



NPDES Laboratory Inspections

Pre - Inspection

Purpose of NPDES Inspections

Routine NPDES compliance inspections should:

- Determine compliance status with regulations, permit conditions, and other program requirements.
- Verify the accuracy of information submitted by permittees.
- Verify the adequacy of sampling and monitoring conducted by the permittee.
- Determine if discharges are occurring without authorization.

Authority to Enter and Inspect

The authority for entry is found in section 308(a)(4)(B) of the CWA, which states:

... the Administrator or his **authorized representative**, upon presentation of his credentials (i) shall **have a right of entry** to, upon, or through any premises in which an effluent source is located or in which any **records required to be maintained**... and (ii) may at reasonable times have access to and copy any records, **inspect any monitoring equipment or method** ... and sample any effluents which the owner or operator of such source is required to sample...

Authority to Enter and Inspect

CWA Section 308

- Authorizes inspections and monitoring to determine compliance with NPDES permit conditions
- Limited to records required by the permit
- **Specific authority** may be necessary to inspect other documents

Authority

40 CFR Part 122.41(e)

(e) **Proper operation and maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures...

Permit

4. Test Procedures

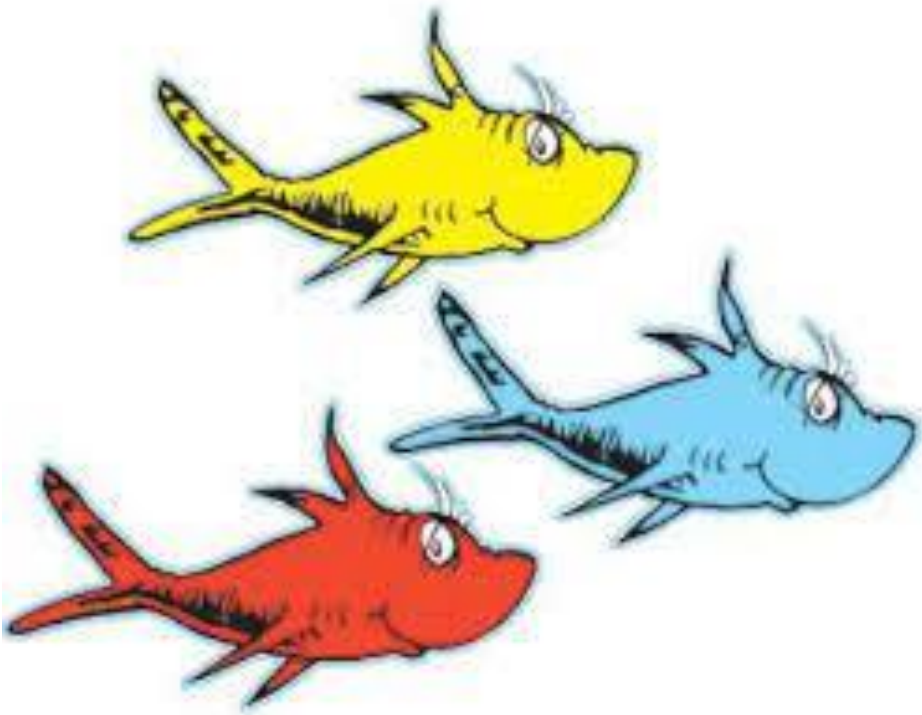
Laboratories used for sample analysis must be certified by the Division. Permittees should contact the Division's Laboratory Certification Section (919 733-3908 or <http://portal.ncdenr.org/web/wq/lab/cert>) for information regarding laboratory certifications.

Test procedures for the analysis of pollutants shall conform to the EMC regulations (published pursuant to NCGS 143-215.63 et. seq.), the Water and Air Quality Reporting Acts, and to regulations published pursuant to Section 304(g), 33 USC 1314, of the CWA (as amended), and 40 CFR 136; or in the case of sludge use or disposal, approved under 40 CFR 136, unless otherwise specified in 40 CFR 503, unless other test procedures have been specified in this permit [40 CFR 122.41].

To meet the intent of the monitoring required by this permit, all test procedures must produce minimum detection and reporting levels that are below the permit discharge requirements and all data generated must be reported down to the minimum detection or lower reporting level of the procedure. If no approved methods are determined capable of achieving minimum detection and reporting levels below permit discharge requirements, then the most sensitive (method with the lowest possible detection and reporting level) approved method must be used.

Inspection

Application



Small Lab

Large Lab

Local Lab

Contract Lab

Evaluation of the Laboratory Space

Is the space suitable for the work being done?

- Space
- Humidity and temperature control
- Power supply
- Light and ventilation
- Supply of laboratory pure water
- Fume hood systems
- Eye wash / Emergency shower

Evaluation of the Laboratory Tools / Instruments

Verify the correct tools are present to conduct the analysis required

Instruments

- pH meters
- DO meters
- Incubators
- Ovens
- Stirrer
- Microscope

Accessories

- Stir Bar
- Pipette
- Containers
- Solutions
- Broom / Mop
- Slides / Oil for the microscope

Evaluation of the Laboratory Chemicals / Solutions



YOU DON'T HAVE TO BE A CHEMIST!

Look for analytes which are needed to conduct the various analysis

Standards

- pH Buffer
- TSS Solution

Reagents

- Total Cl₂
- Methyl-Red Indicator

Look for preservatives which are needed to conduct the various analysis

- Nitric Acid
- Sulfuric Acid
- Ice
- Sodium Thiosulfate
- Hydrogen Chloride

Evaluation of the Laboratory Documentation

Operating Procedures

- Lab Specific Direction
- Equipment Manuals
- Stepwise Procedures

Documents / Records

- Calibration Logs
- Bench Sheets
- Training Records

Percent Recovery		Quality Control Acceptance Criteria
*1020 B.12.c.-2011		Initial Calibration Verification
*1020 B.6.-2011 & *2020 B.2.c.-2010		Reference Weights
		*2540 B.2.-1997
*2020 B.2.d.-2010		Each Reference Weight should weigh to 0.1mg
(once a week)	(once a week)	Laboratory Method Blank
Laboratory Method Blank	Laboratory Fortified Blank	TDEC Recommendation
Distilled Water	Ashless Powder	



Safety



Safety glasses

Safety shoes

Disposable gloves

Disposable clothing

Evaluation of Laboratory Personnel

- Evaluate the following:
 - Adequacy of training
 - Skill and diligence in following procedures
 - Skill and knowledge in using equipment and analytical methods
 - Precision & accuracy in performing analysis

Example



EFFLUENT CHARACTERISTICS	LIMITS		MONITORING I	
	Monthly Average	Weekly Average	Measurement Frequency	Samp Typ
<i>Parameter Code</i>				
Flow 50050	0.24 MGD		Continuous	Record
BOD, 5-day (20°C) ² CO310	30.0 mg/l	45.0 mg/l	Weekly	Compo
Total Suspended Solids ² CO530	30.0 mg/l	45.0 mg/l	Weekly	Compo
NH ₃ as N CO610			2/Month	Compo
Fecal Coliform (<i>geometric mean</i>) 31616	200/100 ml	400/100 ml	Weekly	Grab
Total Residual Chlorine ³ 50060	Daily Maximum 17 µg/l		2/Week	Grab
pH 00400	Not < 6.0 nor > 9.0 S. U.		Weekly	Grab
Temperature (°C) 00010			Weekly	Grab
Total Nitrogen (NO ₂ +NO ₃ +TKN) CO600			Quarterly	Calcula
Total Kjeldahl Nitrogen (TKN) 00625			Quarterly	Compos
Nitrate/Nitrite Nitrogen (NO ₂ +NO ₃) 00630			Quarterly	Compos
Total Phosphorus CO665			Quarterly	Compos
Chronic Toxicity ⁴ THP3B			Quarterly	Compos
Dissolved Oxygen 00300			Weekly	Grab
Total Mercury ⁵ COMER	Monitor & Report within last 12 months of permit cycle		1/Cycle	Grab
Temperature (°C) 00010			Weekly	Grab
Dissolved Oxygen 00300			Weekly	Grab

Permit

We will Evaluate for Total
Residual Chlorine

TRC Lab Evaluation

Most sites use a colorimeter, and some use the titration – ask the operator.

Ask the operator to demonstrate his procedure

Observe where the work is conducted – should be on a smooth flat surface

Where is the SOP for the work – read through it while the operator gets set up.

Is all the equipment in the SOP present and being maintained and operated appropriately

Are all the analytes present and unexpired

Did the operator calibrate the instrument before use

Did the operator follow the procedure

Were the results including any interim results documented

References

“Red Flags” for Lab Inspections

General issues

- Lack of current quality manual (lab QA/QC plan)
- No bench sheets/records
- No SOP's
- Incorrect calculations
- Lack of equipment to do the analyses
- Unkept, dirty lab

pH

- No buffers
- Expired buffers
- No temperature compensator
- Probe stored in DI water
- One point calibration
- Two-point calibration, but buffers do not bracket sample values
- pH data always 7
- No calibration records
- No time of analysis

“Red Flags” for Lab Inspections

Total Residual Chlorine (TRC)

- Expired reagent
- Reagent packets for 25 ml vial when 10 ml sample vial used
- Old visual color comparator unit used (unapproved)
- Data always one number such as 0.4 when permit limit is 0.45 mg/l
- Effluent data always “0” even though facility does not dechlorinate
- Amperometric titration reagent not stored in amber bottle

Total Suspended Solids (TSS)

- Balance not calibrated at least 1/yr
- Balance not to 4 decimal places (0.XXXX)
- Drying oven not at 103-105 °C
- No record of drying temperature
- Pink desiccant in desiccator
- Filters not prewashed
- No second weighing
- Not enough sample filtered to obtain at least 2 mg on filter

“Red Flags” continuation

Biochemical Oxygen Demand (BOD)

- D.O. meter not calibrated correctly
- No record of D.O. meter calibration
- D.O. probe stored submerged in DI water
- No mixer on D.O. probe
- Air bubble in D.O. probe
- D.O. meter does not work properly when turned on
- Incubator not at 20 °C +/- 1 °C
- No thermometer in incubator
- No record of incubator temperature
- No water seals on BOD bottles
- BOD bottles in incubator have air bubbles in them
- BOD bottles read after 4 days for 5-day BOD test
- BOD blanks greater than 0.2 mg/l
- Dirty BOD bottles
- No glucose/glutamic acid standards run or equivalent
- Effluent samples not seeded when effluent sample obtained after disinfection
- Final D.O. reading less than 1.0 mg/l
- Less than 2.0 mg/l depletion
- Initial bottle D.O. greater than 9.2 mg/l

“Red Flags” continuation

Fecal Coliform – for non-colilert IDEXX method

- No sodium thiosulfate preservative in sample collection bottles
- Water bath not at $44.5\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$
- No record of incubator temperature during analyses
- Expired growth media
- No autoclave or other method for sterilizing equipment
- Data always “0”; no positive control sample run
- Dilution/rinse water not buffered
- Insufficient volumes run to obtain results
- 8 hour holding time exceeded (from time of collection to incubation)

Resources



NPDES Compliance Inspection Manual - <https://www.epa.gov/sites/default/files/2017-01/documents/npdesinspect.pdf>

40 CFR Part 122.41(e)

40 CFR Part 136.3

Clean Water Act Section 308: Inspections, Monitoring, Entry - (a) Maintenance; monitoring equipment; entry; access to information



Thank you

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