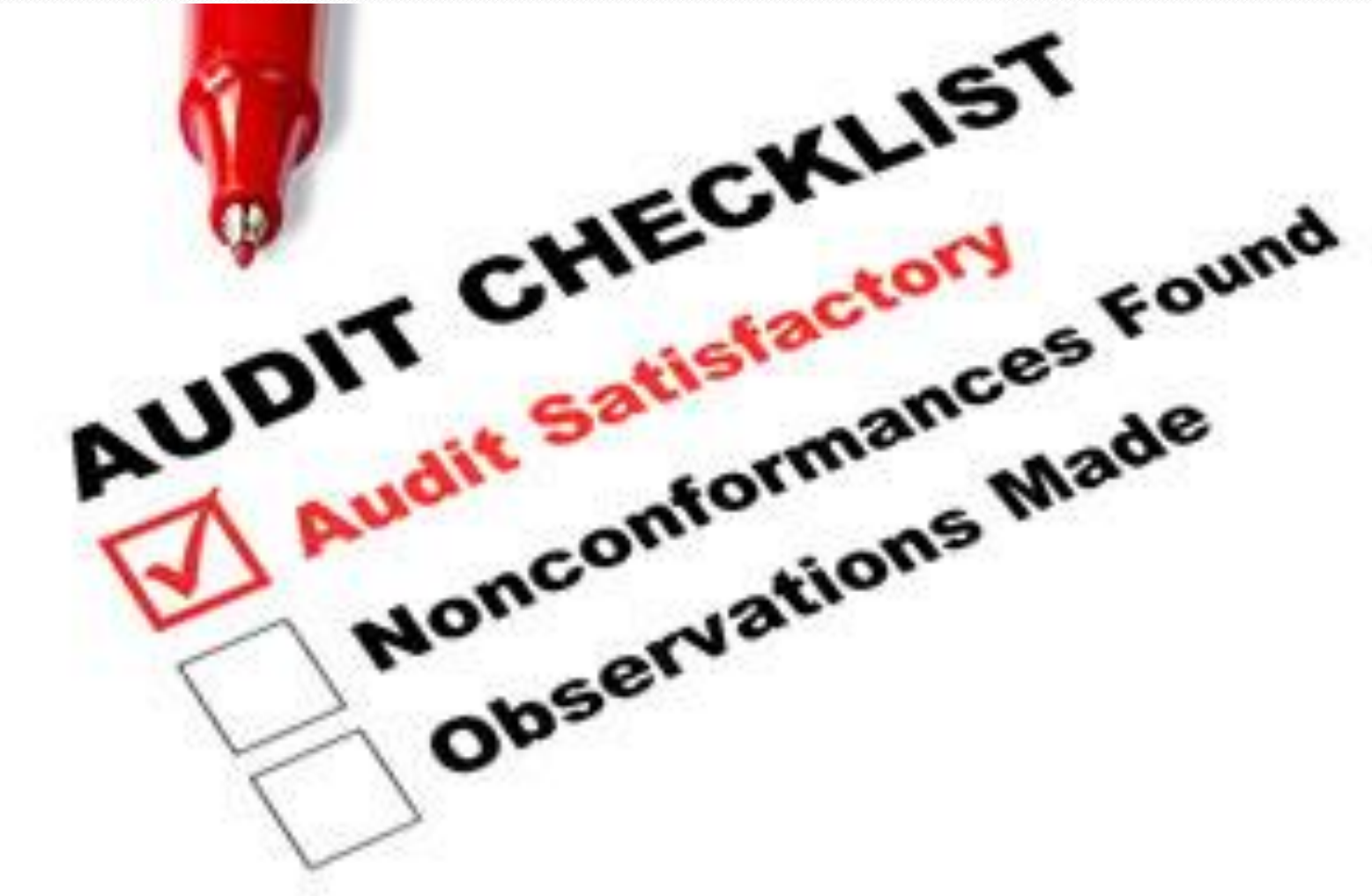
Documentation

- Take detailed notes on both procedures that are performed correctly and incorrectly
- Document anything that is not 100% correct as a deviation
- When deviations are encountered, document what occurred, who was involved, where and when it occurred, and if possible why it occurred

Documentation



Evaluation


AUDIT CHECKLIST
Audit Satisfactory
Nonconformances Found
Observations Made

Item to be Evaluated	Y	N	N/A	Comments
Part 1: Record Keeping				
Are there SOPs for the transportation, handling, protection, storage, and/or disposal of samples?	√			
Are there SOPs for field activities and are they accessible to all sample collectors?	√			SOPs available in shared computer drive.
Is there documentation that all sample collectors have read the SOPs?		√		Some documentation missing for John Doe.
Is there documentation that all sample collectors have been sufficiently trained to perform field activities?		√		Some documentation missing for John Doe.
Are COC forms filled out completely and legibly using black, waterproof ink?		√		Forms filled out in pencil
Are all errors in documentation corrected and initiated without obliteration?	√			Errors corrected with single line through them, dated, and initialed.

Item to be Evaluated	Y	N	N/A	Comments
Part 2: Safety				
Are all traffic laws and posted signs being obeyed?	√			
Is the correct PPE being worn?	√			
Are gloves being worn when collecting and/or handling samples?		√		Gloves were only being worn part of the time.
Are proper procedures being followed when operating equipment with moving or rotating parts?			√	Sampler does not use such equipment.
Are proper procedures being followed when working in confined spaces?			√	Samplers are not allowed to enter confined spaces.
Are all injuries or accidents being reported immediately to the appropriate supervisor?	√			

Item to be Evaluated	Y	N	N/A	Comments
Part 3: Sampling Equipment				
Is the correct sampling equipment being used for the project?	√			LL Hg collected using a sampling pole that does not contain metal.
Is the sampling equipment inspected before use and repaired/replaced when needed?	√			
Is the sampling equipment properly cleaned before each use?		√		The equipment is only cleaned before going on site. It isn't cleaned in between each sampling location.
Is the sampling equipment properly stored when not in use?	√			
Is an equipment blank being performed?	√			Equipment blanks are performed for LL Hg only.

Item to be Evaluated	Y	N	N/A	Comments
Part 4: Sampling				
4.1 General Sampling				
Are sample containers the correct material, correct size, and contain the correct preservation?	√			
Are samples representative of the source water?	√			Samples collected from center of the outfall flow.
Are samples collected for all required analyses?	√			
Are samples being collected using the appropriate sampling method?		√		pH sample collected as a composite but should be a grab
Is field filtration performed prior to preservation?			√	Field filtration was not required.
Is care taken to avoid sample contamination?		√		Gloves were not worn at all times. Bottles were sometimes left uncapped.

Item to be Evaluated	Y	N	N/A	Comments
Part 4: Sampling				
4.2 Bacteria Sampling				
Are faucet aerators or screens removed prior to sampling?		√		Screen was not removed.
Is the tap flushed for ≥ 1 minute prior to sanitization?		√		Tap was not flushed at all prior to sanitization.
Is the faucet sanitized properly using a 5.25% sodium hypochlorite solution?	√			
Is there a ≥ 2 minute wait between sanitation and flushing of the tap?		√		There was only a 1 minute wait.
Is the tap flushed with cold water for 3-5 minutes before the sample is collected?	√			Tap was flushed for 3 minutes.
Is the sample bottle filled to the appropriate mark without over filling?	√			

Item to be Evaluated	Y	N	N/A	Comments
Part 5: Sample Handling				
Are samples uniquely identified to ensure no confusion regarding identity of such samples at any time?		√		Labeled with sample location, sample date, and sample time but missing sampler's initials
Are samples placed on ice immediately after collection?		√		Samples taken back to the lab before being refrigerated.
Are samples stored and transported on ice?	√			
Are samples protected during transport to protect from breakage and contamination?	√			Glass jars wrapped in bubble wrap.
Are samples shipped in a timely manner?	√			

Item to be Evaluated	Y	N	N/A	Comments
Part 6: Field Testing				
6.1 pH				
Is the meter calibrated in the field prior to each use?		√		Meter is calibrated in the lab not the field.
Is the meter calibrated using correct and unexpired standards?	√			Standards don't expire until 12/20/15.
Is the calibration properly documented in the pH meter log book?		√		Calibration time was not recorded.
Is the calibration verified with the acceptable reading of a second source standard?	√			Second source standard (6.0) read 90-110%.
Has the sampler demonstrated that he/she is capable of calibrating and using the pH meter?	√			Documented training includes SOP, calibration, and IDOC/ODOC.

Evaluation

- Review findings with each individual and/or as a group
  - Explain what deviations occurred
  - Try to determine the root cause for each deviation
  - Provide positive feedback
- Prioritize deviations
- Create a report of audit findings and recommendations
- Issue corrective actions

Corrective Actions

- Describe the deviation
- Outline the plan to correct the deviation
- Designate who is in charge of implementing the plan
- Set a deadline for implementation
- Designate who is responsible for making sure the plan is successfully implemented

Follow Up

- If deviations occurred, follow-up reviews to be performed after a designated time frame
- Verify that corrective actions have been successfully implemented
- Determine if further corrective actions are needed

Questions?