STANDARD OPERATING PROCEDURES

DIVISON OF COMPARATIVE MEDICINE
UNIVERSITY OF SOUTH FLORIDA

TITLE:	**Monitoring Animal Drinking Water Quality**
SCOPE:	Animal Care Personnel
RESPONSIBILITY:	Facility Manager and Technical Staff
PURPOSE:	To Outline the Proper Procedures for Collecting, Processing, and Testing Animal Drinking Water Quality

I. PURPOSE

1. To describe the procedures for assuring the quality of potable water for research animals housed in animal facilities under the direction of the Division of Comparative Medicine.

II. RESPONSIBILITY

1. Facility Managers are responsible for the quarterly assessment of water quality using the novaLUM® Luminometer. Water testing will be conducted during the months of March, June, September, and December and the results of testing forwarded to the Microbiological Monitoring Program Manager (MMPM) at mbaldwin@usf.edu.

2. Facility Managers are responsible for maintenance and security of the novaLUM® portable analyzer in their facility and ensuring the supplies (e.g., PocketSwab Plus®, ATP positive controls) necessary for monitoring water sanitation are available as needed.

3. The Microbiological Monitoring Program Manager (MMPM) is responsible for reviewing and maintaining the results of water sample testing, ensuring that water sampling is performed by the methods and at the frequency described in this procedure and oversight of any follow-up testing in response to failed tests.

4. The MMPM maintains a copy of the annual water quality report obtained from the City of Tampa Water Department, and all facility records of animal drinking test results performed for current year.

III. MONITORING DRINKING WATER USING a novaLUM® LUMINOMETER

1. Quarterly, while performing microbiological monitoring of sanitation procedures, a water sample(s) will be obtained from an animal drinking water source identified within the facility (e.g., water bottle filling station, sink, or automatic watering zone) and tested for the presence of adenosine triphosphate (ATP).

2. The novaLUM® uses a process called bioluminescence to detect the presence of ATP. ATP is a biochemical present in all organisms, is useful in detecting the presence or

absence of organic matter (i.e., living or dead microorganisms), and is a good indicator of water quality.

3. A **different water source will be tested each quarter** in facilities with multiple animal drinking water sources.

4. **For each drinking water system zone,** samples will be collected from the farthest point possible from the zone's solenoid or manual water valve.

5. Prior to quarterly testing of samples, the calibration of the novaLUM® analyzer must be verified following the procedures described in **SOP #1139 *Charm Sciences novaLUM™ Luminometer***.

6. Sampling Procedure:
    a. Flush water line by running water for at least 1 minute.
    b. Grasp the PocketSwab Plus® by the black body. **Do not** touch the clear microtube at the bottom. Carefully separate the top and bottom of the PocketSwab Plus® by twisting and pulling. **Do not** touch the white swab.
    c. **Place swab tip in mid-stream of running water being careful not to touch the swab to any other surfaces.**
    d. Hold PocketSwab Plus® upright with the microtube pointing down for the remainder of the test.
    e. Reinsert the swab into the body of the PocketSwab Plus® and gently push and twist the handle to engage the threads.

Note: To hold for counting at a later time, do not twist down or puncture the microtube seal. The swab is stable at room temperature in this position for up to six hours.

7. To Activate Swab:
    a. Twist the handle down completely to puncture microtube seal.
    b. Gently shake side-to-side 3 times to mix reagents. Note: Liquid should appear in bottom of vial. If not, unscrew swab handle until swab is just above microtube, and twist handle down again. Shake side to side 3 times.
    c. Sampling is now complete.

8. Assay Procedure:
    a. Optimal results are obtained when swabs are read within one minute after activation.
    b. Turn on the novaLUM® by pressing the red **"ON/OFF"** key. You should hear an audible beep.
    c. When powered up, the novaLUM® defaults to **"MAIN MENU"** screen. Scroll down to Item #2, **"PROGRAMMED PLANS"** and press **"OK"** to open the **"CHANNEL MENU"**. (Note: Pressing the **"ESC"** key always returns you to the previous menu).
        1. From the **"CHANNEL MENU"** select Item #1 **"LUM"** and press **"OK"** to open the **"PLAN MENU"** from the **"PLAN MENU"** scroll down to **"H_2O TEST"**.
        2. Room numbers with sources of animal drinking water are listed consecutively and list the source(s) of drinking water within the room (e.g., COM 1312 Sink, COM 1319 Lixit, etc).

3. Insert the PocketSwab Plus® into the novaLUM® chamber on the top of the device (remove chamber cap first). The novaLUM® should be in the upright position, not tilted or on its side.
4. Press **"OK"** to start the count and after five seconds the result (Pass or Fail) will appear on the screen.
5. Press **"OK"** to advance to the next location after each test. Use the **"PREV"** key to return to the previous location to read multiple samples from the same location
6. Results are automatically stored in the novaLUM® memory.

9. Test Failure Follow-up:
   a. **Facility Managers will be notified of failed tests**.
   b. **Facility Managers are responsible for investigating and correcting the cause of failed tests**. After corrective actions are complete additional samples of the same water source(s) will be retested. All retests will be conducted no more than 5 days after the failed test. If corrective actions require equipment repairs, the retest period may be extended.
   c. If the retest fails, Facility Managers will consult the MMPM to reassess the cause of the failure and adequacy of corrective actions taken. The MMPM may elect to conduct side-by-side tests using the novaLUM® and RODAC plates (***See SOP #1011 RODAC Plate Procedures*)** and/or testing by the Florida Department of Health (FDH) of the same failed water sample source(s). Side-by-side retests will be conducted no more than 7 days after the failed retest. If corrective actions require equipment repairs, the retest period may be extended.

10. Data:
    a. Immediately after completing any testing Facility Managers will download data from the novaLUM® according to the procedures in ***SOP #1139***. The data file created during the download will be sent via E-mail to the MMPM at mbaldwin@usf.edu.
    b. Data from RODAC plate testing will be processed according to the procedures in ***SOP #1011***.
    c. The Microbiological Monitoring Program Manager will update and maintain data from novaLUM®, RODAC and FDH testing.

IV. WATER TESTING BY FLORDIA DEPARTMENT OF HEALTH

1. The MMPM may submit water samples to the Florida Department of Health (FDH) determine the **heterotrophic plate count (HPC)**, and/or the **total coliform count (TCC**) as needed or in response to unsatisfactory quarterly novaLUM® testing.

2. **A minimum of two (2) samples will be collected from each** potable water source to be tested within the facility. Samples from watering systems will be collected from the farthest point possible from the zone's solenoid or manual water valve.

Sample Collection

1. **Obtain 2 samples from each point of collection.** A sample is required for each test requested (TCC & HPC).

2. Samples are collected and submitted in **Nasco Sodium Thiosulfate Whirl-Pak Bags**.

3. Sample bags are sterile and contain a chlorine neutralizer (white tablet). **DO NOT TOUCH THE OPENING OR INSIDE SURFACES OF THE BAG. DO NOT REMOVE THE WHITE TABLET**.

4. Before collecting sample **remove any aerators or other devices from the faucet** or hose bib.

5. **Disinfect the faucet or tap at the opening with bleach**. Spray bleach up into the mouth of the tap or faucet. Recommended bleach dilution is 1 part household bleach to 9 parts water. Be careful to avoid contaminating sample with bleach solution, it can invalidate result.

6. **Flush line by running water for at least 5 minutes**.

7. **Do not to rinse the sample container** or closure.

8. **Adjust water flow** to the diameter of a pencil.

9. **Prepare sample bag** by tearing off top of bag at scored line, and pull tabs outward to open bag.

10. **DO NOT ALLOW FAUCET TO TOUCH THE INNER SURFACES OF THE BAG**.

11. **Fill bag to upper fill line** (4oz. fill line). Samples with less than 100 ml will be rejected.

12. **Do not overfill the container or pour any water out** as this will cause dilution/loss of thiosulfate. If the bag is over-filled by accident, collect another sample instead of pouring out part of the sample.

13. **Pull wire ends to close bag**. There should be a small amount of air in the bag with the water. While holding the wire ends whirl the bag 3 complete revolutions. (Do not roll wires down to seal).

14. **Turn wire tapes in on opposite faces of fold to seal**.

15. **Label the sample** with name, collection number, and point of collection with a felt tip marker which contains waterproof ink.

16. **All samples must be stored in a cooler with an ice pack(s)**. DO NOT use wet ice. Samples are only valid up to 30 hours after collection. Placing the submittal form in a plastic bag in the cooler will prevent the paper from getting wet in transit. Do not store samples in a hot vehicle or in sunlight.

Sample Submission

1. **Up to 7 sample points may be submitted per submission form**.

2. **Submit a separate submission form for each type of testing requested**. Samples for HPC on one form, samples for total coliform on another form.

3. **Samples for HPC analysis are only accepted Monday-Wednesday.**

4. **Fill out the required fields** on the sample submission form.
   a. System/Owners Name: *USF Division of Comparative Medicine*
   b. Address of Collection: *fill in complete address*
   c. Sample site: *Facility abbreviation and room # (e.g., COM 1360)*
   d. Supply type: *Check other*
   e. Date/Time Collected: *required for sample acceptance*
   f. Sample ID: *same as on the sample bag*
   g. Mailing Address: *University of South Florida, Division of Comparative Medicine, MDC 20, 12901 Bruce B. Downs Blvd., Tampa, FL. 33612*

5. **Call FDH lab at least 1 hour prior to delivering samples for HPC** at 974-4103. This is necessary to allow for the preparation of test media.

6. **Deliver samples** to: *William G. "Doc" Myers Bldg., Department of Health Tampa Branch Laboratory*, *3602 Spectrum Blvd, Tampa, FL 33612.* **Follow signs to loading dock** for sample drop off.

7. Water Laboratory hours are:
   a. Monday - Wednesday 8:00 AM – 4:30 PM
   b. Friday (No HPCs) 8:00 AM – 1:00 PM

Test Results

1. Test results are reviewed and maintained by the MMPM.

2. EPA Maximum contaminant level (MCL) for drinking water samples are:
   a. TCC - zero
   b. HPC - 500 bacterial colonies/ml

   When sample test results exceed the MCL the water system from which the sample was derived will be retested within 14 days following the instructions above.

3. When results of retesting the water sample/system exceed the MCL the MMPM or their designee will be responsible for evaluating the water system and flushing procedures, and taking appropriate corrective action(s) until the system is below the MCL.

4. Retesting and corrective action(s) should be documented and maintained by the MMPM with the water quality reports/records.

Approved: **Date:**