

APPENDIX 1 Field and Laboratory Methods



Appendix 1: Field and Laboratory Methods

A. Laboratory Certification

In order for the WVDA to perform sample analysis for the purpose of determining compliance with chemical or microbiological requirements of the State's covered statutory programs, the laboratory must be certified with respect to Title 47 Code of State Regulations Series 32. This rule governs the certification of laboratories conducting environmental analysis of wastewater and establishes the provisions for obtaining and maintaining laboratory certifications and the procedures required in analyzing samples. The purpose of the rule is to insure that the results of environmental analysis are accurate, reproducible, and verifiable. Only laboratories certified in accordance with 47CSR32 may be called West Virginia Certified Environmental Laboratories. The WVDEP issues a certificate which specifies the categories and parameters within each category for which the laboratory is certified. The WVDA's certificate number is 253.

B. Quality Assurance/Quality Control

The Moorefield Laboratory has in place a rigorous Quality Assurance/Quality Control (QA/QC) Program. This ensures that all data being produced is accurate and falls within acceptable ranges for the methods being utilized.

A complete description of all QA/QC protocols for the WVDA water quality laboratory can be found in WVDA's Standard Operating Procedures Manual. This manual outlines in detail all procedures followed for water quality analysis. Additional information can be found in the Hach *Water Analysis* fourth edition and *Standard Methods for Examining of Water and Wastewater* twentieth edition. Any person seeking additional information on this matter can contact either the Laboratory Supervisor or the QA/QC Officer for the Moorefield Laboratory.

C. Field Procedures

WVDA field procedures are designed to collect representative samples in a safe and practical manner. A representative sample is defined as one that best characterized the entire upstream portion of the watershed at a particular point.

Field data includes temperature, pH, conductivity, and a narrative description of flow and weather conditions at the time of collection. Additional field data, such as dissolved oxygen, may be collected. Field data is recorded on field data sheets which are the core for the chain of custody program and the best link between the pending laboratory findings and the real stream conditions.

Sample Collection. One properly identified sample container is marked with an asterisk or star and is sealed immediately after the sample is collected. This container is used for bacterial analysis and must not be contaminated. One properly identified sample container is used for nutrient analysis. Sample containers and equipment are triple rinsed in the water body to be sampled. Samples are collected in such a manner that the sample container or sample collection equipment does not dislodge sediment from the stream bed.

All pH, conductivity, and temperature readings are taken from this sample container immediately after collection. All meters are calibrated daily prior to beginning a sample run. pH meters are calibrated using a three point calibration. Field temperatures recorded are the temperatures displayed on the Hach

sensION 156 handheld meter while pH is being determined. Several methods are used to collect representative samples:

- Wading – sample is collected upstream of the technician’s position in the water body
- From the stream bank – with extension sampler
- From a bridge – with a “bailer” type sampler.

All samples are placed in a cooler on ice. Samples collected for fecal coliform analysis must be returned to the laboratory within six hours of collection, samples that are scheduled for nutrient analysis must be delivered within 24 hours.

D. Laboratory Procedures

Sample Analysis for Nutrients

Samples are analyzed for nutrients using a Hach brand DR4000/U spectrophotometer. A spectrophotometer is a device used for measuring absorbance of light. In 2003 the Moorefield Laboratory began using a Lachat Quikchem 8000 automated ion analyzer. This instrument utilizes the technology of flow injection analysis (FIA) which is used for the determination of **nitrate (NO₃-N)**. The concentration is colorimetrically determined by a spectrophotometer.

Ammonia-nitrogen is analyzed using USEPA Method 350.2 from Methods for Chemical Analysis of Water and Wastes. The absorbance is read using a 1-inch light path at a wavelength of 425 nm.

Total phosphorus is analyzed using Hach Method 8190 from Hach’s Water Analysis Handbook Fourth Edition which is a USEPA accepted method for reporting wastewater analyses. Sample absorbance is measured at 880 nm.

Sample Analysis for Fecal Coliform Bacteria

Fecal Coliform Bacteria are analyzed using the Membrane Filtration Procedure outlined in Standard Methods for the Examination of Water and Wastewater 20th Edition (Section 9222D).