

Georgia Department of Natural Resources

Environmental Protection Division laboratory

Effective Date: 06/10/2021

SOP 2-005 Rev. 5

Page 1 of 4

Laboratory Manager Approval: Shene A. Jones / 08/19/2021
QA Manager Approval: Jeffrey Moore / 08/19/2021

Drinking Water pH and Turbidity Screen by EPA 180.1

Access to this SOP shall be available within the laboratory for reference purposes; the official copy of this SOP resides on the official Georgia EPD website at <https://epd.georgia.gov/about-us/epd-laboratory-operations>. Printed copies of this SOP will contain a watermark indicating the copy is an uncontrolled copy.

1. Scope and Application:

This method is used to screen preserved drinking water samples for pH and turbidity.

1.1 Restricted Procedure:

This procedure is restricted to use by an analyst experienced in the handling of hazardous materials. Additionally, the analyst must complete the requirements of the GAEPD Initial Demonstration of Analyst Proficiency prior to the analysis of actual samples. Analysts are further warned that performance of this analysis involves the use of potentially hazardous chemicals; refer to the GAEPD Chemical Hygiene Plan for additional information regarding chemicals required by this method.

2. Definitions

Refer to Section 3 and Section 4 of the Georgia EPD Laboratory Quality Assurance Manual for Quality Control Definitions. (See SOP reference 13.4)

3. Interferences

- 3.1 Contamination is the prime concern. The work area (including counters and hoods) is cleaned weekly to eliminate sources of contamination. All reagents and apparatus must be routinely demonstrated to be free from interferences under the conditions of the analysis by running laboratory reagent blanks.

4. Safety

Refer to Laboratory Chemical Hygiene Plan, online revision. (See SOP reference 13.5)

5. Apparatus and Equipment

Georgia Department of Natural Resources

Environmental Protection Division laboratory

Effective Date: 06/10/2021

SOP 2-005 Rev. 5

Page 2 of 4

- 5.1 pH paper that covers the range 0-3
- 5.2 Turbidity meter capable of reading 1 NTU
- 5.3 Turbidity vials specific to the turbidity meter used
- 5.4 Lint free lens cleaning tissue

6. Reagents and Standards.

- 6.1 0.02 NTU Standard
- 6.2 10 NTU Standard
- 6.3 1000 NTU Standard
- 6.4 10 NTU Initial Calibration Verification Standard (ICV). Commercially purchased standard with different lot number as calibration standards
- 6.5 Laboratory Reagent water: 18M Ω water – Purified water which does not contain any measurable quantities of target elements or interfering elements for each element of interest. Milli-Q water is used by the EPD Metals Lab. Milli-Q water is used by the EPD Metals Lab. Milli-Q water has a resistivity of 18.2 [M Ω .cm] @ 25°C and a TOC of 50 μ g/L or less.

7. Sample Collection

Refer to Chapter 5 of the Georgia EPD Laboratory Quality Assurance Manual for Sample Container, Sample Preservation and Sample Holding Times. (See SOP reference 13.4)

8. Calibration

Although the turbidity meter is pre-calibrated, the calibration should be confirmed prior to use.

- 8.1 Warm-up the turbidity meter for at least 30 minutes.
- 8.2 Select calibration icon and choose ProCal option
- 8.3 Wipe the outside of each vial before use with a lint free wipe. Be sure to remove all fingerprint, particles and moisture.
- 8.4 For each standard, hold the vial by its cap and lower it completely into the sample cell of the turbidity meter. Make sure the arrow on top points to the white peg on the turbidity meter.
- 8.5 Select the 1000 NTU option and place the 1000 NTU standard in the sample cell and press calibrate.
- 8.6 Select the 10 NTU option and place the 10 NTU standard in the sample cell and press calibrate.
- 8.7 Select the 0.02 NTU standard option and place the 0.02 NTU standard in the sample cell and press calibrate.
- 8.8 Reread calibration standards and record.

Georgia Department of Natural Resources

Environmental Protection Division laboratory

Effective Date: 06/10/2021

SOP 2-005 Rev. 5

Page 3 of 4

- 8.9 Fill a vial with laboratory reagent water (18 MΩ water). Please note, this reading is considered the blank reading. Place the vial inside the sample cell. If the reading is >1, repeat steps 8.1-8.8.
- 8.10 Place the ICV inside the sample cell. If the reading is not 10NTU ± 10%, recalibrate the instrument using steps 8.1-8.9.

9. Quality Control

Not Applicable.

10. Procedure

- 10.1 Make sure the sample vials are cleaned before using. Mix the sample bottle by inverting three times. Immediately fill the vial completely with sample. Wipe the outside of the vial with a lint free wipe. Be sure to remove all fingerprints, particles and moisture. Holding the vial by its cap, lower it completely into the sample cell. If the turbidity is >1 NTU, empty the vial, mix the sample and measure the turbidity again. If the result is still >1, inform your supervisor and place the sample in the designated holding area.
- 10.2 Check the sample for pH using pH paper or pH strips. Compare the pH paper color to the color chart included with the pH paper or strip. Inform your supervisor if any samples have a pH >2. These samples need an additional 5ml of concentrated nitric acid added and the pH and turbidity need to be rechecked after a minimum of 16 hours.
- 10.3 Repeat steps 10.1-10.2 for the every sample. Recheck the blank and ICV at the end of the batch (see 8.9 and 8.10).
- 10.4 Pour 10ml to 15ml of sample into a labeled 15ml HDPE centrifuge tube. For a batch of 10 samples or less, take one sample and make three tubes for that sample (two extra tubes for the MS and MSD). For batches of eleven samples or more take two samples from that batch and label one set of MS and MSD tubes for each sample.
- 10.5 The following information must be recorded on the batch sheet: The analyst initials, the date, the lot numbers of all standards and pH paper, the turbidity of each sample. Check box <1 if turbidity results are such. If >1 check box and write in actual result. Check box for pH <2 and if pH is >2 check that box and write in actual result.
- 10.6 All results must be entered into Labworks before any other analysis can be started. The test code for pH is DWPH and the test code for turbidity is DWTURB.
- 10.7 Place the prepared and labeled centrifuge tubes with the batch sheets in the ICPMS lab for analysis.

11. Calculations

Not applicable.

Georgia Department of Natural Resources

Environmental Protection Division laboratory

Effective Date: 06/10/2021

SOP 2-005 Rev. 5

Page 4 of 4

12. Waste Management

- 12.1 See GA EPD Laboratory SOP – EPD Laboratory Waste Management Standard Operating Procedures. (See SOP reference 13.3)

13. References

- 13.1 Micro 100 Turbidimeter operating manual.
- 13.2 EPA Method 180.1, Determination of Turbidity by Nephelometry, Revision 2, August 1993.
- 13.3 GA EPD Laboratory SOP – EPD Laboratory Waste Management SOP, SOP 6-015, online revision.
- 13.4 GA EPD Laboratory Quality Assurance Plan, online revision.
- 13.5 GA EPD Laboratory Safety/Chemical Hygiene Plan & Fire Safety Plan, online revision.

14. Practical Quantitation Limits (PQL's), Precision and Accuracy Criteria and Quality Control Approach

Not applicable.

Uncontrolled Copy