

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

FIELD SAMPLING AND TESTING OF SURFACE WATER
FOR QUALITY DETERMINATION

1.0 PURPOSE

- 1.1 This procedure sets forth guidelines for collecting surface water samples within the limits of Division of Highways projects and in adjacent surface waters that may be affected by construction on these projects.
- 1.2 The procedure establishes general and specific methods to be utilized in determination of sampling points, duration of sampling and how to collect samples. It also discusses necessary equipment and tests.

2.0 APPLICABLE DOCUMENTS

MP 642.40.20
MP 642.03.50

3.0 EQUIPMENT

- 3.1 Chemically inert glass and/or plastic bottles (depending on the test to be performed) or 1 liter capacity fitted with screw caps will be used for chemical analyses samples.
- 3.1.1 All containers will be machine or hand washed with a suitable cleaning compound or biodegradable soap. After washing, containers will be well rinsed with clean tap water and finally with distilled water to remove any residue of the cleaning compound or soap.
- 3.2 Containers used for samples for biological test determination by the Central Laboratory shall be 100 ml plastic bottles with screw caps. The bottles and caps must be able to withstand sterilization procedures.

- 3.2.1 The bottles and caps shall be sterilized in an autoclave. The sterilized bottles shall be capped in such a way as to prevent contamination before samples are obtained.
- 3.3 Plastic or rubber gloves when sampling in certain contaminated waters (for example, sewage waters).
- 3.4 Rubber boots if required for sampling in deep water.
- 3.5 Materials Control, Soils and Testing (MCS&T) Division personnel will need equipment to determine pH, temperature, dissolved oxygen, specific conductivity, total alkalinity, and total acidity. District personnel will need equipment for determination of pH, temperature, and turbidity.
- 4.0 SOURCE OF SAMPLES
- 4.1 Samples may be obtained from streams, springs, drainage from coal mines and waste, or other sources that may affect water quality.
- 4.2 Generally, all perennial streams should be sampled. In certain cases, sources that are of an intermittent nature may require sampling when flows are present and if it is likely that the source will have a significant affect on the quality of receiving waters and the stream flow.
- 4.3 Drainage from coal mines or coal waste piles should be sampled if this drainage is disrupted, channelized by the highway construction, or it is contributing to the flow of water that passes through the project or proposed project, but is not located within project limits.
- 4.4 Springs or other special sources should be sampled especially if the supply is for human consumption and/or other public, recreational or natural resource uses in the immediate area.
- 4.5 When possible, samples to be taken prior to construction or in the design phase of a project should be obtained when flows are considered to be in low or normal condition, except as noted in 4.2.

5.0 POINTS OF SAMPLING

5.1 Samples should not be taken from areas of stagnation, heavy aeration, or agitation unless for special circumstances and tests.

5.2 Samples shall not be taken from the confluence of streams. Samples shall be taken a minimum of 15 m above and 30 m below such points. When mixing has not created visible homogeneous conditions within 30 m below a confluence, sampling will be conducted at the nearest spot where visible homogeneity exists.

5.2.1 When conditions are such that homogeneity does not exist within 305 m downstream from a confluence, sufficient samples should be obtained to delineate any differences. These points of sampling are to be recorded.

5.3 Under some conditions, to be determined by the sampler, points of sampling may have to be located at a specific spot to determine influx of concentrated substances or isolated source of pollution.

6.0 FREQUENCY AND DURATION OF SAMPLING

6.1 Samples Collected by MCS&T Division Personnel: Sampling will be conducted in the design phase of a project. At least three (3) samples should be obtained at different times prior to construction at each of the sources outlined in Section 4.1 if encountered in the project area.

6.2 Samples Collected by District Personnel During Construction: Sampling by District personnel will be conducted as an acceptance procedure when MP 642.03.50 is in effect on a project. See MP 642.03.50 for sampling requirements.


6.2.1 In some cases, MP 642.03.50 may not be in effect on a project. Sampling will be conducted if it is determined that construction activity could result in a disturbance of the water source drainage area. Sampling frequency will be daily.

- 6.2.1.1 When construction is not active, but conditions are such that erosion and pollution can still occur, sampling will be conducted daily.
- 6.2.1.2 When construction is not active, but conditions are such that erosion and pollution are not likely to occur, sampling will be conducted weekly.
- 6.3 Monitoring will be continued throughout the life of the project.
- 7.0 VOLUME OF SAMPLES
- 7.1 Samples collected for testing in the MCS&T Division Central Laboratory will be of the quantities as set forth in MP 642.40.20 for each test required.
- 7.2 The quantity of water for field testing by MCS&T Division personnel shall be 1 liter.
- 7.3 The quantity of water for District testing shall be a minimum of 500 ml.
- 7.4 A minimum sample for biological testing will be 100 ml.
- 7.5 Appropriate preservation methods and quantities for all tests are listed in MP 642.40.20.
- 8.0 SAMPLING
- 8.1 Individual grab samples will be appropriate in most cases.
- 8.2 Generally, sampling from the stream bank will be acceptable. In certain cases, however, grab or composite samples collected from a boat or structure may be necessary.
- 8.3 The sample should be taken at least an arm's length in depth or half the stream depth.
- 8.3.1 In some sources too shallow for submerging the sampling bottle, water will have to be dipped or a hole dug large enough to allow submergence of a sample bottle. When a

hole is dug, a minimum of 15 minutes must pass before the sample is taken. However, in some cases where stream flow and volume is low or turbidity is not equalized, a longer waiting period will be necessary.

- 8.4 The mouth of the sample bottle should be held in such a manner that the flow of water will not pass over the hand before entering the bottle.
- 8.5 The container used for chemical test samples should be rinsed two or three times with the water to be collected before taking the sample. Rinse water is to be poured out downstream of the site.
- 8.6 The sample will be capped and sealed as soon as possible after sampling to limit exposure to the atmosphere.
- 8.7 Containers used for biological test samples will be kept sterile at all times. The bottle will be submerged and the cap taken off underwater when taking the sample. The container will be capped after filling while still underwater.
- 8.8 Samples shall be handled prior to analysis in a manner that protects the substances to be tested.
- 9.0 TESTING
- 9.1 The following tests will be conducted by MCS&T Division personnel in the field at the sample site: 1) pH, 2) dissolved oxygen, 3) specific conductivity, 4) total alkalinity, 5) total acidity, and 6) water temperature.
- 9.2 Tests to be conducted in the field by District personnel will be pH and water temperature.
 - 9.2.1 The turbidity of the sample will be determined in the District laboratory.
- 10.0 SHIPPING SAMPLES
- 10.1 Samples collected for testing by the Central Laboratory will be delivered to the MCS&T Division.

- 10.1.1 Samples shall be scheduled to arrive within the limits of the holding times as indicated in MP 642.40.20.
- 11.0 DOCUMENTATION
- 11.1 Water quality results for samples taken by MCS&T Division personnel will be maintained on the Division's appropriate forms.
- 11.2 Water quality results for samples taken by District personnel may be maintained on the Division's form entitled "Environmental Water: Quality Check" (see attachment).
- 12.0 ASSISTANCE
- 12.1 Personnel from the MCS&T Division will provide training for District personnel in all aspects of the work made necessary by this MP.
- 12.2 Assistance in planning and developing a testing program for a particular project or projects will also be provided by this Division.



Gary L. Robson, Director
Materials Control, Soils
and Testing Division

GLR:k

Attachment

ENVIRONMENTAL WATER: QUALITY CHECK

PROJECT: _____ COUNTY: _____ DISTRICT: _____

LAB NUMBER: _____

DATE SAMPLED/TESTED: _____

SAMPLED BY: _____

SAMPLING OBSERVED BY DISTRICT? YES NO

RAINFALL (24 HRS) _____"

	SITE #	SITE #	SITE #	SITE #	SITE #
STATION	_____	_____	_____	_____	_____
OFFSET	_____	_____	_____	_____	_____
TURBIDITY	_____	_____	_____	_____	_____
pH	_____	_____	_____	_____	_____
IRON	_____	_____	_____	_____	_____
WATER TEMP °C	_____	_____	_____	_____	_____
AIR TEMP °C	_____	_____	_____	_____	_____

REMARKS: _____

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32^{\circ}$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) - 1.8$$

TECHNICIAN'S SIGNATURE