NORTH CAROLINA WASTEWATER/GROUNDWATER LABORATORY CERTIFICATION APPROVED PROCEDURE FOR THE ANALYSIS OF TEMPERATURE

This document provides an approved procedure for the analysis of Temperature per 15A NCAC 2H .0805 (a) (6) (F) and (g) (3). The procedures in this document, in addition to all requirements of the EPA approved method found in 40 CFR Part 136.3, must be met.

HOLDING TIME:

- Immediate (i.e., *in situ*) analysis is required (40 CFR Part 136 Table II).
- When analyzing samples at a site where *in situ* analysis will interfere with obtaining an accurate reading due to conditions present (e.g., low flow, etc.), it is acceptable to collect the sample in a container and analyze on site.
- When analyzing samples in a hazardous area (such as some highway bridges, etc.), the samples should be transported and analyzed at a safe location near the collection point.

GENERAL INFORMATION:

- Temperature measurements must be made with a Celsius thermometer or other acceptable temperature-measuring device. Infrared (IR) devices are not acceptable for compliance monitoring. It is recommended that all liquid-in-glass thermometers have a metal case to prevent breakage.
- A Conductivity, Dissolved Oxygen, pH or multi-parameter meter with a temperature sensing device may be used to measure and document temperature for compliance monitoring.
- The number of decimal places that the measurement is reported to will determine the degree increments required for the temperature measuring device. Standard Methods 2550 B – 2000 states that the thermometer should have a scale indicated for every 0.1ºC. This is required for all measurements performed to tenth degree increments. (e.g., 24.7ºC). If measurements are reported in whole numbers, a temperature measuring device having a scale indicated for every 1ºC is adequate (e.g., 22ºC).
- Unless greater precision is required by the permit or data receiving agency, it is recommended that all temperatures reported for compliance monitoring, be reported in whole numbers. It should be noted that many vendors require proficiency testing (PT) samples be reported to two decimal places.
- All thermometers and temperature measuring devices must be checked **every 12 months** against a National Institute of Standards and Technology (NIST) traceable thermometer. The process must be documented and proper corrections made to all compliance data. To check a thermometer or the temperature sensor of a meter, read the temperature of the thermometer/meter against a NIST traceable thermometer and record the two temperatures. The verification must be performed in the approximate range of the sample temperatures measured. The thermometer/meter readings must be **less than or equal to 1ºC** from the NIST traceable thermometer reading. The documentation must include the serial number of the NIST traceable thermometer that was used in the comparison. Also document any correction that applies on both the thermometer/meter and on a separate sheet to be filed. (NOTE: Other certified laboratories may provide assistance in meeting this requirement.)
    - NIST traceable thermometers used for temperature measurement must be recalibrated in accordance with the manufacturer's recalibration date. If no recalibration date is given, the NIST traceable thermometer must be recalibrated annually.
    - NIST traceable thermometers used to verify the calibration of other thermometers or temperature sensors (i.e., limited use only) must be recalibrated in accordance with the manufacturer's recalibration date and the process documented. If no recalibration date is given, the NIST traceable thermometer must be recalibrated every 5 years.

DOCUMENTATION:

The following must be documented in indelible ink whenever sample analysis is performed.

1. Date and time of sample collection.
2. Date and time of sample analysis. Alternatively, one time may be documented for collection and analysis with the notation that samples are measured *in situ* or immediately at the sample site.
3. Sample site including facility name and location, ID, etc.
4. Collector's/analyst's name or initials.
5. Document sample temperature measurements with any applicable temperature corrections applied.
6. All data must be reported in °C.
7. The temperature correction (even if it is zero) must be posted on the meter as well as in hard copy format (to be retained for 5 years).
8. Annual calibration verification against an NIST traceable thermometer.
9. Thermometer/instrument identification.
10. Parameter analyzed.
11. Data qualifiers, when necessary.
12. Equipment maintenance (recommended).

Refer to *Quality Assurance Policies for Field Laboratories* (at http://portal.ncdenr.org/web/wq/lab/cert/field/policy) for additional quality assurance and quality control requirements.

Ref: Standard Methods 2550 B - 2000.