

City of Round Rock
Environmental Services Laboratory
NELAP Recognized Lab T104702327
Round Rock, TX 78664

Standard Operating Procedure (SOP)
for

Bacteriological Sample Collection, Transportation and Storage for External Customers

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1.0 IDENTIFICATION OF TEST METHOD:

1.1 This protocol describes the procedure requested for collection, transportation, and storage of bacteriological samples for analysis at the City of Round Rock, Environmental Services Laboratory (CORRESL) by bacteriological test methods including Colilert and Colilert-18, Presence/Absence, Colilert and Colilert-18, Quanti-Tray, and Heterotrophic Plate Count.

2.0 **MATRIX:** Potable and Non-potable Water

3.0 **DETECTION LIMIT:** N/A

4.0 SCOPE AND APPLICATION:

4.1 This procedure applies to external personnel who collect, transport, and/or store samples which are intended for bacteriological analysis by the City of Round Rock, Environmental Services Laboratory.

5.0 RESPONSIBILITY AND APPLICABLE POLICY

5.1 Proper bacteriological sampling, storage, and transport prior to laboratory submission are the responsibility of the submitter.

6.0 SUMMARY OF METHOD:

6.1 The person performing sample collection will identify suitable sampling sites, collect samples using aseptic procedures, document sample collection, and store samples properly, and transport samples to the laboratory. Utmost care should be taken to ensure representative samples are obtained and are maintained in proper conditions for accurate performance of bacteriological test methods.

7.0 DEFINITIONS:

7.1 Bac-T: Bacteriological Test

7.2 mL: milliliter

7.3 CORRESL: City of Round Rock, Environmental Services Laboratory

7.4 TCEQ: Texas Commission on Environmental Quality

7.5 PPE: Personal Protective Equipment

7.6 mg/L: Milligrams per liter

7.7 DPD: N,N-diethyl-p-phenylenediamine, chemical indicator used to determine chlorine concentrations in water.

7.8 Potable Water: Water that is intended for drinking or which is a source of water intended for drinking. (i.e. public drinking water distribution, construction, special, and raw samples, LT2 source water samples). Potable water samples have a holding time of thirty (30) hours and should be submitted to the laboratory within 24 hours of collection.

7.9 Non-potable Water: Water that is not intended for drinking or which is not a source for drinking water. (i.e. Wastewater, Pools, Spas, Recreational Waters). Non-potable water samples have a six (6) hour holding time and must be submitted to the laboratory as soon as possible.

7.10 PWS: Public Water System,

7.11 PWSID: Public Water System Identification number.

8.0 INTERFERENCES:

8.1 Environmental conditions, such as rain, wind, shrubs, can affect the sampler's ability to obtain a representative sample using aseptic technique.

9.0 SAFETY

9.1 Choose adequate PPE to provide protection from testing chemicals and environmental conditions.

9.2 Evaluate sampling site conditions before igniting propane torch; be aware of residential gas meters.

9.3 Be aware of domesticated and feral animals in the sampling area, use caution when approaching, leaving.

10.0 EQUIPMENT AND SUPPLIES:

- 10.1 Supplied Bac-T sample bottle with sodium thiosulfate preservative. (CORRESL verifies each lot of bottles is sterile, contains enough sodium thiosulfate to neutralize 15mg/L chlorine, and has accurate 100mL demarcation.)
- 10.2 Handheld propane torch (i.e. Bernzomatic) (optional)
- 10.3 Isopropyl alcohol (Rubbing Alcohol) or bleach solution
- 10.4 Antiseptic Hand Cleaner (optional)
- 10.5 Chlorine Test Kit
- 10.6 Cooler with ice pack/ice
- 10.7 Permanent Marker
- 10.8 CORRESL Water Bacteriology Form
- 10.9 Pen with indelible ink for form completion.
- 11.0 **REAGENTS AND STANDARDS:**
 - 11.1 DPD Total or Free Chlorine Dispenser or Pillows (appropriate to disinfectant type used)
 - 11.2 Chlorine Test Kit
- 12.0 **SAMPLE COLLECTION, PRESERVATION, SHIPMENT, STORAGE:** See Procedure (Section 15).
- 13.0 **QUALITY CONTROL:** CORRESL performs quality control on provided bottles prior to release to clients. The CORRESL performs extensive on-going quality control of the laboratory and testing methods per the 2003 NELAC Standard and the TCEQ Laboratory Accreditation Program. Quality control procedures and documentation are available to clients upon request.
- 14.0 **CALIBRATION AND STANDARDIZATION:** The submitter is responsible for the maintenance, standardization, and calibration of its chlorine testing equipment. Please refer to your chlorine test kit's instruction manual for further information.
- 15.0 **PROCEDURE:**
 - 15.1 **Select an appropriate sampling point.** (For complete rules and regulations refer to the Texas Administrative Code TAC290.109(c) and TCEQ's "How to Develop a Monitoring Plan for a Public Water System", RG-384.)
 - 15.1.1 Select a tap that is supplying water from a service pipe directly connected to the main, not a cistern or storage tank.
 - 15.1.2 Select an outside sampling point (hose bib-type faucet), if available. If an inside point must be used, select a faucet that is not subject to additional treatment (i.e. water softener) and without an aerator, filter, or shower apparatus. Do not collect samples from a drinking fountain.
 - 15.1.3 Select a faucet that is not angled, does not leak, is at least 18 inches from the ground/floor and which is not obstructed by landscaping. Do not use a leaking faucet – choose another site.
 - 15.1.4 Ensure the sampling faucet is made of materials that will allow you to heat it with a torch or use a strong alcohol/bleach solution to disinfect it. Remove all hoses and attachments.
 - 15.1.5 If a sample must be taken from a non-conforming site, document the inadequacies and justification on the bacteriological form.
 - 15.2 **Obtain a Chlorine Residual with a Chlorine Test Kit.**
 - 15.2.1 Turn faucet on and let run several minutes.
 - 15.2.2 Obtain a chlorine residual per chlorine test kit instructions.
 - 15.2.3 If chlorine residual is below 0.5 mg/L for chloramines or 0.2mg/L for free chlorine, re-flush faucet and/or nearest hydrant and re-test.
 - 15.2.4 If no residual can be obtained, select a different sampling location and notify appropriate personnel of chlorine deficiency.
 - 15.2.5 Record the chlorine residual result obtained by testing on the Water Bacteriology Form.
 - 15.3 **Disinfection**
 - 15.3.1 Turn faucet off and douse faucet head with isopropyl alcohol or bleach solution and/or flame with handheld torch.

15.3.2 Ensure hands are clean, if available use antiseptic hand cleaner.

15.4 Bacteriological Sample Collection

15.4.1 Turn faucet on slowly and adjust to obtain a laminar (non-splashing/smooth) pencil thin stream.

15.4.2 If a steady stream cannot be obtained, select a different sampling location.

15.4.3 Carefully remove the plastic wrapper from the sample bottle, be sure not to contaminate the lip or lid.

15.4.4 Keep sampling bottle closed until it is to be filled. Remove lid of sample container, keep lid facing down.

15.4.5 Do not rinse the bottle out – the white powder (sodium thiosulfate) is used to neutralize any chlorine present.

15.4.6 Collect a **minimum** of 100mL of water sample – approved laboratory sample bottles are marked. Leave ample space (quarter-sized) in the bottle to facilitate mixing by shaking. Immediately re-cap sample bottle while keeping lid facing down.

15.4.7 Use a permanent marker to assign a unique field identification number to the sample bottle. Use a pen with indelible to fill in the required information (15.4.7.1 to 15.4.7.8) on the Water Bacteriology Form.

15.4.7.1 The Customer Information Section should include PWSID#, PWS Name (if a PWS), the name of the submitter, submitter address, sampler name/phone, and how results are to be reported (mail/fax/e-mail).

15.4.7.2 The Sample Information section should include the field ID, date and time of sample collection, sample site name.

15.4.7.3 Potable or non-potable water type must have only one type circled.

15.4.7.4 System Type must have only one type circled.

15.4.7.5 Sample Type must have only one type circled.

15.4.7.6 Disinfection Residual should be entered (numerically). (For ALL samples: distribution, special, construction, repeat, raw) and the type must have only one circle.

15.4.7.7 The type of test requested should be circled. If no type is indicated, the laboratory will run the 24 hour presence/absence test. The laboratory reserves the right to run an equivalent test (i.e. 18 hour vs. 24 hour) of the same method if sample conditions or time restraints require.

15.4.7.8 Place the sample bottle in a cooler for transport to the lab.

15.5 Sample Transport

15.5.1 For best results, samples should be delivered to the laboratory on the day of collection and placed in a cooler to begin the chilling process while in transport to the lab. If potable water samples cannot be analyzed on the day of collection, refrigerate and submit to the laboratory within 24 hours of collection. (Total holding time from collection to lab set-up cannot exceed 30 hours).

15.5.2 If sampling personnel are unable to deliver their samples to the laboratory, transfer custody to transporting personnel. (Sampler signs in the "Relinquished by" space with the date and time of transfer, Transporter signs in the "Received by" space in the same box.)

15.5.3 Keep potable water samples separate for non-potable samples to minimize contamination risks.

15.6 Lab Arrival

15.6.1 Upon lab arrival, present and relinquish (Presenting personnel signs "Relinquished by" by space with the date and time of transfer, Lab Personnel signs in the "Received by" space in the same box.) the completed City of Round Rock Water Bacteriology Form and labeled samples to the lab personnel.

- 15.6.2 The CORRESL lab personnel will evaluate sample acceptability per the CORRESL Sample Acceptance Policy:
- 15.6.2.1 Sample will be rejected if bottle is not suitable for bacteriological analysis, or if the bottle is in cracked or leaking condition.
 - 15.6.2.2 Sample will be rejected if the container does not have the minimum volume of 100mL or if it is completely full. An air space the size of a quarter must be present to allow for uniform mixing of sample. When possible, try to fill the sample bottle to the neck to ensure adequate volume and head space.
 - 15.6.2.3 If the sample is submitted to the lab on the day of collection, there is no temperature requirement. (Should be in cooler, "chilling process begun".)
 - 15.6.2.4 If the sample is submitted on the day after collection, and is a Public Water System Bac-T (i.e. distribution, special, construction, construction, raw) there is no temperature requirement.
 - 15.6.2.5 If the sample is submitted on the day after collection and is a Long Term 2 (LT2) E. coli enumeration sample, the temperature of the sample must be between 0.1C and 10C. Samples outside this range will be rejected.
 - 15.6.2.6 Samples which are visibly frozen or partially frozen will be rejected.
 - 15.6.2.7 Samples with heavy turbidity or coloration that could interfere with the analysis will be rejected.
 - 15.6.2.8 The laboratory reserves the right to accept or reject samples with extenuating circumstances.
 - 15.6.2.9 If excess chlorine is present in the sample, the test procedure will indicate such and the sample will be invalidated.

16.0 Troubleshooting:

- 16.1 If a sample or sample form is found to deficient due to documentation, the submitter will be contacted to resolve the deficiency, if possible. Samples that are found to be unacceptable and whose deficiencies cannot be corrected by the submitter will be rejected.
- 16.2 If a sample is rejected it is recorded in the rejection log, the customer is notified and a replacement sample is requested.
- 16.3 If a sample or sample result is found to be unacceptable, check to ensure adherence to the sampling and submission protocol. Ensure that a proper sampling point was chosen, the sampling points was free of possible contaminant sources, the chlorine residual was properly tested and recorded, and the transportation and storage met the above requirements.
- 16.4 For additional recourse regarding unacceptable samples refer to the TCEQ "Coliform Sampling for Public Water Systems" document, RG-421, and the Texas Administrative Code TAC 290.109(c)(4).

17.0 **Data Analysis and Calculations:** N/A

18.0 **Method Performance:** N/A

19.0 **Pollution Prevention:** Ensure that all plastic wrappers from sample bottles are properly discard in a waste receptacle.

20.0 **Data Assessment and Acceptance Criteria Control Measures:** Samples that are not collected, transported, and submitted in compliance with this SOP may be rejected and not analyzed.

21.0 **Corrective Actions for Out of Control or Unacceptable Data:**

- 21.1 Samples that are not collected, transported, and submitted in compliance with this SOP may not be analyzed and the corrective action (discarding) will be documented on the related sample paperwork. Bacteriological Corrective Action Logs and a Rejection Log are maintained at the CORRESL.
- 21.2 If there are mitigating circumstances to the validity of the sample, a Quality Manager can accept the sample for analysis and all deviations and their acceptance will be documented on the related paperwork. The results of such analysis will be qualified as not meeting NELAC requirements and may not be acceptable to TCEQ.

22.0 Contingencies for Handling Out of Control or Unacceptable Data:

22.1 Samples which do not meet the acceptance criteria outlined in 15.6.2 will be rejected and will not be analyzed unless exempted by a Quality Manager. Related results will be qualified as not meeting NELAC requirements and may not be acceptable to TCEQ.


22.2 Samples can be analyzed if collection, transport, and submission deviations are deemed acceptable by a Quality Manager. All deviations and their acceptance will be recorded on related paperwork. Related results will be qualified as not meeting NELAC requirements and may not be acceptable to TCEQ.

23.0 Waste Management: Ensure that all plastic wrappers and sampling waste be properly discarded in solid waste containers.

24.0 References:

24.1 "Standard Method 9060 A, Sample Collection", Standard Methods for the Examination of Water and Wastewater, 21st Edition, American Public Health Association, 2005.

24.2 "Standard Method 9060 B, Preservation and Storage", Standard Methods for the Examination of Water and Wastewater, 21st Edition, American Public Health Association, 2005.

24.3  052404-02, Water Bacteriology Form, 052404-02.
CORRESL COC Rev.

24.4 Texas Administrative Code (TAC), Section 290

24.5 TCEQ Publications RG-421 and 384.

25.0 Tables, Diagrams, Flowcharts, and Validation Data: N/A

26.0 List of Attachments: N/A