



STATE OF TENNESSEE  
**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**  
**KNOXVILLE ENVIRONMENTAL FIELD OFFICE**

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October 06, 2023

Ms. Diane McDaniel  
Director  
P.O. Box 2008  
Oak Ridge, TN 37831

RE: **Compliance Evaluation Inspection (CEI)**  
Y-12 National Security Complex  
NPDES Permit TN0002968  
Anderson County, TN

Dear Ms. McDaniel:

On September 6, 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. TN0002968. The Division thanks Ms. Kim Hanzelka, Mr. Kris Kinder, Mr. Adam Smith, and Mr. Jimmy Stinnett for their time and assistance. Please see the sections below for details regarding the inspection.

## **I. Permit**

NPDES permit TN0002968 became effective on October 1, 2022, and will expire on September 30, 2027. The Y-12 National Security Complex permit allows the discharge into East Fork Poplar Creek, Bear Creek, McCoy Branch, and unnamed tributaries to the Clinch River. The permit includes over 50 outfalls that include the cooling tower blowdown, cooling water, condensate, sump pump, stormwater, and groundwater. Based on field observations during the inspection, the permit appeared to be consistent with the facility operations.

## **II. Records/Reports**

Y-12 submits monthly reports on the netDMR system. Depending on the outfall and parameter samples are required monthly, quarterly, annually, and once per batch. There are monthly reports for outfalls 501-G, 200-G, 502-G, 512G, and 551-G. The months without discharge the permittee marks it correctly. The 502-G (West End Treatment) outfall has a batch discharge once a year in September for 2021 and 2022 and August for 2023. The 501-G outfall (Central Pollution Control) has not discharged in the period of records reviewed. Internal outfall 512-G is monitored monthly. Uranium is measured quarterly until third quarter of 2022, and the test

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results are attached to the netDMR submission. Records were reviewed onsite for the first three months of 2023. Records were consistent with netDMR reporting.

In the permit that became effective on October 1, 2022, there was a report submittal schedule. There was an initial water usage study that is due fifteen months from the effective date of the permit. This study was submitted in August 2023. Following this initial study an annual report will be due twelve months after the submittal of the initial study, August 2024. An annual stormwater report is due by January 31 of every year. This year the study was submitted January 25, 2023. A biological monitoring and abatement program annual report is due by July 31 of every year, and it was submitted July 24, 2023. Outfall 200 biomonitoring report is due by March 31 of every year and was submitted May 23, 2023. A wastewater control plan is due 12 months after the effective date of the permit, and it was submitted September 25, 2023.

Since the previous inspection in March 2021, there have been two reported violations. There was an ammonia exceedance of 1.29 mg/L with a limit of 1.01 mg/L in July 2023. In January 2023 there was a cyanide exceedance of 0.0149 mg/L with a limit of 0.0052 mg/L.

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

The West End Treatment Facility processes liquid waste. Water that enters the facility can go through three different paths depending on the constituents of the water. The first treatment option is to go through the Central Pollution Control Facility that acts as a pretreatment before entering the main treatment facility. In the Central Pollution Control Facility there is the ability to treat water with uranium, high or low pH, and precipitate heavy metals that may be in the water. After adjustments are made the water is then brought by tanker to the West End Treatment Facility. The second path the wastewater can follow is at the treatment facility. It is another “pre-treatment” system that can remove heavy metals and pH adjust as well. From there the water is sent to the Waste Tank Farm. The third pathway, if the water meets the waste acceptance criteria, it is brought straight to the tank farm.

Once in the tank farm the first step of treatment is biodenitrification. In this part of the process there is no oxygen added to the system. The bacteria use the oxygen attached to the nitrates for their processes. Acetic acid is used as the carbon source in this step of the process. Sodium nitrates and phosphorus may have to be added to this portion of the system. After the denitrification the water is sent to another set of tanks that perform BOD oxidation. At this point oxygen is added to the system for the BOD removal. Once the water has been through Tank Farm 2 the water is sent through the Effluent polishing system. The pH is dropped using sulfuric acid to 2.5 and sent through a gasification system to strip the CO<sub>2</sub>. Then ferric sulfate is used to enhance precipitation. Sodium Hydroxide is used to bring the pH to the level needed for the next step which is the addition of coagulant. After the coagulant is mixed in the water is put into a clarifier. The clarifier overflow is sent through a soft filter where any solids are removed. Then it is sent through carbon filters, polishing filters, and will eventually be discharged. Water from this treatment facility is discharged once a year for around four weeks. The discharge had just

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happened before the inspection. The discharge is monitored at outfall 502 that then proceeds to outfall 200.

Contaminated groundwater seeps and leachate from the Bear Creek Burial Grounds is processed at the Groundwater Treatment Facility. There is an onsite treatment unit at the Liquid Storage Facility (LSF) where the groundwater is removed. A pretreatment filtration, an oil/water separator, and storage. Tankers bring the water to the treatment facility where it goes through a cartridge filter then to an air stripping unit. Following the air stripping it goes through a carbon column and then through polishing filters before it is discharged through the outfall. There is around two and a half million gallons treated per year. This water is monitored at outfall 512 before being discharged to outfall 200.

During the inspection the Central Pollution Control facility and the central mercury facility were not visited due to being in the protected area and not having a clearance to visit.

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

Several outfalls were visited on Bear Creek during the inspection:

C03- is a stormwater outfall that has instream monitoring for continuous readings. This is where a large project to replace the pipes that were failing. There were two 96 in. pipes put in place for the stream to flow under the ground until it pops up again at the oil water separator.

13- is no longer used

14- had fish visibly swimming

21- will be the main line for the Lithium Processing Facility (LPF), the line will be redone and will be continuously monitored.

109- is a large contributor. There is a homemade perforated bucket for dichlorination if/when needed. It a rare occasion that any chemical must be added. This outfall was very cloudy during the inspection.

200- Permit sign was in place with the permit required information. There is also construction at this outfall to build the influent structure for the mercury processing facility.

Station 17 – is the final checkpoint before the creek leaves the facility.

S06 – stormwater outfall

34- cooling water that contains chlorine, monitoring to check the chlorine and a system two dechlorinator

C08- flume in the creek to measure the base flow, due to the design on the flume it becomes inaccurate during heavy rain and there is an increase in velocity.

57 & 58- large pipes without flow

55- used to monitor weekly for mercury, barely flows

51- spring influenced outfall

87- used be an issue with chlorine but the cooling tower that is connected has been permanently closed

44- stormwater

42- water from the old steam plant

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S06- stormwater

S30- RMA Storage waste

Most outfalls were not flowing or had very little flow. Outfall 109 was the only one that showed concern with the cloudy water.

We visited the oil water separator that is the last step before Bear Creek leaves the facility. There is a buildup of gravel that washed to the location when the large pipes were replaced at C03. The cleanup is in the works.

### **V. Flow Measurement**

There are various flow meters on the creek and at the outfalls. All are calibrated by the metrology department on a regular basis.

### **VI. Laboratory**

There is a laboratory inside the protected area that analyzes a select number of samples as well as an offsite laboratory that analyzes the rest. For this inspection the offsite analytical lab was visited. They have an inorganics laboratory, wet chemistry laboratory, radiochemistry laboratory, and pesticides/PCBs laboratory.

The pesticides/PCBs laboratory uses liquids/solids prep methods (EPA method) after the prep stage sample go through gas chromatography analysis. The samples are run through a database for identification and then is reported into a LIMS system. It is an electronic process and QA/QC is run with every batch of samples. Last month there was an issue with analyzing methanol. The laboratory has two machines to run the methanol and despite preventative maintenance both machines went down at the same time. The laboratory changed parts and are on a yearly preventative maintenance schedule with the vendor. They are also going to be doing their own monitoring to ensure it does not happen again.

The radiochemistry laboratory analyzes water, sewer, and dike water. The samples go through a chemical separation process and then go through 1 of 4 different processes. The four processes are alpha spectroscopy, gamma emission spectroscopy, gas flow proportional counting, and liquid scintillation counting. Eleven different analyses are performed by this laboratory.

The inorganics laboratory analyzes the of BODs, alkalinity, pH, fluoride, solids analysis, MBAs, phenols and cyanide and CODs. This laboratory also has the capability to analyze E. coli samples. This analysis is currently on hold as they transition to the IDEXX method. Once the work instructions are written and understood to go with this new method, the analysis will be open again. The proper QA/QC is followed according to the 40 CFR 136.

Any instream monitoring is calibrated by the metrology department to insure proper process control analysis and documentation.

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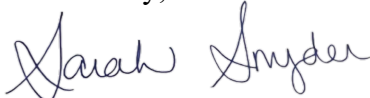
**VII. Sludge Handling/Disposal (or Biosolids Handling/Disposal)**

Sludge is boxed up and shipped to Nevada for ultimate disposal. There has been a hold on shipping the wastes since July 2019. It was discovered the wrong type of waste was being shipped so there was a hold on everything shipped out of Y-12. It is about to be accepted again and everything shipped out will be sent through x-ray to verify the contents.

**VII. 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,

A handwritten signature in blue ink that reads "Sarah Snyder". The signature is fluid and cursive, with the first name "Sarah" and last name "Snyder" clearly distinguishable.

Sarah Snyder  
Environmental Scientist II  
Division of Water Resources  
Knoxville Environmental Field Office

cc: Stacey Loveless,  
Robert Ramsey, Facilities Manager, Knoxville Environmental Field Office (via email)  
WaterLog database