



STATE OF TENNESSEE  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**  
**KNOXVILLE ENVIRONMENTAL FIELD OFFICE**  
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August 02, 2023

Mr. Johnny O. Moore  
ORNL Site Office Manager  
P.O. Box 2008  
Oak Ridge, TN 37831

RE: **Compliance Evaluation Inspection with Biomonitoring**  
Oak Ridge National Laboratory (ORNL)  
NPDES Permit TN0002941  
Roane County, TN

Dear Mr. Moore:

On June 23, 2023, Mrs. Sarah Snyder of the Tennessee Department of Environment and Conservation, Division of Water Resources, performed a routine compliance inspection at the above referenced facility to evaluate compliance with NPDES Permit No. TN0002941. During the week of June 19-23 three samples were taken from Outfall X12 for wet testing and during the week of July 17-21 samples will be taken from outfall X01. The Division thanks Mr. Wes Goddard, Mr. Scott Gregory, and Mr. Thomas Doty as well as their staff, the utilities staff, and UCOR staff for their time and assistance. Please see the sections below for details regarding the inspection.

### **I. Permit**

NPDES permit TN0002941 became effective on March 1, 2023 after a minor modification on February 24, 2023 and will expire on December 31, 2023. The Division appreciates the submittal of the permit renewal application in a timely manner (received June 30, 2023). The Oak Ridge National Laboratory permit allows the discharge into White Oak Creek, Clinch River, and Melton Branch. The permit includes over 675 outfalls that include the domestic wastewater from outfall X01, process wastewater from X12, and non-process water from the other outfalls (001 to 675). Based on field observations during the inspection, the permit appeared to be consistent with the facility operations.

### **II. Records/Reports**

ORNL submits monthly reports on the netDMR system. Also, as part of the permit requirements an annual WQPP must be submitted. The 2022 edition was received May 1, 2023 and the 2021 edition was received on April 29, 2022. Also, as part of the permit there was a required nutrient study. The findings from this study were submitted to The Division in February 2022. Another permit requirement is quarterly status reports for the Process Water Treatment upgrades. Those reports have been submitted as required.

Laboratory records are kept electronically on a database on site. All the information that was requested for review while on site was easily manageable and easily accessible.

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### **III. Facility Site Review, Self-Compliance Program, Operations & Maintenance, and Sanitary Sewer Overflows**

17.6 miles of sewer line on the reservation come from two separate lines one from the East and one from the West to the facility. There are 37 lift stations within the 17.6 miles to bring domestic waste to the treatment facility. Influent processing has been recently renovated and contains two bar screens that have a compaction system for the waste and then a pistagrit system to remove grit. The waste collected by these two systems are sent to Nevada sister facility for handling of potential radioactive waste. There are equalization lagoons that help when there is an increase in flow due to rain. The East lagoon is not connected to system and is used for any material that does not meet the waste acceptance criteria but has been given a variance and needs to be diluted. Water must be physically removed from the lagoon. The activated sludge system can hold 300,000 gal and the water has a retention time of around 30 hours. The weirs are brushed down daily and during the summer months everything is cleaned on the weekends when flow is minimal. After the water leaves the clarifier portion it is sent to tertiary sand filter before ultimate disposal. The wastewater facility is in the process of constructing a new SBR system, and it should be completed in 2024. The main concrete structures have been put in place.

The process water system was able to be viewed from the perimeter due to the hazards within the area. Water comes from Bethel Valley Storage Tanks and Melton Valley Collection tank are piped to the Metals Tank and then a plant sump accepts tanker trucks, trench drains and rainwater that are also sent to the Metals Tank. The Metals Tank proceeds into the “hot” area. The process water has coagulant and flocculant added to the water in a rapid mix to help with the coagulation and flocculation before being sent to a clarifier. Solids are allowed to settle in the clarifier and are removed from the bottom. Water that leaves the clarifier to pre-filters containing gravel, sand, and anthracite. After the pre-filters the water moves to zeolite filters, there is about a 3-month life span for the zeolite. This is better than other media that has been used in the past. The spent zeolite is sent to a dewatering bin before disposal. Water then moves to the “cold” side of the facility. The cold side has water coming from non-rad sources as well as the “hot” side of the facility. Water leaves the 325,000-gal storage tank and goes through Dual Media Filters (DMF) and then through Granular Activated Carbon (GAC) columns. After water is goes through the GAC it is pH adjusted, if necessary, this is not something that has to be done on a regular basis. With the design of the new facility, they have better ways to isolate the flow and better ways to collect water for testing. Water flows through a Parshall Flume to White Oak Creek.

### **IV. Effluent/Receiving Waters**

Effluent from the domestic waste facility is disinfected with ozone. There was previously a study being conducted using PAA but that has been abandoned due to it being ineffective in this application. The new treatment facility will disinfect with UV. We visited the outfall X01 and there were fish swimming in the creek where the water was being discharged. The sign at this outfall had fallen due to construction around it. Jessica, the operator, said she is getting a new sign made and will have it up as soon as they stop construction to avoid having it knocked down again. Reference page 24 of the NPDES permit on the requirements for the sign.

Outfall X12 had the correct signage in place and was also in good shape. There was no sign of illicit discharge or excessive growth around the discharge point. No disinfection is required for this outfall.

Non-process water outfalls: 219, 221, 021, 224, 227, 230, 310, 630, 231, 313, 314, 016, 302, 304, 001, X26 were visited as well. Outfall 231 had a homemade dichlorination system in place. Dechlorinating tablets from this system were in the stream. These tablets need to be contained within the dichlorination system and not end up in the stream.

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### **V. Flow Measurement**

Influent flow is measured by a Palmer Bowlus flume as it leaves the influent building into the treatment process. The effluent is measured before it leaves the facility by a Parshall flume and a bubbler system.

### **VI. Laboratory**

We visited three laboratories on site. The first laboratory visited was the RMAL. This lab performs the BOD, e. coli, oil and grease, and TSS testing for the facility. The laboratory records are kept in an excel spreadsheet along with all the QA/QC data. The proper QA/QC is being used according to the 40 CFR 136. The RMAL laboratory recently received their ISO 17025 certification.

The field measurements for DO and pH are conducted by the Field Laboratory. The Field laboratory also collects samples for all other testing and sends it off as necessary. The Division thanks this entire group for their time and help over the course of the sampling. They have well maintained records with chain of custody forms for the samples that are sent elsewhere to be tested.

The Biomonitoring testing is also conducted on-site in the environmental laboratory. The laboratory was visited, and the current test observed. The logbooks were available for review and the test subjects were viewed under the dissecting microscope.

Laboratory equipment is calibrated on a quarterly basis by the on-site metrology department. Sampler aliquots are verified monthly. The sampling containers have spouts on the bottom of the jug that allow for sample to be taken. There is a concern that solids could settle at the bottom of the sample container and not be collected when samples are taken. It is required that samples be representative of the water that is being sampled. The Division recommends sample containers that can be mixed and ensure that all the sample is removed from the sample container.

### **VII. Sludge Handling/Disposal (or Biosolids Handling/Disposal)**

Waste activated sludge (WAS) is sent to a compartment within in the tank. The solids are then sent to a rotary press for dewatering and then to a dryer to be completely dried. They are sent to a sister facility in Nevada for disposal.

The process waste facility solids are sent to tank that feeds a filter press. Diatomaceous Earth is added to the solids that leave the tank to make them less “sticky”. After being dewatered, the solids are sent for ultimate disposal in Nevada.

### **VIII. Pollution Prevention and Storm Water**

The aging infrastructure is being addressed on campus. There is currently a project in the design phase for replacing underground facilities to reduce I&I coming into the wastewater facility.

### **IX. Biomonitoring Test**

This inspection included a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow (*Pimephales promelas*) Larval Survival and Growth Test on samples of final effluent from Outfalls X01 and X12. Due to laboratory issues the X01 sample was taken later (July 17-21).

Both outfall test results received a >100 % (pass) on both test organisms.

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**X. Additional Comments and Conclusions**

The Division appreciates the facility staff's continued effort to keep the plant in compliance and to protect the receiving stream. If you have any questions or need additional information, please contact me via telephone at (865) 809-5086 or via email Sarah.Snyder@tn.gov.

Sincerely,



Sarah Snyder

Environmental Scientist II

Division of Water Resources

Knoxville Environmental Field Office

cc: Wes Goddard, Clean Water Act/NEPA/NHPA Team Lead, ORNL (via email)  
Scott Gregory, Environmental Sampling and Data Evaluation Team Lead, ORNL (via email)  
Thomas Doty, Department of Energy, ORNL (via email)  
Robert Ramsey, Facilities Manager, Knoxville Environmental Field Office (via email)  
WaterLog database