



Nuclear Fuel Services, Inc.

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21G-22-0079
GOV-01-55-04
ACF-22-0150

June 30, 2022

Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Attn: Document Control Desk

Reference: 1) Docket No. 70-143; SNM License 124
2) Letter from NFS to NRC, License Amendment Request for U-Metal at the NFS Site, dated November 18, 2021 (21G-21-0092)
3) Letter from NRC to NFS, Acceptance of Application for U-Metal License Amendment, dated March 25, 2022
4) Letter from NRC to NFS, Request for Additional Information to Support Environmental Review of NFS Application to Amend Its Special Nuclear Materials License SNM-124 to Construct and Operate a Uranium Metal Process, dated April 28, 2022

Subject: **RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT ENVIRONMENTAL REVIEW OF NFS APPLICATION TO AMEND SNM-124 TO CONSTRUCT AND OPERATE A URANIUM METAL PROCESS**

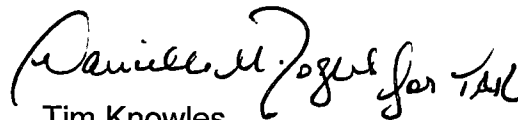
By our letter dated November 18, 2021, Nuclear Fuel Services, Inc. (NFS) submitted a License Amendment Request (LAR) for U-Metal at the NFS Site (Reference 2). By letter dated March 25, 2022, (Reference 3) NRC accepted the application with no omissions or deficiencies identified. As part of the detailed environmental review of the application, NRC staff requested additional information (Reference 4). NFS herein provides the following responses to the NRC Request for Additional Information (Attachment 1). NFS will provide, under separate cover, a revised Environmental Report that includes information provided in this transmittal.

If you or your staff have any questions, require additional information, or wish to discuss this matter further, please contact me at (423) 743-1705, or Tom Holly, Licensing Manager, at (423) 743-2595. Please reference our unique document identification number (21G-22-0079) in any correspondence concerning this letter.

NM5520
NM55

Sincerely,

NUCLEAR FUEL SERVICES, INC.



Tim Knowles
Safety and Safeguards Director

TCH/las

Attachment 1: NFS Response to the Request for Additional Information
Enclosure A: NFS Licenses and Permits
Enclosure B: NPDES Permit TN0002038 - Wastewater Treatment Facility
Enclosure C: NPDES Permit TNR050873 - Storm Water Discharges Associated with - Industrial Activities
Enclosure D: Tennessee Department of Environment and Conservation - Rare Species Database Review

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Regional Administrator
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Mr. Larry Harris
NRC Senior Resident Inspector

Attachment

NFS Response to the Request for Additional Information

(44 pages to follow)

NFS Response to Requests for Additional Information for the Development of the Environmental Assessment for the BWXT Nuclear Fuel Services License Amendment Request to SNM-124 Authorizing Uranium Purification and Conversion Services (U-Metal Project)

Request 1:

Please provide a list of Federal, State, and Local Agency Licenses and Permits required for activities at the NFS facility and the current status of each. Also explain if any of these permits will need to be updated due to the processes associated with the proposed action. Please identify if any new permits will be required due to the proposed action. Please provide a copy of the current National Pollutant Discharge Elimination System (NPDES) permit.

Response 1:

Included with this response is a table that contains all current Federal, State, and Local Agency Licenses and Permits (Enclosure A) required for activities at the NFS facility and the current status of each. Also, as requested, the National Pollutant Discharge Elimination System (NPDES) Waste Water Treatment Facility (WWTF) Permit (TN0002038) (Enclosure B) and NPDES Storm Water Permit (TNR050873) (Enclosure C) are provided. You will note that the expiration date for the NPDES Storm Water Permit is stated as June 30, 2022. This permit has been extended through June 30, 2025 by the State of Tennessee.

The potential liquid effluents generated from the proposed uranium metal process operation (U-Metal) will not introduce any new radiological or chemical attributes. Any additional effluent volumes generated by the new process will be nominal. The volume/amount that NFS discharges will not significantly increase. Therefore, the NPDES WWTF Permit and the NPDES Storm Water Permit will not require modification to support the U-Metal Project.

A new air emission unit equipped with an air control device system will be installed to support the U-Metal process. Installing a new system requires NFS evaluate the potential gaseous and particulate emissions to determine the impact to the environment. In addition to the U-Metal Project, this new emission point will be supporting emissions from the current BLEU Preparation Facility (BPF) Bldg. 333 operations and a recently approved insignificant emissions unit for Advanced Pilot Line (APL) operations. The emission calculations for this new source considers all three (3) operations. Currently both BPF and APL planned emissions are released through a permitted stack system. Once the new emission unit and control device system is completed, a permit modification request will be submitted to remove these sources from the current permitted stack prior to the new system becoming operational.

NFS determined the combined total operations (BPF/APL/U-Metal) result in potential radiological emissions from the source equaling less than 0.1 millirem per year (mrem/yr) to the public. A conservative estimate of the radiological emissions and the effective dose equivalent to the most exposed member of the public is 0.00534 mrem/year.

NFS determined the combined total operations (BPF/APL/U-Metal) result in less than five tons per year of each chemical air contaminant and each regulated air pollutant that is not a hazardous air pollutant, and less than 1,000 pounds per year of each hazardous air pollutant. The potential emissions include:

Table 1. Gaseous Emissions

Emission	Total (tons/yr)	BPF (tons/yr)	APL (tons/yr)	U-Metal (tons/yr)
Particulate	0.05	0.04	0.00	0.004
Carbon Monoxide	1.7	-	-	1.7
NOx	2.4	1.07	0.09	1.23
Nitric Acid	1.3	1.16	0.00	0.17
Ammonia	2.3	-	0.01	2.29
Hydrogen Fluoride	0.24	-	-	0.24

NFS has submitted a request for a permit exemption for an insignificant emission unit designation as defined in parts 1200-3-9-.04(4)(a) and 1200-3-9-.04(4)(d)9 of the Tennessee Air Pollution Control Regulations for the new U-Metal process operation. If this designation request is not granted by TDEC, then a new construction permit will be obtained for the U-Metal process.

NFS will be required to obtain a Building Permit from the Town of Erwin to construct the new Utility Building (Building 389).

NFS will be evaluating the construction activities for the new process. If an area of land greater than 1 acre is disturbed, then it may become necessary to apply for a Storm Water Construction Permit. If construction is held to less than 1 acre, then storm water controls will be governed by the current NPDES permit.

The new U-Metal process will not require any additional permit modifications.

Request 2:

Please provide the physical details of the new facility including the details of all building/buildings that will be constructed or renovated as part of the proposed U-Metal Project including height, area and location. Please provide information in a publicly available response.

Response 2:

The new Utility Building (Building 389) is a combination of masonry and steel construction. The overall building height is equivalent to the existing facility; approximately 30 ft (above finished floor) on the east side and approximately 28 ft on the west side (monosloped roof). The building's interior rooms have masonry walls with steel doors and a concrete roof deck with the exception of the restroom facilities and office area where gypsum board with steel stud construction is used. Building 389 is approximately 3,000 ft² and contains support equipment for main process operations such as a scrubber, solution storage tanks (e.g., wastewater, bulk chemical supply), electrical room, AHF supply room and office areas. Solution storage is contained within a diked containment area. The new Utility Building is adjacent to the west side of the current processing area in the southwest corner of the plant site and located where the former Versatile Automated Gamma Assay System was used for radioactive waste analysis.

The main material processing area is contained within an existing building (Building 301) inside a Material Access Area that has been deactivated and decommissioned. This portion of the building has previously been used for HEU process operations associated with the commercial development line. The main processing area occupies approximately 9,000 ft² of the existing structure and is physically separated from other process operations unrelated to the proposed action.

Request 3:

Provide details of the construction process for the new U-Metal Project including timeframe, material transport, access, noise, and effluent. Add any best practices or mitigation activities planned to reduce impacts. What is the expected duration of the proposed action?

Response 3:

The U-Metal Project construction contract is under negotiation with the National Nuclear Safety Administration (NNSA). The current proposed duration for construction is approximately 27 months, however is dependent upon funding profile.

Construction type material will be transported via flatbed, WB-62 type truck or other standard delivery type truck on the main roadways and access points to the site (Interstate 26 and main site access roads). Oversized deliveries are not anticipated.

Construction type materials will be delivered to the site via existing access points and gates (e.g., new construction accesses to the Protected Area will not be created). Deliveries will be grouped as much as possible to reduce material transport requirements.

Anticipated construction equipment includes a 60 ft crane, backhoe, grader, front loader, trencher, boom truck, lull, concrete trucks, fork trucks and/or compactor for a short duration (<6 months aggregate). Noise from construction is anticipated to be typical construction type noise, a majority of which will occur within the Protected Area (with the exception of equipment and material transport). The Protected Area is surrounded by a 20-ft sand wall that would provide sound dampening for construction related noise. Construction activities are planned for daylight hours, primarily on weekdays. The average site ambient noise level within the Protected Area is approximately 65 decibels (based on a 3-year average).

Airborne effluents are anticipated to be normal construction type effluents (e.g., operation of a diesel vehicle); with the exception of the excavation for the Utility Building foundation, all work will be conducted on a paved surface with storm water runoff drains. Additional on-site fuel storage for construction equipment is not anticipated due to the small scope of the project and duration of construction vehicle use; if fuel storage is necessary, secondary containment will be utilized. "Crush and run" gravel will be used for a crane pad to allow for stability and drainage. The location for the new Utility Building is a paved surface and will require cut/excavation for a foundation; all dust creating cuts (e.g., concrete, brick) will be conducted as a wet cut (with water) to mitigate fugitive dust. Excavated soil to support foundation work will be retained and stored on site within a contained area surrounded by erosion and sediment control

devices. Representative samples will be obtained to allow for accurate characterization. Excavated areas (e.g., foundation) will be backfilled with 57 stone and crush and run until foundation work is completed. The final site area following construction of the new Utility Building will be a paved surface and utilize the existing storm water runoff system.

Request 4:

Please provide a list of the gaseous effluents based on the proposed U-Metal Project. What additions or changes will be made to the Radiological Surveillance program based on the license amendment adding the U-Metal Project to the facility. Add details why or why not changes would be required.

Response 4:

The new U-Metal process gaseous effluents are provided in Table 2. As stated previously, the new U-Metal emission source will also include BPF and APL. These sources are also included in the attached table. With approval from the TDEC, these processes will share new Emission Point, STACKX-9Z01, and will be governed by requirements issued by the TDEC Division of Air Pollution Control. The gaseous effluents from the new U-Metal process are similar in attribute and quantity to those emitted from current operations at the NFS facility.

Chapter 9 of the US NRC License sets forth the requirements of the radiological effluent control and the environmental surveillance and monitoring program at NFS. This includes specific actions to be flowed into operating and sampling procedures; including performing routine measurements and calculations, comparing results to action levels, and reporting the results to plant management and the NRC, as appropriate. The license requires continuous sampling of all process ventilation stacks, collected and analyzed daily for the presence of radioactive material. In addition to point source sampling, NFS is also required to collect ambient air, soil, silt/sediment, vegetation, and groundwater samples from off-site locations. These are collected in areas surrounding the plant-site and based upon prevailing weather patterns.

Based upon this continuous monitoring, a biannual dose assessment for the maximally exposed off-site receptor is completed and submitted to the NRC. The new stack will be located in the same vicinity and will replace the current Building 301 Stack 774. Therefore, the Radiological Surveillance program will not require any changes to support the new U-Metal process.

Table 2. Gaseous Effluents from the U-Metal Project

Uranium Metal Purification and Conversion Process	
Chemical Name	Chemical Formula
Nitrogen Dioxide	NO ₂
Nitric Acid	HNO ₃
Acetic Acid	CH ₃ COOH
Hydrogen Peroxide	H ₂ O ₂
Inert Gases (O ₂ , N ₂ , Ar)	O ₂ , N ₂ , Ar
Hydrogen	H ₂
Hydrogen Fluoride	AHF
Hydrofluoric Acid	HF
Ammonia	NH ₃
Iodine	I ₂
Nitrous Oxide	N ₂ O
Carbon Dioxide	CO ₂
Carbon Monoxide	CO
Water	H ₂ O
Fluoroboric Acid	HBF ₄
Radionuclides	U-234, U-235, U-238
Particulate Matter	-
BLEU Processing Facility (BPF)	
Nitric Acid Vapor	HNO ₃
Nitrogen Dioxide Vapor	NO ₂
NORPAR 12	-
Tri-butyl Phosphate	(C ₄ H ₉) ₃ PO ₄
Radionuclides	U-234, U-235, U-238
Particulate Matter	-
Advanced Pilot Line	
Nitric Acid Vapor	HNO ₃
Hydrogen Peroxide Vapor	H ₂ O ₂
Nitrogen Dioxide	NO ₂
Ammonia Vapor	NH ₃
Radionuclides	U-234, U-235, U-238
Particulate Matter	-

The above listed gaseous effluents are similar in attribute and quantity to those emitted from current operations at the NFS facility.

Request 5:

What liquid effluent and/or run-off will be associated with the addition of the U-Metal Project? How will the current permits and treatment be impacted?

Response 5:

Due to the operations and controls already established at NFS, the impact of the additional U-Metal process on liquid effluent and/or runoff will be minimal. The amount of additional runoff due to the U-Metal process will be minor compared to that of the existing facility. The proposed process will not generate any new chemical or radiological attributes with the potential to enter surface water ways. Liquid effluent sampling or treatment will not require any changes to support the U-Metal process. Based on this analysis, modifications to the NPDES Industrial Storm Water Permit (TNR050873) will not be required. NFS will be evaluating the construction activities for the new process. If an area of land greater than 1 acre is disturbed, then it may become necessary to apply for a Storm Water Construction Permit, however this is not anticipated. If construction is held to less than 1 acre, then storm water controls will be governed by the current NPDES permit.

The NFS Storm Water Pollution Prevention Plan (NFS-GH-906) will be revised to include information concerning the construction of the utility building. This plan is revised annually to capture any change to the plant site.

Request 6:

What additions or changes will be made to the radiological surveillance program based on the proposed action? Will the radiological monitoring programs need to be revised due to the addition of the U-Metal Project?

Response 6:

From a liquid effluent or ambient air standpoint, additional sampling will not be required. The new stack, STACKX-9Z01, and control system will replace the existing Building 301 stack (Stack 774) and the sample data will be included in the NRC biannual effluent monitoring report. The radiological monitoring program will not be revised as the chemical/radiological attributes are not changing and the method used to perform the monitoring will not change. NFS' routine radiological surveillance program includes sampling of different media that could potentially be affected by facility operations. The radiological surveillance program will not require any changes to support the U-Metal process.

Chapter 9 of the US NRC License sets forth the requirements of the radiological effluent control and environmental monitoring program at NFS. This includes specific actions to be flowed into operating and sampling procedures. To ensure compliance, the license requires performing routine measurements and calculations, comparing results to action levels, and reporting the results to plant management and the NRC, as appropriate. Continual monitoring of all gaseous and liquid effluents is required to demonstrate compliance. Samples are collected at a determined frequency and analyzed for the presence of radioactive material. When radionuclides are detected above the action levels, an investigation will be undertaken to identify the cause of the exceedance, and appropriate corrective action(s) will be initiated to reduce observed levels that are above the action levels and to minimize the likelihood of recurrence.

Based upon this continuous monitoring, a biannual dose assessment for the maximally exposed off-site receptor is completed and submitted to the NRC.

In addition to point source sampling, NFS is also required to collect ambient air, soil, silt/sediment, vegetation, and groundwater samples from off-site locations. These are collected in areas surrounding the plant-site and based upon prevailing weather patterns.

Since the new process will be located within the protected area of the plant and the new stack will be located in the same vicinity as the previous emission point, the Radiological Surveillance program will not require any changes to support the U-Metal process.

Request 7:

What is the expected timeframe for decommissioning for the proposed action, U-Metal Project and what activities would be required?

Response 7:

The U-Metal Project would continue as long as the service is contracted. This has not been specifically defined; however, discussions indicated a long-term contract. The closest parallel is the downblending operations which has been safely performed by NFS for over 20 years (a routinely renewed contract). The proposed action is anticipated to be included in the scope of the next licensing renewal.

Activities for decommissioning would follow the standard safe shutdown approach to place all systems in a purged layup. The systems would then be disconnected from existing site facilities to put the systems (i.e., equipment) in a "cold and dark" condition to facilitate safe removal and disposal. Plans would be to use the facility for other processes until such time the site is decommissioned.

Request 8:

Verify the additional building square footage. Will any non-paved land be impacted either by construction or operation? Verify no new construction entrances will be used and that the construction vehicles will enter through existing entrances.

Response 8:

Utility Building 389, the additional building proposed for the U-Metal Project, is approximately 3,000 ft². Building 301 is an existing structure that will house the process operations portion of the U-Metal Project and is approximately 9,000 ft². This building is in its final phase of decontamination and decommissioning to remove processing equipment no longer needed and will be an empty structure prior to the start of construction for the U-Metal Project.

The proposed activity will not affect any previously un-disturbed land.

New construction entrances will not be created. Construction vehicles will enter through existing site and Protected Area entrances.

Request 9:

Are there any actions or physical attributes of the new facilities due to the U-metal Project that might impact the visual resources during both construction and operation?

Response 9:

The visual resources will not be impacted by any actions or physical attributes of the new facility, during either construction or operation.

A new stack (Height of 85 ft and a tapered diameter of 46 inches at the base and 32 inches at the top) is planned for the Utility Building. However, it will replace an existing stack (Height of 75 ft and a tapered diameter of 32.125 inches at the base and 27 inches at the top) and be of similar appearance and construction. The new stack will be located within 15 ft of the existing stack and the existing stack will be removed.

A 60 ft crawler crane will be used to replace HVAC units on the roof of Building 301 and to assist in the construction of Building 389. The crane will be utilized for a short duration (approximately 60 working days) and will need to be removed to allow for continued construction. This type of crane has been utilized by the site for prior work activities.

Three existing HVAC units, which sit 6 ft above the HVAC platform, will be replaced with three new units on the roof of Building 301. One of the three new units will sit 2 ft taller than the existing units. The remaining two new units will be 1 ft and 2 ft shorter than the other two existing units.

Request 10:

Verify that there have been no new scenic designated areas near the facility since the license renewal in 2011.

Response 10:

There is new data available on scenic resources within the viewshed of the facility. The information reviewed and cited does not identify any new scenic designated areas near the facility since the license renewal in 2011. Section 3.9 Visual Resources of the Supplemental Environmental Report will be revised to incorporate the updated information provided below and submitted to the NRC for review.

3.9 VISUAL/SCENIC RESOURCES

The following changes have been made to the Facility since the 1980s:

- Decommissioning of portions of the Facility that started in the mid-1980s;
- Construction of the BLEU Complex Facility on the southwest side of the Facility in August 2002;
- Security wall around the perimeter of the Facility started in 2007 and completed in 2012;
- Modernization of ammonia stripping tower (2012);
- Replaced exit/entry access control point (2012);
- Redesign and installation of the main stack (2014);
- Replacement of fan house (2014);
- Decommissioning of the BLEU Complex (2018);
- Decommissioning of the northern burial ground area and surface water impoundments (2018);
- Relocation of the meteorological tower (2020);
- Addition of a new office building (2020); and
- Relocation and modernization of Versatile Automated Gamma Assay System (VAGAS) in 2021.

The protection and preservation of scenic and environmental resources on the Facility and surrounding community are part of all construction projects.

Previously identified scenic resources in the vicinity of the NFS Erwin Facility include (NRC 2011):

- Nolichucky River: While it is not an officially designated scenic

resource, the river is a popular recreational feature located approximately 0.2-mile from the NFS Erwin Facility. The NFS Erwin Facility may be partially seen from the river as it flows nearby. An approximately 8-mile stretch of the river located upstream from the NFS Erwin Facility and extending from Poplar, North Carolina to Unaka Springs, Tennessee is listed in the Nationwide Rivers Inventory for its scenic, recreational, and geological values. The NFS Erwin Facility is not visible from this stretch of the river because of the mountainous terrain between these areas.

- Appalachian Trail: The trail crosses the Nolichucky River approximately 1.7-miles southwest of the NFS Erwin Facility. Intervening vegetation effectively screens the NFS Erwin Facility from view along this section of the Appalachian Trail. The Town of Erwin is visible on the trail along Cliff Ridge; however, viewers would not be able to identify the NFS Erwin Facility from this vantage point.
- Erwin Linear Trail: The Erwin Linear Trail runs parallel to Interstate 26 along North Indian Creek and the Nolichucky River. The NFS Erwin Facility may be partially visible at various locations along this trail.

The following resources were consulted to determine if additional scenic resources have been designated in the vicinity of the NFS Erwin facility since 2011:

- Tennessee Scenic Roadways (TDOT 2022)
- Tennessee Scenic Rivers (TDEC 2022)
- State and National Scenic Byways (Scenic America 2022)
- National Wild and Scenic Rivers (National Wild and Scenic Rivers System 2022)
- National Scenic Trails (National Park Service 2022)
- National Scenic Areas (Wikipedia 2022)
- National Wilderness Areas (Wilderness Connect 2022)
- Trails.com
- Unicoi County Hiking Trails & Greenways (Unicoi County Chamber of Commerce 2022)

No additional designated scenic resources were identified using these resources.

Request 11:

Will there be any visual impact from the new building at the facility during construction or operation? How tall is the new utility building compared to the rest of the facility structures?

Response 11:

The visual resources will not be impacted by any actions or physical attributes of the new facility, during either construction or operation.

A 60 ft crawler crane will be used to replace HVAC units on the roof of Building 301 and to assist in the construction of Utility Building 389. The crane will be utilized for a short duration (approximately 60 working days) and will need to be removed to allow for continued construction. This type of crane has been utilized by the site for prior work activities.

The new utility building is of equivalent height to the adjacent existing process facility; approximately 30ft high (above finished floor) on the east side and 28ft high on the west side (monosloped roof). There is a nearby structure adjacent to the roof of Building 301 that extends to a height of 62 ft; this is one of the tallest structures on the NFS site. The roof of Building 301 is at the same height as an equipment platform that will span the distance between Building 301 and Building 389. The roof of Building 389 is approximately 15 feet higher than the roof of Building 301, however is of similar height to other adjacent structures. The equipment platform will house the HVAC blowers associated with the scrubber (located in Utility Building 389), a 12-ton chiller unit and several small roof top units (RTUs); additionally, several pipe chases will span the distance between Utility Building 389 and Building 301 suspended from the bottom of the equipment platform. The elevation of the equipment on the platform will not extend higher than the roof height for Utility Building 389.

Three existing HVAC units, which sit 6 ft above the HVAC platform, will be replaced with three new units on the roof of Building 301. One of the three new units will sit 2 ft taller than the existing units. The remaining two new units will be 1 ft and 2 ft shorter than the other two existing units.

A new stack (Height of 85 ft and a tapered diameter of 46 inches at the base and 32 inches at the top) is planned for the Utility Building 389, however it will replace an existing stack (Height of 75 ft and a tapered diameter of 32.125 inches at the base and 27 inches at the top) and be of similar height and appearance. The new stack will be located within 15 feet of the existing stack and the existing stack will be removed.

Request 12:

Provide details of the proposed process of the U-Metal project and the particulates that would be release in addition to other approved process. Would any of the emissions from the new process create a need for a new air permit? Provide information on additional particulate control.

Response 12:

In preparation of the Insignificant Source Designation Application for TDEC, all processes (BPF, APL, and U-Metal) have been evaluated and the potential to emit for particulates has been calculated. The total potential to emit particulates has been determined to be 0.05 tons/yr. Of this total, approximately 0.0045 tons/yr (10%) is expected from the U-Metal process. Plant wide, the estimated particulate emission is approximately 18 tons/yr. The addition of particulates from the U-Metal process equates to an increase of 0.025%.

All emissions have been reviewed and fall within the bounds of "Insignificant Emission Source" as defined in parts 1200-3-9-.04(4)(a) and 1200-3-9-.04(4)(d)9 of the Tennessee Air Pollution Control Regulations. Process off-gas and room ventilation streams are filtered with high efficiency particulate air (HEPA) filters before passing to the process scrubber and emission stack.

NFS has submitted a request for insignificant emission source designation from the State of Tennessee, Division of Air Pollution Control. In the event that this request is denied, a construction air permit will be requested.

Request 13:

Provide information on the type of effluents and mitigation due to construction including fugitive dust.

Response 13:

Airborne effluents from construction activities will be typical of industrial settings; anticipated large construction equipment includes a 60 ft crane, backhoe, grader, front loader, trencher, boom truck, lull, concrete trucks, fork trucks and/or compactor for a short duration (<6 months aggregate). Best Management Practices (BMP) will be implemented during construction for fugitive dust. Examples of BMPs (not all inclusive) include minimizing disturbed areas, water and/or street sweepers used as necessary, gravel utilized as backfill until pavement is restored, and trucks transporting any backfill will be covered.

Construction activities will occur on paved surfaces following excavation and foundation work. The location for the new Utility Building 389 is on a paved surface; for the foundation and subsurface utility lines, the paved surface will be removed via a wet cut method to reduce fugitive dust. Excavated soil in support of foundation work will be retained and stored. Representative samples will be obtained to allow for accurate characterization. Soil is not anticipated to be contaminated. Excavated areas (e.g., foundation) will be backfilled with 57 stone and crush and run until foundation work is completed.

Travel paths for equipment delivery will occur on paved surfaces and are not anticipated to create fugitive dust; if excessive dust is noted, wet mitigation methods would be employed.

With the exception of restoring impacted paved surfaces to allow for trenching and excavation, grinding activities are not expected to occur for the proposed activity. All building penetrations will be made with a wet cutting device or drill to assist in mitigating fugitive dust.

Request 14:

Will construction or operation of the proposed project impact any Prevention of Signification Deterioration Class I areas within the region of the facility?

Response 14:

There are no Class I areas within 2 miles of the NFS site that would be impacted by construction or operation.

Request 15:

The application references 2011 noise standards. In addition, the ER states that the Town of Erwin does not have a specific environmental noise standard applicable to the NFS facility and that alarm levels outside the perimeter are not above significant levels. Are these facts still true in 2022? If not, please update the Town of Erwin noise requirements and any events that have exceeded the noise levels or have received complaints.

Response 15:

The Town of Erwin limits building operations within residential areas to occur between 7:00am and 6:00pm. The facility is zoned as Industrial. Unicoi County does not have a noise ordinance. No other changes to local noise ordinances or standards have occurred since 2011. To NFS's knowledge, there have been no noise complaints referred to the site by nearby residents that required action.

Request 16:

What are the specific sources of noise during the construction and operation phases of the proposed action? When and how long would these activities occur. What levels and mitigation measures are planned during these times? Are there any noise ordinances in the town of Erwin that would be exceeded by any activities on the site including construction and operational activities?

Response 16:

The construction area supporting the proposed action is within an industrial environment (e.g., immediate surrounding facilities are industrial in nature). The expected environmental noise generation would be attributed to use of ground moving equipment and crane usage (e.g., 60 ft crane, backhoe, grader, front loader, trencher, boom truck, lull, concrete trucks, fork trucks, compactor). These types of activities are currently performed at the NFS site on an as needed basis. The expected use of construction equipment would be intermittent and is expected to last < 6 months, aggregate. Construction activities will occur within the Protected Area that is surrounded by a 20 ft tall sand wall which would provide significant noise mitigation to offsite locations. Additionally, construction activities will typically occur during daylight hours (between 7:00am and 6:00pm), on weekdays to comply with the Town of Erwin construction time restriction to accommodate nearby residences.

Following construction, noise levels are anticipated to return to typical site ambient levels (Average of 65 decibels within the Protected Area, 50 decibels in the OCA parking area).

Request 17:

To what extent will the site be regraded to accommodate the new U-Metal Project Facilities? Will any of the construction or operational activities involve the subterranean environment (e.g., below ground surface)? Will construction of the process buildings include foundational activities? Will there be any subsurface systems put in place? If so, provide details.

Response 17:

The area identified for the new Utility Building 389 is currently a paved surface; some minor grading will be required to construct the approximate 3,000 square foot facility.

The Utility Building 389 will require a foundation; excavation will be to an approximate maximum depth of 8 ft below grade. In addition to the foundation work that supports the new Utility Building 389, subsurface utility lines will be connected to the current plant systems (e.g., city water, city sewer, fire main). Excavations to support the utility lines will be to a depth of approximately 3 ft. The new stack will also require a foundation; excavation will be to an approximate maximum depth of 4 ft. All excavated soil will be retained and stored. Representative samples will be obtained to allow for accurate characterization. Soil is not anticipated to be contaminated. Excavated areas (e.g., foundation) will be backfilled with 57 stone and crush and run until foundation work is completed. Following construction activities, all surfaces in and around Utility Building 389 and Building 301 will be returned to a paved state.

Subsurface systems, other than utility connections, (e.g., supply or retention tanks) will not be installed.

Groundwater is not expected to be impacted by either construction or normal process activities; historically, groundwater has been measured at depths greater than 10 ft below the ground surface. Groundwater measurements are obtained from groundwater monitoring wells and are documented on monitoring reports that are reviewed during periodic inspections.

Request 18:

The application's Environmental Report states that "Under the proposed action, no significant changes in NFS' authorized operations are planned regarding the discharge of facility effluents into surface waters. Liquid effluents at the NFS site are treated first at the [wastewater treatment facility] before they are discharged in compliance with NRC regulatory limits and state authorized NPDES permit levels into the Nolichucky River. Storm water discharge at the [facility] is regulated under a TDEC [Tennessee Department of Environmental Compliance] multi-sector general NPDES storm water permit." What changes/additions would occur to the surface water discharge due to the addition of the U-Metal Project? How would any new liquid effluent be treated? Would the current permits need to be updated to account for any new effluents from the proposed action?

Response 18:

Due to the current operations and controls already established at NFS, the impact of the additional U-Metal process on liquid effluent and /or runoff will be minimal. This proposed process will not generate any new chemical or radiological attributes with the potential to enter surface water ways. Any additional effluent volumes generated by the new process will be nominal. The amount discharged will not significantly increase. Liquid effluent sampling and or treatment will not require any changes to support the U-Metal process. As part of the US NRC license requirement, the NFS environmental surveillance program routinely samples surrounding surface waters, both up and downstream from the facility.

Because the nature of the work conducted at U-Metal is similar to other existing processes, modification to the NPDES Industrial Storm Water Permit (TNR050873) will not be required. NFS will be evaluating the construction activities for the new process. If an area of land greater than 1 acre is disturbed, then it may become necessary to apply for a Storm Water Construction Permit. If construction is held to less than 1 acre, then storm water controls will be governed by the current NPDES permit.

The NFS Storm Water Pollution Prevention Plan (NFS-GH-906) will be revised to include information concerning the construction of the utility building. This plan is revised annually to capture any change to the plant site.

Request 19:

Are there any jurisdictional wetlands on or near the site? How will the proposed action affect those? Will there be any mitigation activities to avoid potential impacts?

Response 19:

USFWS National Wetland Inventory mapping indicates the presence of three riverine wetlands and one freshwater pond at the Facility, however this map is out of date (it is based on color infrared imagery from 1983) and not consistent with current site characteristics. There are no jurisdictional wetlands located on the NFS site and none will be impacted by the proposed action.

Request 20:

What are the potential pathways for impacts to ground water due to construction and operation of the proposed U-Metal project?

Response 20:

The new Utility Building 389 will require a foundation; excavation will be to an approximate maximum depth of 8 ft. In addition to the foundation work that supports the new Utility Building 389, subsurface utility lines will be connected to the current plant systems (e.g., city water, city sewer, fire main). Excavations to support the utility lines will be to a depth of approximately 3 ft. The new stack will also require a foundation; excavation will be to an approximate maximum depth of 4 ft.

Groundwater is not expected to be impacted by either construction or normal process activities; historically, groundwater has been measured at depths greater than 10 ft below the ground surface in the construction area. Groundwater measurements are obtained from groundwater monitoring wells and are documented on monitoring reports that are reviewed during periodic NRC inspections.

Request 21:

Is there any potential interaction with the groundwater due to the U-Metal Project? How will leaks and spills be treated? Are there any accident scenarios associated with the proposed action in which the groundwater would be impacted?

Response 21:

Groundwater is not expected to be impacted by either construction or normal process activities; historically, groundwater has been measured at depths greater than 10 ft below the ground surface in the construction area. Groundwater measurements are obtained from groundwater monitoring wells and are documented on monitoring reports that are reviewed during periodic NRC inspections.

The site has a Spill Prevention, Control and Countermeasures Plan (SPCC) that will account for activities associated with the construction and operation of the U-Metal process. Any spills or releases, during construction or operation, will be controlled and mitigated in accordance with site plans and procedures.

The implementing procedures of the SPCC are:

1. NFS-HS-E-05, Spill Response and Reporting;
2. NFS-GH-33, Inspection of Hazardous Material Containment Areas and Loading and Unloading of Bulk Chemicals; and
3. NFS-HS-B-40, Inspecting Emergency Equipment and Supplies.

The NFS procedure for responding to releases, whether to land, water or air, is summarized as follows:

- 1) The responsible area supervisor or manager shall immediately, if safe to do so:
 - a) Immediately notify Safety Supervision or Plant Superintendent (if no Safety Supervision on-site) by calling Extension 1444, providing any available information on injuries, date and time of release, location, substance involved, amount released and any immediate hazards.
 - b) Remove any injured personnel for treatment or notify Fire Brigade to do so.
 - c) If possible, stop the leak.

d) After the condition is brought under control, the area Supervisor should document the appropriate details of the event using the PIRCS (Problem Identification Resolution and Correction System).

2) The responding Safety Supervision or Plant Superintendent should, as appropriate:

a) Dispatch the Safety Department personnel to the scene. The Fire Brigade Personnel may be requested to respond as appropriate.

b) Utilize HazMat Quick Response Guides for initial spill response measures. For large spills, response measures should be continuously evaluated as event specific emergency condition parameters, such as quantity of release; wind direction; monitoring data; chemical modeling; become available. Additional guidance may be found in Safety Data Sheets located on the MSDS online system and by using the NIOSH guide to Chemical Hazards.

c) Refer to NFS procedure, NFS-HS-E-05 to determine if the spill is an oil, hazardous substance or extremely hazardous substance and if it exceeds the appropriate reportable quantity (RQ). An attachment to the procedure, NFS-HS-E-05, lists the chemical substances stored in bulk at NFS and their reportable quantities. If the event is determined to be reportable, notify Safety Management using phone numbers listed in NFS-HS-E-05.

d) Upon notification of a reportable event, implement (Safety Management) EPA reporting requirements in accordance with NFS-HS-E-05.

The location for the new Utility Building 389 is paved with appropriate storm water runoff and drainage. Following construction activities, the area around the new Utility Building 389 will be returned to a paved state if disturbed during construction. The chemicals utilized within the Utility Building 389 (e.g., KOH, NaOH, Nitric Acid) are contained within a diked area; applicable deliveries will occur directly to the Utility Building 389 or be hard piped from the site's bulk chemical storage.

There are no anticipated accident scenarios that have an impact on groundwater.

Request 22:

What changes, if any, are being made to the sites environmental monitoring program due to the addition of the U-Metal project? What changes, if any, are being made to procedures related to the minimization of contamination of the subsurface due to the new project.

Response 22:

The environmental monitoring program for liquid effluents or ground water will not require any changes for the new U-Metal process because new radiological and chemical attributes will not be introduced. Currently, ground water monitoring wells are sampled at a set frequency (i.e., monthly/quarterly) for the presence of radionuclides.

The NFS Storm Water Pollution Prevention Plan (NFS-GH-906) will be revised to include the new building.

Erosion and sediment controls will be implemented during the facility construction to prevent storm water runoff. These controls will remain in place until all disturbed areas of the construction site are permanently stabilized.

Request 23:

The information regarding terrestrial resources in the application is dated from 1991 and 1996. Please provide updated information relevant to 2022. Please discuss any impacts if there is new information.

Response 23:

Updated information has been obtained and remains relatively unchanged. The USDA-NRCS Land Resource Regions and Major Land Resource Areas (2022) provides current information regarding forests, tree species, and wildlife species in the region.

The Tennessee Historical Society (2018) provides additional information regarding species present in the surrounding Cherokee National Forest.

Common mammal and bird species likely to occur in the vicinity of the facility are provided by the Tennessee Wildlife Resources Agency (TWRA) (2022a and 2022b).

The Supplemental Environmental Report will be updated with this more recent data and submitted to the NRC for review. Below are revised Section 3.5.1 Terrestrial Biota of the ER:

3.5.1 Terrestrial Biota

Plant communities at the NFS Erwin Facility are characteristic of the intermountain regions of central and southern Appalachia. The USDA-NRCS Land Resource Regions and Major Land Resource Areas (MLRA) (2022) indicates the NFS Erwin Facility is in the Southern Blue Ridge MLRA. The most common forest trees in this region include white oak, black oak, scarlet oak, chestnut oak, hickory, eastern white pine, Virginia pine, pitch pine, yellow poplar, and northern red oak. Higher elevations also include black cherry, black birch, and sugar maple (USDA-NRCS 2022).

The NFS Erwin Facility lies within Indian Creek Valley. Plant communities in this valley consist of second growth forests and open grassy areas. Most of the Facility is occupied by buildings, building grounds, and open fields. Limited areas consist of woods and brush. Nearby mountainous areas, which are part of the Unaka Mountains Recreation Zone of the Cherokee National Forest, are largely undisturbed and support extensive forests and wildlife resources (USFS 2022a).

The terrestrial fauna of the Erwin region includes a large number of vertebrate species 120 birds, 47 mammals, and 54 reptiles and amphibians (Tennessee Historical Society 2018); however, most of these species would not be expected

to occur in the Indian Creek Valley because of extensive disturbance and lack of natural habitats. Species in this area are likely to include small rodents, eastern cottontail, Virginia opossum, red fox, and white-tailed deer (TWRA 2022a). Common bird species in this area are likely to include mourning dove, northern flicker, blue jay, Carolina chickadee, American robin, European starling, Northern cardinal, red-tailed hawk, and house sparrow (TWRA 2022b). Many of these species are well adapted to developed urban and suburban areas. Undeveloped areas of the NFS site are likely to support some of the smaller wildlife species. Important game species of the region include whitetail deer, eastern gray squirrel, ruffed grouse, and wild turkey, which occur in the forests of the surrounding mountains (USFS 2022b) but are not common on-site.

Request 24:

The information regarding fish species present in the Nolichucky River is dated 1996. Please provide updated information relevant to 2022. Please discuss any impacts if there is new information.

Response 24:

The TWRA Region IV Warmwater Streams and Rivers Fisheries Report provides baseline information on game and non-game fish and macroinvertebrate populations for the region including the NFS Erwin Facility. The most recent available report is from 2017. This report indicates that sportfish present in the Nolichucky River include all species of black bass as well as rock bass, muskellunge, channel catfish, flathead catfish and other sunfish. During the winter months the river is stocked with rainbow trout from the USFWS hatchery in Erwin. The report further indicates the river has historically supported 50 species of fish and at least 21 species of mussels (TWRA 2017).

The Supplemental Environmental Report will be updated with this more recent data and submitted to the NRC for review. Below is revised Sections 3.5.2 Aquatic Biota of the ER:

3.5.2 Aquatic Biota

Aquatic habitat on or adjacent to the NFS Erwin Facility ranges from the Nolichucky River to several small streams. Banner Spring Branch contains several species of minnows where it converges with Martin Creek. Martin Creek is typical of creeks in eastern Tennessee. The stream bed is composed of sand, pebbles, rocks, and some organic matter. A state-operated fish hatchery is located on a tributary to Martin Creek approximately 600 feet upstream of the Facility. The Nolichucky River in the Erwin vicinity contains a substrate of rocks, sand, boulders, and some aquatic moss. The TWRA Region IV Warmwater Streams and Rivers Fisheries Report provides baseline information on game and non-game fish and macroinvertebrate populations for the region including the NFS Erwin Facility. The most recent available report is from 2017. This report indicates that sportfish present in the Nolichucky River include all species of black bass as well as rock bass, muskellunge, channel catfish, flathead catfish and various sunfish. During the winter months the river is stocked with rainbow trout from the USFWS hatchery in Erwin. The report further indicates the river has historically supported 50 species of fish and at least 21 species of mussels (TWRA 2017).

Request 25:

Will any of the activities including both construction and operation of the proposed action potentially impact ecological resources? How will the natural habitats surrounding the facility be maintained? Will additional mitigation measures be required as a result of the activities for the proposed action?

Response 25:

The proposed action and all associated ground disturbance will take place within the previously disturbed areas within the protected area. Natural, undisturbed or ecological sensitive areas will not be affected by the proposed action during construction or operation. The site will have the required erosion and sediment control measures and Best Management Practices (BMP)s (consistent with TDECs Erosion and Sediment Control Handbook) installed prior to any ground disturbance until final restoration of the site. Examples of BMPs (not all inclusive) include utilizing a construction work schedule to sequence work, proper vehicular maintenance, designated storage areas, use of check dams (as needed), silt fencing, and crane pad stabilization.

Request 26:

The Environmental Report in the application identifies listed plant species that could potentially be impacted by activities at the facility. The ER references “the TDEC's August 20, 2021, response indicates that seven state-listed plant and animal species have been documented within one mile of the facility. Additional species are documented by TDEC within four miles of the facility; however, no impacts to any species are anticipated at such a great distance from the Facility. The TDEC species list does not document occurrences of any information for Planning and Consultation tool (IPaC) identified species within one mile of the Facility.” Please provide a copy of the referenced letter.

Response 26: Refer to Enclosure D for a copy of TDEC’s August 20, 2021 response.

Request 27:

Will there be any construction impacts to ecological resources? How will the resources be protected during the construction process?

Response 27:

The proposed action and all associated ground disturbance will take place within the previously disturbed areas within the protected area. Natural, undisturbed or ecological sensitive areas will not be affected by the proposed action during construction or operation. The site work plan will have all the required erosion and sediment control measures, Storm water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMP)s (e.g., silt fence, straw bale structures, etc.) included and these measures will be installed prior to any ground disturbance until final restoration of the site.

Request 28:

Provide the supporting data for the archaeological information from the National Park Service. Has a historic and cultural survey been conducted on this facility? If so, please provide a copy. Will any of the proposed construction or operation activities affect undisturbed areas of the facility?

Response 28:

There is no potential for the proposed action to disturb or cause effect to pre-historic, historic, or cultural resources; all construction will occur in previously disturbed areas within the Protected Area. If an artifact is uncovered, an unanticipated discoveries plan would be implemented, and applicable agencies would be notified for further investigation.

Request 29:

How many jobs will the proposed action bring to the facility during both the construction and operational phases of the project? Would the addition of these jobs impact the housing, job market, school system within the immediate area?

Response 29:

NFS estimates the proposed U-Metal project will add 30-50 additional jobs during construction above current staffing, which will fluctuate during the project. Operation of the U-Metal project could produce 50-90 additional jobs for the site. Current contract projections indicate a reduction in workforce associated with the loss of the downblending scope; the addition of the U-Metal Project jobs will offset this potential downsize. If this offset were to occur, there would be no net effect on housing, the job market or the school systems within the immediate area of the NFS Site. If the positions associated with the U-Metal Project were required to be filled from external candidates, NFS preferentially recruits from the local population; the added operations positions associated with the U-Metal Project will follow this same methodology.

Housing availability in Unicoi County and the surrounding area (e.g., Johnson City, Gray, Jonesborough, Asheville, NC) provides for local housing options. The addition of less than 100 employees and associated family members would not make housing options any more or less available than the current housing market. Additionally, the addition of less than 100 employees and associated family members would not be anticipated to drive housing prices higher than current market rates.

The job market in Unicoi County and the surrounding area would not be impacted by either the construction or operations phase of the U-Metal Project; the addition of personnel available for employment associated with employees of the U-Metal Project are anticipated to be a portion of the total number of personnel actively working on the project. This would be less than 100 potential candidates entering the job market in a fairly large area.

The school system local to the NFS Site is a county wide school system (Unicoi County); however children of NFS employees are enrolled throughout several surrounding school systems in addition to Unicoi County. A portion of the employees associated with the U-Metal Project would have students; even if all the employee's students were enrolled in the Unicoi County School System, they would not all be in the same grade and would not represent an overwhelming impact on the local school system.

The addition of jobs associated with either construction or operations are not expected to impact the housing, job market, school system within the immediate area.

Request 30:

What additional radiological sources are expected from the proposed action during the construction and operation phases? How will those be monitored? What mitigation will occur to reduce impact to the public?

Response 30:

Additional radiological sources are not expected from the proposed action during construction and operation. The construction and operation impacts are monitored by a robust and comprehensive routine radiological surveillance program in consultation with TDEC which includes ambient air sampling, dosimeters, and surface water.

The operational mitigation to reduce the impact to the public incorporates safety factors into the design of radiological material related process equipment. NFS' emissions are reduced by the use of effluent control equipment, which minimizes the amount of air contaminants that reach the environment.

Request 31:

What is the current level of traffic to the facility due to operation and workers? Will transportation routes change due to the proposed action? Will there be any additional entrances for construction of the additional buildings? How many additional vehicles will be added to local roadways/railways due to construction and operation of the proposed action including material and workers?

Response 31:

Currently, over 1200 personnel work at the NFS site. The incremental impact of the proposed U-Metal project will not significantly increase the current level of traffic. Transportation routes will not change for construction or operation of the proposed U-Metal project. There will be no additional entrances for construction. There is estimated to be 30-50 additional vehicles to support construction activities and 50-90 vehicles distributed over three 8-hour shifts Monday – Friday (~17 – 30 at the beginning of the shift) for facility operations. NFS staggers shift start times in 30-minute segments to minimize traffic impacts and allow for security access.

Request 32:

Please update ER Table 13 – “Employee Data Distribution by Residence” with current information.

Response 32:

The information listed in the Supplemental Environmental Report is current as of July 2021. There was an omission in deleting the title that was listed in the 2009 Environmental Report.

Deleted wording:

"Table 13 (NFS Employee Distribution by Residence_ represents the distribution of NFS employees among the ROI counties in April 2007."

Request 33:

What additional wastes (radiological and non-radiological) will be produced due to the construction and operation of the U-Metal Project? How will these wastes be managed?

Response 33:

General construction debris will be produced due to the construction of U-Metal Project. It is anticipated that approximately 15,000 cubic feet of soil/asphalt/concrete will be packaged for disposal. This waste will be assessed for the presence of hazardous and/or radioactive materials. Based on the results of this evaluation, it will be processed using existing procedures and dispositioned at a licensed waste disposal facility.

Wastes generated (including general job control waste) as result of the new U-Metal process operations will be handled in accordance with existing NFS waste handling procedures. On average, NFS handles and dispositions approximately 950,000 kg of radiological waste, 7,500 kg of hazardous waste, and 230,000 kg of non-hazardous waste annually. During operation of the U-Metal process, it is anticipated that these waste streams will not be significantly impacted. Based on forecasted production rates, the U-Metal process could produce up to 10,000 kg of radiological waste per year. This translates to a 1% increase in radiological waste production for the entire facility. It is expected that hazardous and non-hazardous waste generation for this process may have a similar increase. New waste streams will not be generated from the construction or operation of the U-Metal process and all wastes will be processed and dispositioned using existing procedures and waste vendors.

All waste will be handled in accordance with existing NFS waste handling procedures, managed in accordance with all applicable regulatory requirements (NRC, EPA, and DOT), and transported to an approved licensed waste disposal facility.

Request 34:

How will the proposed action impact the liquid waste effluents and gaseous effluents? How will they being managed to meet the current allowable release limits under State, local and other federal permits?

Response 34:

The proposed action will have no significant impact on liquid or gaseous effluents. A review of all proposed and potential liquid and gaseous/particulate effluents found that no new chemical or radiological attribute would be emitted. All gaseous/particulate and liquid effluents will be governed by the current US NRC License, SNM-124, and applicable State of Tennessee air permits and NPDES permits.

Due to the current operations and controls already established at NFS, the impact of the additional U-Metal process on liquid effluent and /or runoff will be minimal; the amount of additional runoff due to the U-Metal Project will be minor compared to the existing facility. Analysis of this proposed process have identified no new chemical or radiological attributes with the potential to enter surface water ways. Liquid effluent sampling and or treatment will not require any changes to support the U-Metal process. Because of this, modification of the NPDES Industrial Storm Water Permit (TNR050873) will not be required. NFS will be evaluating the construction activities for the new process. If an area of land greater than 1 acre is disturbed, then it may become necessary to apply for a Storm Water Construction Permit. If construction is held to less than 1 acre, then storm water controls will be governed by the current NPDES permit.

All gaseous emissions have been reviewed and fall within the bounds of "Insignificant Emission Source" as defined in parts 1200-3-9-.04(4)(a) and 1200-3-9-.04(4)(d)9 of the Tennessee Air Pollution Control Regulations. Process off-gas and room ventilation streams are filtered with high efficiency particulate air (HEPA) filters before passing to the process scrubber and emission stack. NFS has determined that the proposed operations would result in potential radiological dose equivalent from the source of less than 0.1 millirem per year (mrem/yr) to the public and less than five tons per year of each chemical air contaminant and each regulated air pollutant that is not a hazardous air pollutant, and less than 1,000 pounds per year of each hazardous air pollutant. The potential to emit emissions include: Particulate (0.05 tons/year), Carbon Monoxide (1.7 tons/year), NOx (2.4 tons/year), Nitric Acid (1.3 tons/year), Ammonia (2.3 tons/year), and Hydrogen Fluoride (0.24 tons/year). A conservative estimate of the radiological emissions and the effective dose equivalent to the most exposed member of the public is 0.00534 mrem/year.

NFS has submitted a request for insignificant emission source designation from the State of Tennessee, Division of Air Pollution Control. In the event that this request is denied, a construction air permit will be requested

Request 35:

What and how much additional radiological, non-radiological, hazardous and commercial waste will be generated by construction and operation of the U-Metal Project? How will these wastes be disposed?

Response 35:

During the construction of the new Building 389 and associated utility lines, it is anticipated that approximately 15,000 cubic feet of soil/asphalt/concrete will be packaged for disposal. This amount will be assessed for the presence of hazardous and/or radioactive materials. This waste will be assessed for the presence of hazardous and/or radioactive materials. Based on the results of this evaluation, it will be processed using existing procedures and dispositioned at a licensed waste disposal facility.

On average, NFS handles and disposes approximately 950,000 kg of radiological waste, 7,500 kg of hazardous waste, and 230,000 kg of non-hazardous waste annually. During operation of the U-Metal process, it is anticipated that these waste streams will not be significantly impacted. Based on forecasted production rates, the U-Metal process could produce up to 10,000 kg of radiological waste per year. This translates to a 1% increase in radiological waste production for the entire facility. It is expected that hazardous and non-hazardous waste generation for this process may have a similar increase. New waste streams will not be generated from the construction or operation of the new process and all wastes will be processed and dispositioned using existing procedures and waste vendors.

All waste will be handled in accordance with existing NFS waste handling procedures and will be managed in accordance with all applicable regulatory requirements (NRC, EPA, and DOT) and transported to an approved licensed waste disposal facility.

Request 36:

Provide a discussion on past, present, and reasonably foreseeable future actions that may result in a potential for cumulative environmental impacts. What other projects are under consideration or have been recently added within all resource areas? How would those actions cumulatively impact the environment when added to the impacts from construction and operation of the U-Metal Project?

Response 36:

At the NFS site, the BLEU Complex was decontaminated and decommissioned in 2015 to support additional expansion projects; this site was seeded with grass, however it remains an area available for future project development. A proposed project for a portion of this space is the addition of a warehouse/laydown area; the design of this laydown area is yet to be refined; however, it would be either of asphalt/concrete or "crush and run" gravel construction.

Regional projects that are large enough to be considered for a cumulative impacts discussion include the Unicoi hospital which was constructed in 2018 approximately 1.5 miles from the NFS facility. In addition, Blue Ridge Paddling purchased an existing facility approximately 1 mile from NFS in 2022. The combination of the NFS site along with these two projects have not created any significant or adverse impacts to the local community or the resource area.

According to the Tennessee Department of Transportation (TDOT) website on active and proposed projects, there is only one project scheduled for Unicoi County which is the I-26/Pinnacle Road bridge repair approximately 7 miles north of the U-Metal Project. Lane closures will be in place for the entire project. It is anticipated that this project will be completed before the U-Metal project will commence therefore, no additional congestion on I-26 from the construction of the U-Metal Project are anticipated.

There are no other known projects in progress or forecasted in the resource area. There is no cumulative impact to the environment expected from construction and operation of the U-Metal Project from these identified projects.

ENCLOSURE A:
NFS LICENSES AND PERMITS
(3 PAGES TO FOLLOW)

NFS Licenses and Permits

Type of License/Permit	Issuing Agency	License/Permit No.	Responsible Department	Date of Expiration	Renewal Frequency
Special Nuclear Material License	U. S. NRC	SNM-124	Licensing	08/31/37	*
Quality Assurance Program for Shipping Packages for Radioactive Material	U. S. NRC	71-0249	QA	Does Not Expire	N/A
Quality Assurance Program for Rad. Material Packages	U. S. DOE	2011-004	T&WM	11/30/25	*
Certificates of Compliance for Rad. Material Packages: ES-3100	U. S. NRC	9315	T&WM	04/30/26	5 years
Certificate of Compliance for Rad. Material Packages: LR-230	U. S. NRC	9291	T&WM	7/31/24	5 years
Certificate of Compliance for Rad. Material Packages: Versa-Pac	U. S. NRC	9342	T&WM	5/31/24	5 years
Certificate of Compliance for Rad. Material Packages: 2000 MED	U. S. DOT	0575	T&WM	04/30/26	5 years
Hazardous Materials Certificate of Registration	U. S. DOT	051120550079C	T&WM	06/30/23	Annual
Federal Explosives License/Permit	U. S. DOJ	1-TN-171-33-3L-01124	Security	11/01/23	3 years
Radio System Licenses	Federal Communication Commission	WNVW604 WNQK722 KWW972	Security	05/06/31 10/12/29 03/21/25	10 years
Radioactive Material (Source Material) License	State of TN	S-86001	Licensing	02/28/25	10 years
Radioactive Material (Sealed Sources) License	State of TN	R-86002	Licensing	09/30/29	10 years
Radioactive Material (R&D) License	State of TN	R-86008	Licensing	8/31/30	10 years
Registration of X-ray Producing Equipment	State of TN	786-0008	Licensing	Per 1 st Qtr. Invoice	Annual
Rad. Waste License-for-Delivery	State of TN	T-TN001-L21	T&WM	12/31/23	Annual
Hazardous Waste Management Permit	State of TN	TNHW-157	Environmental Safety	09/25/24	10 year max
NPDES Permit for WWTF Discharges	State of TN	TN0002038	Environmental Safety	2/28/25 (submitted 05/19/20)	4 years
NPDES Permit for Storm Water Discharges	State of TN	TNR050873	Environmental Safety	6/30/25	5 years
Tennessee Multi-Sector General NPDES Storm Water Permit (TNSP)	State of TN	TNR053969	Environmental Safety	8/3/25	5 years

NFS Licenses and Permits

Type of License/Permit	Issuing Agency	License/Permit No.	Responsible Department	Date of Expiration	Renewal Frequency
Air Pollution Control Operating Permit: Bldg. 234 Permit closed – closure letter issued by State 06/09/2016	State of TN	017604P	Environmental Safety	Does Not Expire	N/A
Air Pollution Control Operating Permit: Bldg. 300 & Bldg. 333 operations Environmental source 86-0002-08	State of TN	071415P	Environmental Safety	11/01/25	9 years
Air Pollution Control Operating Permit: Bldg. 330 / WWTF Environmental source 86-0002-12	State of TN	070054P	Environmental Safety	11/01/25	9 years
Air Pollution Control Operating Permit: Bldg. 130 Steam Boilers Environmental source 86-0002-24	State of TN	070056F	Environmental Safety	11/01/25	9 years
Air Pollution Control Operating Permit: Generator (1000 kW) Environmental source 86-0002-54	State of TN	070058P	Environmental Safety	11/01/25	9 years
Air Pollution Control Operating Permit: Emergency Generators; GEN0234, GEN0138, and GEN0480 Environmental source 86-0002-55	State of TN	069006P	Environmental Safety	11/01/24	9 years
Air Pollution Control Operating Permit: Two Emergency fire water pumps Environmental source 86-0002-57	State of TN	069005P	Environmental Safety	11/01/24	9 years
POTW (Sanitary Sewer) Discharge Permit	City of Erwin	013	Environmental Safety	12/31/23	2 years
Nuclear Fuel Services Pretreatment Permit	City of Erwin	013	Environmental Safety	01/15/23	2 years

* - As specified in license/registration

** - Not a regulatory requirement.

† - Every three years or when changes are made to the monitoring system

NFS Licenses and Permits

Type of License/Permit	Issuing Agency	License/Permit No.	Responsible Department	Date of Expiration	Renewal Frequency
Application for Authorization to Operate a Class V Underground Injection Well for Storm Water Discharge to the Subsurface or Modification of a Karst Feature	State of TN	UNC 001	Decomm. Environmental	06/03/24	5 year max
Attendant (Boiler) Variance Renewal	State of TN	N/A	Facilities Support	04/30/23	†3 years
Re-Accreditation Application for a Firm to Conduct Asbestos Activities & Firm Affirmation Statement and also Asbestos Certification Continuance and Re-Accreditation Application to Conduct Asbestos Activities	State of TN	A-F-846-88329	Industrial Safety	05/31/23	Annual
Generator Site Access Permit	State of UT	0109 000 006	T&WM	06/30/23	Annual
WCS Generator Certification	WCS	TNNUCFSER	T&WM	3/31/23	Annual
Rad. Waste Registration (Shipper)	State of TX	W0064	T&WM	04/30/25	10 years

21G-22-0079
GOV-01-55-04
ACF-22-0150

ENCLOSURE B
NPDES PERMIT TN0002038
WASTEWATER TREATMENT FACILITY

(71 PAGES TO FOLLOW)

STATE OF TENNESSEE



NPDES PERMIT

No. TN0002038

Authorization to discharge under the
National Pollutant Discharge Elimination System (NPDES)

Issued By

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.)

Discharger: **Nuclear Fuel Services**
is authorized to discharge: **wastewater from Fenton's process, laboratory facilities, laundry facility, fuel production facilities, commercial development line (CDL), miscellaneous, blended low enriched uranium preparation facility (BLEU/BPF), development laboratories and decommissioning activities through Outfall 001**
from a facility located at: **1205 Banner Hill Road, Erwin, Unicoi County, Tennessee**
to receiving waters named: **Nolichucky River at mile 94.6 for Outfall 001**
in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on: **March 1, 2021**
This permit shall expire on: **February 28, 2025**
Issuance date: **February 4, 2021**



for Jennifer Dodd
Director

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PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Nuclear Fuel Services is authorized to discharge wastewater from Fenton's process, laboratory facilities, laundry facility, fuel production facilities, commercial development line (CDL), miscellaneous, blended low enriched uranium preparation facility (BLEU/BPF), development laboratories and decommissioning activities through Outfall 001 to Nolichucky River at mile 94.6 for Outfall 001.

These discharges shall be limited and monitored by the permittee as specified below:

Outfall 001, Effluent Gross, All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00340	Oxygen demand, chem. (COD)	<=	370	mg/L	Grab	Monthly	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Once Per Batch	Daily Minimum
00400	pH	<=	9.0	SU	Grab	Once Per Batch	Maximum
00530	Total Suspended Solids (TSS)	<=	40	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00545	Settleable Solids	<=	0.5	mL/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	30	mg/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	20	mg/L	Grab	Once Per Batch	Monthly Average
00630	Nitrite plus Nitrate (as N)	<=	420	lb/d	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01027	Cadmium, total (as Cd)	<=	0.01	mg/L	Grab	Monthly	Daily Maximum
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01042	Copper, total (as Cu)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
01051	Lead, total (as Pb)	<=	0.1	mg/L	Grab	Monthly	Daily Maximum

01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01077	Silver, total (as Ag)	<=	0.05	mg/L	Grab	Monthly	Daily Maximum
22708	Uranium, natural, total	<=	4.0	mg/L	Grab	Once Per Batch	Daily Maximum
22708	Uranium, natural, total	<=	2.0	mg/L	Grab	Once Per Batch	Monthly Average
34475	Tetrachloroethylene	Report	-	mg/L	Grab	Quarterly	Daily Maximum
50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Daily Maximum
50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Monthly Average
50060	Chlorine, total residual (TRC)	<=	2.0	mg/L	Grab	Once Per Batch	Daily Maximum
70295	Total Dissolved Solids (TDS)	Report	-	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.05	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.00037	mg/L	Grab	Once Per Batch	Monthly Average
TAA3B	LC50 Static 48Hr Acute Ceriodaphnia	Report	-	%	Grab	Annual	Minimum
TAA6C	LC50 Static 48Hr Acute Pimephales promelas	Report	-	%	Grab	Annual	Minimum

- (1) Flow shall be reported in Million Gallons per Batch.
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The chronic mercury limit shall apply only if the discharge of batches containing mercury occur four (4) or more consecutive days/week during the monitoring period; otherwise, only the daily maximum limit for batches containing mercury shall apply. If any individual analytical test result for mercury is less than the minimum quantification level (0.0002 mg/L), then a value of zero (0) may be used for DMR calculations and reporting requirements.
- (4) The total residual chlorine limit is only applicable when chlorine is used in the treatment process.
- (5) Tetrachloroethylene (PCE) is only required to be sampled when a groundwater treatment system that contains PCE is discharging through Outfall 001.

Additional monitoring requirements and conditions applicable to Outfall 001 include:

There shall be no distinctly visible floating solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life.

The wastewater discharge shall not contain pollutants in quantities that will be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream.

Sludge or any other material removed by any treatment works must be disposed of in a manner, which prevents its entrance into or pollution of any surface or subsurface waters. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TCA 68-46-101 et seq.

The waters shall not be modified through the addition of pollutants or through physical alteration to the extent that the diversity and/or productivity of aquatic biota within the receiving waters are substantially decreased or, in the case of wadable streams, substantially different from conditions in reference streams in the same ecoregion.

The waters shall not contain substances or a combination of substances including disease - causing agents which, by way of either direct exposure or indirect exposure through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), physical deformations, or restrict or impair growth in fish or aquatic life or their offspring.

NOTE: For the monitoring and reporting of measurements of FLOW, the "Monthly Avg." shall be the total flow volume during the reporting period divided by the number of calendar days in that period. The "Daily Max." shall be the total flow volume for the day with the greatest amount of discharge during the reporting period. Example: 3 discharges of 15,000 gallons/day and 1 discharge of 20,000 gallons/day during a 1-month period results in a Monthly Avg. of 65,000 gallons/30 days, or 2,166 gallons/day (to be reported as 0.002166 MGD). The Daily Maximum to be reported for this example is 20,000 gallons/day or 0.020 MGD.

B. MONITORING PROCEDURES

1. Representative Sampling

Samples and measurements taken in compliance with the monitoring requirements specified herein shall be representative of the volume and nature of the monitored discharge and shall be taken after treatment and prior to mixing with uncontaminated storm water runoff or the receiving stream. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated¹ and maintained to ensure that the accuracy of the measurements is consistent with accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than plus or minus 10% from the true discharge rates throughout the range of expected discharge volumes.

¹ The division expects for permittees to meet EPA's guidance on proper operation and maintenance of flow measurement devices, as stated in the NPDES Compliance Inspection Manual. On page 120, the documents states, in part: "The facility must ensure that their flow measurement systems are calibrated by a qualified source at least once a year to ensure their accuracy."

2. Sampling Frequency

If there is a discharge from a permitted outfall on any given day during the monitoring period, the permittee must sample and report the results of analyses accordingly, and the permittee should not mark the 'No Discharge' box on the Discharge Monitoring Report form.

3. Test Procedures

- a. Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304 (h) of the Clean Water Act (the "Act"), as amended, under which such procedures may be required.
- b. Unless otherwise noted in the permit, all pollutant parameters shall be determined according to methods prescribed in Title 40, CFR Part 136, as amended, promulgated pursuant to Section 304 (h) of the Act.

In instances where permit limits established through implementation of applicable water criteria are below analytical capabilities, compliance with those limits will be determined using the detection limits described in the TN Rules, Chapter 0400-40-03-.05(8).

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

- a. The exact place, date and time of sampling or measurements;
- b. The exact person(s) collecting samples or measurements;
- c. The dates and times the analyses were performed;
- d. The person(s) or laboratory who performed the analyses;
- e. The analytical techniques or methods used, and;
- f. The results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation shall be retained for a minimum of three (3) years, or longer, if requested by the Division of Water Resources.

C. DEFINITIONS

For the purpose of this permit, **annually** is defined as a monitoring frequency of once every twelve (12) months beginning with the date of issuance of this permit so long as the following set of measurements for a given 12 month period are made approximately 12 months subsequent to that time.

A **bypass** is defined as the intentional diversion of waste streams from any portion of a treatment facility.

A **calendar day** is defined as the 24-hour period from midnight to midnight or any other 24-hour period that reasonably approximates the midnight to midnight time period.

The **Daily Maximum Amount** is a limitation measured in pounds per day (lb/day), on the total amount of any pollutant in the discharge by weight during any calendar day.

The **Daily Maximum Concentration** is a limitation on the average concentration, in milligrams per liter (mg/L), of the discharge during any calendar day. When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite; when other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

"Degradation" means the alteration of the properties of waters by the addition of pollutants, withdrawal of water, or removal of habitat, except those alterations of a short duration.

"De Minimis" - Degradation of a small magnitude, as provided in this paragraph.

(a) Discharges and withdrawals

1. Subject to the limitation in part 3 of this subparagraph, a single discharge other than those from new domestic wastewater sources will be considered de minimis if it uses less than five percent of the available assimilative capacity for the substance being discharged.
2. Subject to the limitation in part 3 of this subparagraph, a single water withdrawal will be considered de minimis if it removes less than five percent of the 7Q10 flow of the stream.
3. If more than one activity described in part 1 or 2 of this subparagraph has been authorized in a segment and the total of the authorized and proposed impacts uses no more than 10% of the assimilative capacity, or 7Q10 low flow, they are presumed to be de minimis. Where the total of the authorized and proposed impacts uses 10% of the assimilative capacity, or 7Q10 low flow, additional degradation may only be treated as de minimis if the Division finds on a scientific basis that the additional degradation has an insignificant effect on the resource.

(b) Habitat alterations authorized by an Aquatic Resource Alteration Permit (ARAP) are de minimis if the Division finds that the impacts, individually and cumulatively are offset by impact minimization and/or in-system mitigation, provided however, in ONRWs the mitigation must occur within the ONRW.

Discharge or "discharge of a pollutant" refers to the addition of pollutants to waters from a source.

The **geometric mean** of any set of values is the n^{th} root of the product of the individual values where "n" is equal to the number of individual values. The geometric mean is equivalent to the antilog of the arithmetic mean of the logarithms of the individual values. For the purposes of calculating the geometric mean, values of zero (0) shall be considered to be one (1).

A **Grab Sample**, for the purposes of this permit, is defined as a single effluent sample of at least 100 milliliters (sample volumes <100 milliliters are allowed when specified per standard methods, latest edition) collected at a randomly selected time over a period not exceeding 15 minutes. The sample(s) shall be collected at the period(s) most representative of the total discharge.

The **Instantaneous Concentration** is a limitation on the concentration, in milligrams per liter (mg/L), of any pollutant contained in the discharge determined from a grab sample taken at any point in time.

The **monthly average amount** shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

The **monthly average concentration**, other than for *E. coli* bacteria, is the arithmetic mean of all the composite or grab samples collected in a one-calendar month period.

A **one-week period** (or **calendar-week**) is defined as the period from Sunday through Saturday. For reporting purposes, a calendar week that contains a change of month shall be considered part of the latter month.

Pollutant means sewage, industrial wastes, or other wastes.

A **Qualifying Storm Event** is one which is greater than 0.1 inches and that occurs after a period of at least 72 hours after any previous storm event with rainfall of 0.1 inches or greater.

For the purpose of this permit, a **Quarter** is defined as any one of the following three-month periods: January 1 through March 31, April 1 through June 30, July 1 through September 30, or October 1 through December 31.

A **rationale** (or "fact sheet") is a document that is prepared when drafting an NPDES permit or permit action. It provides the technical, regulatory and administrative basis for an agency's permit decision.

For the purpose of this permit, **Semi-annually** means the same as "once every six months." Measurements of the effluent characteristics' concentrations may be made anytime during a 6-month period beginning from the issuance date of this permit so long as the second set of measurements for a given 12-month period are made approximately 6 months subsequent to that time, if feasible.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

The term, **washout** is applicable to activated sludge plants and is defined as loss of mixed liquor suspended solids (MLSS) of 30.00% or more from the aeration basin(s).

Waters means any and all water, public or private, on or beneath the surface of the ground, which are contained within, flow through, or border upon Tennessee or any portion thereof except those bodies of water confined to and retained within the limits of private property in single ownership which do not combine or effect a junction with natural surface or underground waters.

D. ACRONYMS AND ABBREVIATIONS

1Q10 – 1-day minimum, 10-year recurrence interval
30Q5 – 30-day minimum, 5-year recurrence interval
7Q10 – 7-day minimum, 10-year recurrence interval
BAT – best available technology economically achievable
BCT – best conventional pollutant control technology
BDL – below detection level
BOD₅ – five-day biochemical oxygen demand
BPT – best practicable control technology currently available
CBOD₅ – five-day carbonaceous biochemical oxygen demand
CEI – compliance evaluation inspection
CFR – code of federal regulations
CFS – cubic feet per second
CFU – colony forming units
CIU – categorical industrial user
CSO – combined sewer overflow
DMR – discharge monitoring report
D.O. – dissolved oxygen
E. coli – *Escherichia coli*
EFO – environmental field office
LB(lb) - pound
IC₂₅ – inhibition concentration causing 25% reduction in survival, reproduction and growth of the test organisms
IU – industrial user
IWS – industrial waste survey
LC₅₀ – acute test causing 50% lethality
MDL – method detection level
MGD – million gallons per day
MG/L(mg/L) – milligrams per liter
ML – minimum level of quantification
mL – milliliter
MLSS – mixed liquor suspended solids

MOR – monthly operating report
uCi – microcurie, unit of measurement for radioactivity
pCi – picocurie, 1 uCi = 1,000,000 pCi
mrem – millirem, used for doses of radiation
NODI – no discharge
NPDES – national pollutant discharge elimination system
PL – permit limit
POTW – publicly owned treatment works
RDL – required detection limit
SAR – semi-annual [pretreatment program] report
SIU – significant industrial user
SSO – sanitary sewer overflow
STP – sewage treatment plant
TCA – Tennessee code annotated
TDEC – Tennessee Department of Environment and Conservation
TIE/TRE – toxicity identification evaluation/toxicity reduction evaluation
TMDL – total maximum daily load
TRC – total residual chlorine
TSS – total suspended solids
ug/L – micrograms per liter
WQBEL – water quality based effluent limit

E. REPORTING

1. Monitoring Results

Monitoring results shall be recorded monthly and submitted monthly using NETDMR. Submittals shall be no later than 15 days after the completion of the reporting period. If NETDMR is not functioning, a completed DMR with an original signature shall be submitted to the following address:

**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
COMPLIANCE & ENFORCEMENT SECTION
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102**

If NETDMR is not functioning, a copy of the completed and signed DMR shall be mailed to the Johnson City Environmental Field Office (EFO) at the following address:

**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
Johnson City Environmental Field Office
2305 Silverdale Road
Johnson City, Tennessee 37601**

A copy should be retained for the permittee's files. In addition, any communication regarding compliance with the conditions of this permit must be sent to the two offices listed above.

The first DMR is due on the 15th of the month following permit effectiveness.

DMRs and any other information or report must be signed and certified by a responsible corporate officer as defined in 40 CFR 122.22, a general partner or proprietor, or a principal municipal executive officer or ranking elected official, or his duly authorized representative. Such authorization must be submitted in writing and must explain the duties and responsibilities of the authorized representative.

The electronic submission of DMR data will be accepted only if formally approved beforehand by the division. For purposes of determining compliance with this permit, data approved by the division to be submitted electronically is legally equivalent to data submitted on signed and certified DMR forms.

2. Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than required at the location(s) designated, using approved analytical methods as specified herein, the results of such monitoring shall be included in the calculation and reporting of the values required in the DMR form. Such increased frequency shall also be indicated on the form.

3. Falsifying Results and/or Reports

Knowingly making any false statement on any report required by this permit or falsifying any result may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Water Pollution Control Act, as amended, and in Section 69-3-115 of the Tennessee Water Quality Control Act.

4. Outlier data

Outlier data include analytical results that are probably false. The validity of results is based on operational knowledge and a properly implemented quality assurance program. False results may include laboratory artifacts, potential sample tampering, broken or suspect sample containers, sample contamination or similar demonstrated quality control flaw.

Outlier data are identified through a properly implemented quality assurance program, and according to ASTM standards (e.g. Grubbs Test, 'h' and 'k' statistics). Furthermore, outliers should be verified, corrected, or removed, based on further inquiries into the matter. If an outlier was verified (through repeated testing and/or analysis), it should remain in the preliminary data set. If an outlier resulted from a transcription or similar clerical error, it should be corrected and subsequently reported.

Therefore, only if an outlier was associated with problems in the collection or analysis of the samples and as such does not conform with the Guidelines Establishing Test Procedures for the Analysis of Pollutants (40 CFR §136), it can be removed from the data set and not reported

on the Discharge Monitoring Report forms (DMRs). Otherwise, all results (including monitoring of pollutants more frequently than required at the location(s) designated, using approved analytical methods as specified in the permit) should be included in the calculation and reporting of the values required in the DMR form. You are encouraged to use "comment" section of the DMR form (or attach additional pages), in order to explain any potential outliers or dubious results.

F. SCHEDULE OF COMPLIANCE

Full compliance and operational levels shall be attained from the effective date of this permit.

PART II

A. GENERAL PROVISIONS

1. Duty to Reapply

Permittee is not authorized to discharge after the expiration date of this permit. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information and forms as are required to the Director of the Division of Water Resources (the "Director") no later than 180 days prior to the expiration date. Such applications must be properly signed and certified.

2. Right of Entry

The permittee shall allow the Director, the Regional Administrator of the U.S. Environmental Protection Agency, or their authorized representatives, upon the presentation of credentials:

- a. To enter upon the permittee's premises where an effluent source is located or where records are required to be kept under the terms and conditions of this permit, and at reasonable times to copy these records;
- b. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- c. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Director.

3. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Water Pollution Control Act, as amended, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Water Resources. As required by the Federal Act, effluent data shall not be considered confidential.

4. Proper Operation and Maintenance

- a. The permittee shall at all times properly operate and maintain all facilities and systems (and related appurtenances) for collection and treatment which are installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance also includes adequate laboratory and process controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems, which are installed by a permittee only when the operation is

necessary to achieve compliance with the conditions of the permit. Backup continuous pH and flow monitoring equipment are not required.

- b. Dilution water shall not be added to comply with effluent requirements to achieve BCT, BPT, BAT and/or other technology-based effluent limitations such as those in State of Tennessee Rule 0400-40-05-.09.

5. Treatment Facility Failure

The permittee, in order to maintain compliance with this permit, shall control production, all discharges, or both, upon reduction, loss, or failure of the treatment facility, until the facility is restored, or an alternative method of treatment is provided. This requirement applies in such situations as the reduction, loss, or failure of the primary source of power.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Severability

The provisions of this permit are severable. If any provision of this permit due to any circumstance, is held invalid, then the application of such provision to other circumstances and to the remainder of this permit shall not be affected thereby.

8. Other Information

If the permittee becomes aware that he failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Director, then he shall promptly submit such facts or information.

B. CHANGES AFFECTING THE PERMIT

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

- a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
- b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

- c. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices.

2. Permit Modification, Revocation, or Termination

- a. This permit may be modified, revoked and reissued, or terminated for cause as described in 40 CFR 122.62 and 122.64, Federal Register, Volume 49, No. 188 (Wednesday, September 26, 1984), as amended.
- b. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- c. If any applicable effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for any toxic pollutant under Section 307(a) of the Federal Water Pollution Control Act, as amended, the Director shall modify or revoke and reissue the permit to conform to the prohibition or to the effluent standard, providing that the effluent standard is more stringent than the limitation in the permit on the toxic pollutant. The permittee shall comply with these effluent standards or prohibitions within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified or revoked and reissued to incorporate the requirement.
- d. The filing of a request by the permittee for a modification, revocation, reissuance, termination, or notification of planned changes or anticipated noncompliance does not halt any permit condition.

3. Change of Ownership

This permit may be transferred to another party (provided there are neither modifications to the facility or its operations, nor any other changes which might affect the permit limits and conditions contained in the permit) by the permittee if:

- a. The permittee notifies the Director of the proposed transfer at least 30 days in advance of the proposed transfer date;
- b. The notice includes a written agreement between the existing and new permittees containing a specified date for transfer of permit responsibility, coverage, and liability between them; and
- c. The Director, within 30 days, does not notify the current permittee and the new permittee of his intent to modify, revoke or reissue, or terminate the permit and to require that a new application be filed rather than agreeing to the transfer of the permit.

Pursuant to the requirements of 40 CFR 122.61, concerning transfer of ownership, the permittee must provide the following information to the division in their formal notice of intent to transfer ownership: 1) the NPDES permit number of the subject permit; 2) the effective date of the proposed transfer; 3) the name and address of the transferor; 4) the name and address of the transferee; 5) the names of the responsible parties for both the transferor and transferee; 6) a statement that the transferee assumes responsibility for the subject NPDES permit; 7) a statement that the transferor relinquishes responsibility for the subject NPDES permit; 8) the signatures of the responsible parties for both the transferor and transferee pursuant to the requirements of 40 CFR 122.22(a), "Signatories to permit applications"; and, 9) a statement regarding any proposed modifications to the facility, its operations, or any other changes which might affect the permit limits and conditions contained in the permit.

4. Change of Mailing Address

The permittee shall promptly provide to the Director written notice of any change of mailing address. In the absence of such notice the original address of the permittee will be assumed to be correct.

C. NONCOMPLIANCE

1. Effect of Noncompliance

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of applicable State and Federal laws and is grounds for enforcement action, permit termination, permit modification, or denial of permit reissuance.

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate regional Field Office within 24-hours from the time the permittee becomes aware of the circumstances. (The regional Field Office should be contacted for names and phone numbers of environmental response personnel).

A written submission must be provided within five calendar days of the time the permittee becomes aware of the circumstances, unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

- i. A description of the discharge and cause of noncompliance;
- ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and

- iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

- b. Scheduled Reporting

For instances of noncompliance which do not cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

- 3. **Sanitary Sewer Overflow**

- a. "**Sanitary Sewer Overflow**" means the discharge to land or water of wastes from any portion of the collection, transmission, or treatment system other than through permitted outfalls.
- b. Sanitary Sewer Overflows are prohibited.
- c. The permittee shall operate the collection system so as to avoid sanitary sewer overflows. No new or additional flows shall be added upstream of any point in the collection system, which experiences chronic sanitary sewer overflows (greater than 5 overflows per year) or would otherwise overload any portion of the system.
- d. Unless there is specific enforcement action to the contrary, the permittee is relieved of this requirement after: 1) an authorized representative of the Commissioner of the Department of Environment and Conservation has approved an engineering report and construction plans and specifications prepared in accordance with accepted engineering practices for correction of the problem; 2) the correction work is underway; and 3) the cumulative, peak-design, flows potentially added from new connections and line extensions upstream of any chronic overflow point are less than or proportional to the amount of inflow and infiltration removal documented upstream of that point. The inflow and infiltration reduction must be measured by the permittee using practices that are customary in the environmental engineering field and reported in an attachment to a Monthly Operating Report submitted to the regional TDEC Field Office. The data measurement period shall be sufficient to account for seasonal rainfall patterns and seasonal groundwater table elevations.
- e. In the event that more than five (5) sanitary sewer overflows have occurred from a single point in the collection system for reasons that may not warrant the self-imposed moratorium or completion of the actions identified in this paragraph, the permittee may request a meeting with the Division of Water Resources field office staff to petition for a waiver based on mitigating evidence.

4. Upset

- a. "**Upset**" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
- b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:
- i. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - ii. The permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
 - iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
 - iv. The permittee complied with any remedial measures required under "Adverse Impact."

5. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to the waters of Tennessee resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

6. Bypass

- a. "**Bypass**" is the intentional diversion of wastewater away from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
- b. Bypasses are prohibited unless the following 3 conditions are met:

- i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;
 - ii. There are not feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment down-time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass, which occurred during normal periods of equipment down-time or preventative maintenance;
 - iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate environmental assistance center within 24-hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the Director, if possible, at least 10 days before the date of the bypass.
- c. Bypasses not exceeding limitations are allowed **only** if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 6.b.iii, above.

7. Washout

- a. For domestic wastewater plants only, a "washout" shall be defined as loss of Mixed Liquor Suspended Solids (MLSS) of 30.00% or more. This refers to the MLSS in the aeration basin(s) only. This does not include MLSS decrease due to solids wasting to the sludge disposal system. A washout can be caused by improper operation or from peak flows due to infiltration and inflow.
- b. A washout is prohibited. If a washout occurs the permittee must report the incident to the Division of Water Resources in the appropriate regional Field Office within 24-hours by telephone. A written submission must be provided within 5 days. The washout must be noted on the discharge monitoring report. Each day of a washout is a separate violation.

D. LIABILITIES

1. Civil and Criminal Liability

Except as provided in permit conditions for "**Bypass**," "**Overflow**," and "**Upset**," nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Notwithstanding this permit, the permittee shall remain liable for any damages sustained by the State of Tennessee, including but not limited to fish kills and losses of aquatic life and/or wildlife, as a result of the discharge of wastewater to any surface or subsurface waters. Additionally, notwithstanding this Permit, it shall be the responsibility of the permittee to conduct

its wastewater treatment and/or discharge activities in a manner such that public or private nuisances or health hazards will not be created.

2. Liability Under State Law

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or the Federal Water Pollution Control Act, as amended.

PART III

OTHER REQUIREMENTS

A. TOXIC POLLUTANTS

The permittee shall notify the Division of Water Resources as soon as it knows or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. One hundred micrograms per liter (100 ug/l);
 - b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - c. Five (5) times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 122.21(g)(7); or
 - d. The level established by the Director in accordance with 122.44(f).
2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":
 - a. Five hundred micrograms per liter (500 ug/l);
 - b. One milligram per liter (1 mg/L) for antimony;
 - c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 122.21(g)(7); or
 - d. The level established by the Director in accordance with 122.44(f).

B. REOPENER CLAUSE

If an applicable standard or limitation is promulgated under Sections 301(b)(2)(C) and (D), 304(B)(2), and 307(a)(2) and that effluent standard or limitation is more stringent than any effluent

limitation in the permit or controls a pollutant not limited in the permit, the permit shall be promptly modified or revoked and reissued to conform to that effluent standard or limitation.

C. PLACEMENT OF SIGNS

Within sixty (60) days of the effective date of this permit, the permittee shall place and maintain a sign(s) at each outfall and any bypass/overflow point in the collection system. For the purposes of this requirement, any bypass/overflow point that has discharged five (5) or more times in the last year must be so posted. The sign(s) should be clearly visible to the public from the bank and the receiving stream or from the nearest public property/right-of-way, if applicable. The minimum sign size should be two feet by two feet (2' x 2') with one inch (1") letters. The sign should be made of durable material and have a white background with black letters.

The sign(s) are to provide notice to the public as to the nature of the discharge and, in the case of the permitted outfalls, that the discharge is regulated by the Tennessee Department of Environment and Conservation, Division of Water Resources. The following is given as an example of the minimal amount of information that must be included on the sign:

<p style="text-align: center;">TREATED INDUSTRIAL WASTEWATER Nuclear Fuel Services</p> <p style="text-align: center;">(Permittee's Phone Number) NPDES Permit NO. TN0002038</p> <p style="text-align: center;">TENNESSEE DIVISION OF WATER RESOURCES 1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - Johnson City</p>
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D. ANTIDegradation

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06, titled "Tennessee Antidegradation Statement," which prohibits the degradation of exceptional Tennessee waters and the increased discharges of substances that cause or contribute to impairment, the permittee shall further be required, pursuant to the terms and conditions of this permit, to comply with the effluent limitations and schedules of compliance required to implement applicable water quality standards, to comply with a State Water Quality Plan or other state or federal laws or regulations, or where practicable, to comply with a standard permitting no discharge of pollutants.

E. BIOMONITORING REQUIREMENTS, ACUTE

The permittee shall conduct a 48-hour static acute toxicity test on two test species on the same samples of final effluent from Outfall 001. The test species to be used are Water Fleas (*Ceriodaphnia dubia*) and Fathead Minnows (*Pimephales promelas*).

The measured endpoint for toxicity will be the concentration causing 50% lethality (LC50) of the test organisms. The LC50 shall be determined based on a 50% lethality as compared to the controls.

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
Permit Limit (PL)	0.50 X PL	0.25 X PL	0.125 X PL	0.0625 X PL	Control
% effluent					
100	50	25	12.5	6.25	0

The dilution/control water used will be a moderately hard water as described in Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012 (or the most current edition). Results from an acute standard reference toxicant quality assurance test for each species tested shall be submitted with the discharge monitoring report. Reference toxicant tests shall be conducted as required in EPA-821-R-02-012 (or the most current edition). Additionally, the analysis of this multi-concentration test shall include review of the concentration-response relationship to ensure that calculated test results are interpreted appropriately.

Toxicity will be demonstrated if the LC50 is less than or equal to the permit limit indicated for each outfall in the above table(s). Toxicity demonstrated by the tests specified herein constitutes a violation of this permit.

All tests will be conducted using four separate grab samples of final effluent, to be used in four separate tests, and shall be collected at evenly spaced intervals over one batch discharge event. If, in any control more than 10% of the test organisms die in 48 hours, the test (control and effluent) is considered invalid and the test shall be repeated within 30 days of the date the initial test is invalidated. Furthermore, if the results do not meet the acceptability criteria as defined in Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012, or if the required concentration-response review fails to yield a valid relationship per guidance contained in Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing, EPA-821-B-00-004 (or the most current edition), that test shall be repeated. Any test initiated but terminated before completion must also be reported along with a complete explanation for the termination.

The toxicity tests specified herein shall be conducted annually (1/Year) for Outfall 001 and begin no later than 90 days from the effective date of this permit.

In the event of a test failure, the permittee must start a follow-up test within 2 weeks and submit results from a follow-up test within 30 days from obtaining initial WET testing results. The follow-up test must be conducted using the same serial dilutions as presented in the corresponding table(s) above. **The follow-up test will not negate an initial failed test. In addition, the failure of a follow-up test will constitute a separate permit violation which must also be reported.**

In the event of 2 consecutive test failures or 3 test failures within a 12 month period for the same outfall, the permittee must initiate a Toxicity Identification Evaluation/Toxicity Reduction Evaluation (TIE/TRE) study within 30 days and so notify the division by letter. This notification shall include a schedule of activities for the initial investigation of that outfall. **During the term of the TIE/TRE study, the frequency of biomonitoring shall be once every three months.** Additionally, the permittee shall submit progress reports once every three months throughout the term of the TIE/TRE study. The toxicity must be reduced to allowable limits for that outfall within 2 years of initiation of the TIE/TRE study. Subsequent to the results obtained from the TIE/TRE studies, the permittee may request an extension of the TIE/TRE study period if necessary to conduct further analyses. The final determination of any extension period will be made at the discretion of the division.

The TIE/TRE study may be terminated at any time upon the completion and submission of 2 consecutive tests (for the same outfall) demonstrating compliance. Following the completion of TIE/TRE study, the frequency of monitoring will return to a regular schedule, as defined previously in this section as well in Part I of the permit. **During the course of the TIE/TRE study, the permittee will continue to conduct toxicity testing of the outfall being investigated at the frequency of once every three months but will not be required to perform follow-up tests for that outfall during the period of TIE/TRE study.**

Test procedures, quality assurance practices and determination of effluent lethality values will be made in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012, or the most current edition.

Results of all tests, reference toxicant information, copies of raw data sheets, statistical analysis and chemical analysis shall be compiled in a report. The report shall be written in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012, or the most current edition.

Two copies of biomonitoring reports (including follow-up reports) shall be submitted to the division. One copy of the report shall be submitted along with the discharge monitoring report (DMR). The second copy shall be submitted to the local Division of Water Resources office address:

**Environmental Field Office - Johnson City
Division of Water Resources
2305 Silverdale Road
Johnson City, TN 37601**

The reasonable potential to cause toxicity in the receiving stream will be evaluated based on the results of the WET testing. At that time, should the results so dictate, the division maintains the authority to institute specific numeric biomonitoring limitations.

ADDENDUM TO RATIONALE

The Division has received the following comments to the draft permit. Each comment has been addressed in this following addendum.

What is the nearest potable water plant and how far is it from the point of discharge?

The closest drinking water plant is the Unicoi Water Filter Plant which is about 7.5 miles upstream from Outfall 001. The closest drinking water plant downstream is over 100 river miles from the point of discharge.

The permit should include the analytical method used for uranium to ensure the permittee knows exactly which method to be used for compliance purposes.

This permit continues to require compliance with 40 CFR Part 136 methods only. Radiation is regulated by the Nuclear Regulatory Commission (NRC). That program's requirements may change over time. It is beyond the scope of this permit to provide guidance to the permittee on that program's requirements or to make those requirements enforceable through a water quality permit. The analytical method must have an MDL that is lower than both standards set by TDEC and the NRC, following requirements set in 10 CFR 40.63-40.65 and be accurate to 10% of the value for Uranium set in Table 2 in Appendix B of 10 CFR 20. The mass spectroscopy method for Uranium meets these requirements and has been deemed appropriate for compliance by the NRC.

In the NFS new permit for NFS, NPDES, it says, on page 21, "Test procedures, quality assurance practices and determination of effluent lethality values will be made in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012, or the most current edition." Where are those results? For the last 5 years? How do I access those results?

The toxicity (LC50) test results for the previous five years can be found in Appendix 4 of this permit beginning on Page R-36. Potential for toxicity presents when a reported percent value approaches or is less than the concentration of effluent in the river at low flow. The facility averages 0.016 MGD into a stream whose low flow rate is 124 MGD. When mixed the river is less than 1% effluent. The lowest value reported is 20% meaning the discharge would have to be 20% of the receiving stream (24.8 MGD) in order to have potential for toxicity.

Page R-3 of R-43 "The federal effluent guidelines are not applicable to the discharge from this facility. The effluent characteristic monitoring requirements will be based on the permit writer's best professional judgement, the state's drinking water standards, and the state's water quality criteria...Since when are Federal guidelines not applicable to Nuclear facilities?

Effluent limitation guidelines outlined in 40 CFR are the basis for NPDES limits for several industries, however, there are no such guidelines for nuclear facilities because the Nuclear

Regulatory Commission (NRC) has jurisdiction over these facilities instead. In the case for Uranium, effluent limits are based on the state's water quality criteria based on Uranium toxicity. Best professional judgement (BPJ) limits are a type of technology-based limit developed on a case-by-case basis for a facility. No new best professional judgement (BPJ) was used to obtain limits in this permit. This permit retains the effluent limits developed in previous permit terms to comply with anti-backsliding provisions in permit regulations.

How often does TDEC test for the rads [on the] list?

TDEC does not currently test for radioactive material in surface waters since it is outside of its jurisdiction and scope. Radioactive material concentrations are measured at the point of discharge through the relevant NPDES permits, since there is where they are at their highest concentrations.

RE: Letter from Beverly Brown to Marie Moore, Dec. 23, 2019: Compliance Inspection Report NPDES Permit TN0002038 the benchmarks for copper, magnesium and nitrate/nitrite, aluminum, have been exceeded since Feb. of 1998, "due to high levels of these constituents in the surrounding groundwater." In USN's paperwork it's due to water running over rock for the magnesium. So which is it?

A number of factors could be contributing to elevated levels of magnesium, the explanations given are possibilities proposed based on what is known about the surrounding area. The process performed as Nuclear Fuel Services does not have reasonable potential to release Magnesium into the water.

In the draft permit, the table for water quality-based calculations for metals and toxics had an incorrect value for the waste flow. The value was much bigger relative to the actual flow rate of 0.016 MGD. The value has been revised in the table below, and has only increased the concentration limit and therefore shows this facility does not have reasonable potential to discharge metals or toxics in quantities that will affect fish and aquatic life.

WATER QUALITY CALCULATIONS FOR METALS AND OTHER TOXIC SUBSTANCES
WATER QUALITY BASED EFFLUENT CALCULATIONS
OUTFALL 001

FACILITY: Nuclear Fuel Services PERMIT #: TN0002038

Stream (7Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Margin of Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
124.100	180.000	0.016	14	32	50

PARAMETER	1	2	3	4	5	6	7	8	Human Health Water Quality Criteria *					
	Stream Bkgmd. Conc.	Fish/Aqua. Life (F & AL) WQC lab conditions		Fraction Dissolved	F & AL- instream allowable ambient conditions (Tot)		Calc. Effluent Concentration based on F & AL		In-Stream Criteria			Calc. Effluent Concentration **		
	[ug/l]	Chronic [ug/l]	Acute [ug/l]		Chronic [ug/l]	Acute [ug/l]	Chronic [ug/l]	Acute [ug/l]	Organisms [ug/l]	Water/Organisms [ug/l]	DWS [ug/l]	Organisms [ug/l]	Water/Organisms [ug/l]	DWS [ug/l]
Copper (a,b)	5.152	3.383	4.593	0.328	10.303	13.991	19984.02	34287.05	N/A	N/A	N/A	N/A	N/A	N/A
Chromium III	73.418	29.149	224.085	0.199	146.836	1128.822	284798.55	4093550.37	N/A	N/A	N/A	N/A	N/A	N/A
Chromium VI	5.500	11.000	16.000	1.000	11.000	16.000	21335.19	40728.31	N/A	N/A	N/A	N/A	N/A	N/A
Chromium, Total	78.918	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100.0	N/A	N/A	118634.86
Nickel (a,b)	24.957	19.834	178.575	0.397	49.914	449.392	96810.45	1646236.56	4600.0	610.0	100.0	25736918.14	3291173.14	422168.14
Cadmium (a,b)	0.213	0.305	0.620	0.261	1.168	2.375	3702.85	8386.07	N/A	N/A	5.0	N/A	N/A	26929.38
Lead (a,b)	2.051	0.714	18.319	0.174	4.102	105.275	7956.86	400365.92	N/A	N/A	5.0	N/A	N/A	16589.50
Mercury (T) (c)	0.020	0.770	1.400	1.000	0.770	1.400	2908.01	5351.54	0.051	0.05	2.0	172.99	167.37	11137.09
Silver (a,b,e)	0.227	N/A	0.453	1.000	N/A	0.453	N/A	878.98	N/A	N/A	N/A	N/A	N/A	N/A
Zinc (a,b)	83.937	44.989	44.624	0.268	167.874	166.512	325602.80	320319.87	26000.0	7400.0	N/A	145790853.38	41156553.38	N/A
Cyanide (d)	2.600	5.200	22.000	1.000	5.200	22.000	10085.73	75246.63	140.0	140.0	200.0	772945.00	772945.00	1110475.00
Chlorine (T. Res.)	5.500	11.000	19.000	1.000	11.000	19.000	42670.38	104728.38	N/A	N/A	N/A	N/A	N/A	N/A

- a Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness.
- b The criteria for this metal is in the dissolved form at lab conditions. The calculated effluent concentration is in the total recoverable form.
- c The chronic criteria for mercury is not converted to dissolved, since it is based on fish tissue data rather than toxicity.
- d The criteria for this parameter is in the total form.
- e Silver limit is daily max if column 8 is most stringent.
- f When columns 7 or 8 result in a negative number, use results from columns 5 or 6, respectively.
- g When columns 12, 13 or 14 result in a negative number, use results from columns 9, 10 or 11, respectively, as applicable.

* Domestic supply included in river use so pick from columns 7,8,12,13,14,15 or Domestic supply not included in river use so pick from columns 7, 8, 12 or 15.
 ** Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

RATIONALE

Nuclear Fuel Services

NPDES PERMIT NO. TN0002038
Erwin, Unicoi County, Tennessee

Permit Writer: Mr. Oscar Montenegro

I. DISCHARGER

<p>Nuclear Fuel Services 1205 Banner Hill Road Erwin, Unicoi County, Tennessee Site Longitude: -82.43262 Site Latitude: 36.130427</p> <p>Official Contact Person: Ms. B. Marie Moore Environmental Protection & Industrial Safety Manager (423) 743-1737</p> <p>Nature of Business: Nuclear fuel manufacturing and uranium recovery facility. Also conducts decommissioning/remediating and groundwater treatment activities related to past activities.</p>
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<p>SIC Code(s): 2819 Industrial Classification: Primary Discharger Rating: Major</p>

PRIMARY INDUSTRY CATEGORY means any industry category listed in the NRDC Settlement Agreement (Natural Resources Defense Council v. Train, 8 ERC 2120 [D.D.C. 1976], modified 12 ERC 1833 [D.D.C. 1979]).

II. PERMIT STATUS

<p>Issued March 01, 2016 Expired December 31, 2020 Application for renewal received June 04, 2020</p>
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Watershed Scheduling

Environmental Field Office: Johnson City
Primary Outfall Longitude: 36.133333 Primary Outfall Latitude: -82.425
Hydrocode: 6010108 Watershed Group: 5
Watershed Identification: Nolichucky
Target Reissuance Year: 2025

III. FACILITY DISCHARGES AND RECEIVING WATERS

Nuclear Fuel Services (NFS) discharges wastewater from Fenton's process, laboratory facilities, laundry facility, fuel production facilities, commercial development line (CDL), miscellaneous, blended low enriched uranium preparation facility (BLEU/BPF), development laboratories and decommissioning activities through Outfall 001 to Nolichucky River at mile 94.6 for Outfall 001. Process water is released in batches when required. Appendix 1 summarizes facility discharges and the receiving stream information for Outfall 001. Following is a list of questions and answers that are relevant to characterize this permit and the effluent.

Storm water discharges associated with the industrial activity of this facility are covered by the Tennessee Multi-Sector General Storm Water Permit TNR050873. Storm water concerns associated with this facility are covered in this general permit and will, therefore, not be addressed in the new permit.

What is the flow of wastewater discharged by Nuclear Fuel Services (NFS) and what is the flow of the receiving stream?

Over the previous permit cycle, NFS discharged an average of 0.0155 MGD per batch through Outfall 001, and 0.053 MGD on average to Erwin STP. The minimum expected critical low flow (7Q10) of the Nolichucky River is 124.1 MGD.

Does Nuclear Fuel Services discharge radioactive material?

Yes, NFS discharges small amounts of Uranium that remains in the wastewater after it is treated. Uranium is a naturally occurring, unstable element that very slowly decomposes into other elements, which releases trace amounts of radiation.

Does TDEC regulate the radioactivity from this facility?

No, TDEC can only regulate the amounts of material discharged in wastewater through NPDES permits, although this permit includes a maximum concentration for Uranium it is because of its toxicity rather than its radioactivity. TDEC does have a Division of Radiological Health that has monitored the area for radioactive materials in quantities that could affect human health.

The United States Nuclear Regulatory Commission (NRC) has authority over nuclear processes and radioactive material. NFS operates under Operating License SNM-124, a detailed facility page can be found in the NRC's website at <https://www.nrc.gov/info-finder/fc/nuclear-fuel-services.html?panel=0#panel0>

An FAQ about Nuclear Fuel Services and the NRC can be found at <https://www.nrc.gov/materials/fuel-cycle-fac/fuel-fab/nfs-fags.html#2b7>

What was done to follow up on the public hearing regarding this permit that took place on November 16th, 2015?

Responses were written in the final version of the previous permit for each comment received during the public hearing and lists the sampling events that were requested. A Best Professional Judgement was made and determined that Nuclear Fuel Services facility has the best practicable technology for their treatment in place.

Have Nuclear Fuel Services had any permit violations this permit cycle?

NFS has had no permit violations over this period.

IV. APPLICABLE EFFLUENT LIMITATIONS GUIDELINES

The federal effluent guidelines are not applicable to the discharge from this facility. The effluent characteristic monitoring requirements will be based on the permit writer's best professional judgment, the state's drinking water standards, and the state's water quality criteria.

V. PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

Appendix 3 lists the permit limitations and monitoring requirements as defined in the previous permit.

VI. HISTORICAL MONITORING AND INSPECTION

During the previous permit term, Nuclear Fuel Services did not have any appreciable difficulty in meeting effluent limitations as outlined in the previous permit. A summary of the data reported on Discharge Monitoring Report forms during the previous permit term is summarized in Appendix 4.

During the previous permit term, the Division's personnel from the Johnson City Environmental Field Office performed a Compliance Evaluation Inspection (CEI) of the Nuclear Fuel Services. The CEI was performed by Beverly Brown on December 23, 2019. The inspection report described properly run operations and found NFS to be in compliance with their individual NPDES permit and their general stormwater permit.

VII. NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

The proposed new permit limits have been selected by determining a technology-based limit and evaluating if that limit protects the water quality of the receiving stream. If the technology-based limit would cause violations of water quality, the water quality-based limit is chosen. The

technology-based limit is determined from EPA effluent limitations guidelines if applicable (see Part IV); or from State of Tennessee maximum effluent limits for effluent limited segments per Rule 0400-40-05-.08. Note that in general, the term "anti-backsliding" refers to a statutory provision that prohibits the renewal, reissuance, or modification of an existing NPDES permit that contains effluents limits, permit conditions, or standards that are less stringent than those established in the previous permit.

VIII. METALS AND TOXICS

Effluent permit limits for metals and toxics were determined as shown in Appendix 2A.

Outfall 001

Nuclear Fuel Services sends wastewater to the Nolichucky River through permitted Outfall 001 (river mile 96.4) and through Erwin STP's pretreatment program under permit TN0023001 (river mile 94.4).

In addition, the facility's NRC license (SNM-124) requires that the facility demonstrate that wastewater effluents will not cause the dose limits for individual members of the public to be exceeded. Compliance with the NRC license can be demonstrated by measurement or calculation that the individual likely to receive the highest dose from the facility's operation does not receive a total effective dose equivalent exceeding the annual dose limit in 10 CFR 20.1301; or by demonstrating that the annual average concentrations of radioactive material released in the effluent at the boundary of the unrestricted area do not exceed the values specified in 10 CFR 20 Appendix B. All wastewater is also required to comply with the statutes and rules administered by TDEC's Division of Radiological Health.

Flow

Monitoring of flow quantifies the load of pollutants to the stream. Flow shall be reported in Million Gallons per Day (MGD) and monitored at the time of sample collection.

Total Suspended Solids (TSS)

Total Suspended Solids is a general indicator of the quality of a wastewater and will be limited in this permit. The permit writer's technology-based limit for TSS of 40 mg/L, taken from Tennessee Rule 0400-40-05-.09(1)(a) 1., "Conventional Secondary Treatment Plants."

The State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 0400-40-03-.03(3) (c)] state there shall be no distinctly visible solids, scum, foam, oily slick, or the formation of slimes, bottom deposits or sludge banks of such size or character that may be detrimental to fish and aquatic life in the receiving stream.

The permit writer believes the limit of 40 mg/L daily maximum concentration will provide protection of water quality in the receiving stream. Considering the nature of wastewater collection and discharge system, the sample type will be grab and shall occur once per batch released..

pH

According to the State of Tennessee Water Quality Standards [Chapter 0400-40-03-.03(3)(b)], the pH for the protection of Fish and Aquatic Life shall lie within the range of 6.5 to 9.0 for larger rivers and shall not fluctuate more than 1.0 unit in this range over a period of 24-hours. Considering that the receiving stream will provide some buffering capacity and that it was previously determined the receiving stream can withstand pH changes for all nearby dischargers, effluent limitation for pH will be retained in a range 6.0 to 9.0. The sample type will be grab.

Total Residual Chlorine

In a letter dated May 16, 2001, Nuclear Fuel Services notified the division that the chlorination system had been removed from the treatment process. The letter stated that any chlorine treatment in the future would be conducted through the use of portable chlorine cylinders. Wastewater treatment with chlorine involves mixing chlorine gas with water to produce free available chlorine (HOCl and OCl). The free available chlorine reacts with certain pollutants such as ammonia and coliform and converts the free available chlorine to chloramines. The amount of chlorine converted to chloramines is based on the contact time, pH and temperature of the wastewater. A properly designed system will maximize the breakdown and disinfection of pollutants and minimize the free available chlorine at the exit of the treatment system. The total residual chlorine concentration of 2 mg/L at the treatment system exit is an obtainable design parameter that is consistently applied to NPDES permits. The daily maximum concentration permit limit of 2 mg/L will be applied based on the permit writer's judgment of reasonable treatment. The testing for TRC will only be required when chlorine is utilized in the treatment process. The background concentration of TRC is assumed to be 0.0 mg/L.

Ammonia as N

To assess toxicity impacts, the state utilizes the EPA Ambient Water Quality Criteria for Ammonia (<https://www.epa.gov/wqc/aquatic-life-criteria-ammonia>), which is promulgated in Tennessee Rules, Chapter 0400-40-03-.03-3(3)(j), dated *September 11, 2019*, and assumed stream temperatures of 25°C and 15°C and pH of 7.5 or 8.0 to derive an allowable instream protection value protective of chronic exposure to a continuous discharge. A mass balance equation with sewage treatment facility and stream flows and this allowable value determines the monthly average permit limit. The criteria document states that a 30Q5 flow value is protective in deriving allowable values. Where the division has 30Q5 flow values, the division may use them. Otherwise, the division utilizes the available 7Q10 or 1Q10 values that are generally more conservative. The criteria continuous concentrations (CCC) derived from assumed temperature and pH values are as follows:

CCC values based on temperature and pH, in mg/L:

Temperature (°C)	7.5 pH	8.0 pH	Temperature (°C)	7.5 pH	8.0 pH
25	1.01	0.56	15	1.92	1.07

The mass balance equation is as follows:

$$CCC = \frac{Q_S C_S + Q_{001} C_{001}}{Q_S + Q_{001}} \quad \text{or,} \quad C_{001} = \frac{CCC(Q_S + Q_{001}) - (Q_S C_S)}{Q_{001}}$$

where:

- CCC = Criteria continuous concentration (mg/L)
- Q_S = 7Q10 flow of receiving stream (MGD) = 124.1 MGD
- Q₀₀₁ = Design flow of STP (MGD) = 0.0155 MGD
- C_S = Assumed/Measured instream NH₃ (mg/L) = 0.1 mg/L
- C₀₀₁ = Allowable STP discharge of NH₃ (mg/L)

$$C_{001} = \frac{0.56 (124.1 \text{ MGD} + 0.0155 \text{ MGD}) - (124.1 \text{ MGD} \times 0.1 \text{ mg/L})}{0.0155 \text{ MGD}} = 3600 \text{ mg/L (summer)}$$

$$C_{001} = \frac{1.07 (124.1 \text{ MGD} + 0.0155 \text{ MGD}) - (124.1 \text{ MGD} \times 0.1 \text{ mg/L})}{0.0155 \text{ MGD}} = 7600 \text{ mg/L (winter)}$$

Because the NH₃-N concentration limits calculated to protect dissolved oxygen already set by this permit are more restrictive than the toxicity limits calculated above, the monthly average limits for NH₃-N (20 mg/L monthly average, 30 mg/L daily maximum) will be retained in this permit.

Nitrite plus Nitrate

The treatment system treats individual batches of wastewater, each of which can differ in quantity and nitrite-nitrate concentration. During a previous permit renewal period, the facility submitted nitrite-nitrate data that was utilized in the calculations for treatability-based limits from the procedure provided in EPA document 505/2-90-001 titled "Technical Support Document for Water Quality-based Toxics Control". The permittee has since maintained the average loading of nitrites and nitrates below the imposed limit and even accounting for other discharges has not come close to the maximum loading onto the receiving stream. This limit is therefore considered to protective of water quality and will be retained in the new permit.

Alpha Particles, Beta Particles, and Uranium

Alpha particles are released when large atoms (atomic weight >210) decay into smaller atoms because at this point external forces are stronger than those holding the nucleus together. Beta particles are released by atoms with nuclei that have more than the stable number of neutrons, which can be a byproduct of atoms that undergo alpha decay. Both processes occur naturally, and their rates of release (which are forms of radiation) are based on the element. These emitted particles will be referred to as radionuclides for the purposes of this permit.

Uranium is a naturally occurring and relatively plentiful element usually found in rocks and sediment, though uranium containing ores are mined for their use in nuclear power. The process at NFS enriches processed uranium, meaning increasing the concentration of the specific U-235 isotope needed for nuclear power. And, although the excess Uranium is collected and the wastewater for the process is treated before discharge, some amounts of Uranium can remain in the effluent. Uranium often goes through alpha and sometimes beta radiation based on its isotope.

NPDES permits may only limit discharge based on the toxicity of the effluent and not its radioactivity, however, there are a number of water quality standards and designated uses for the water body that this permit must be protective of to prevent the degradation of Tennessee's waters. The imposed limits for Uranium based on drinking water standards will continue to apply, with a monthly average of 2 mg/L monthly average and a daily maximum of 4 mg/L for Outfall 001.

The division of water supply's primary drinking water standards for radionuclides (TN Rule 0400-45-01-.06 (5)) that are applicable to this wastewater are the following:

1. Gross alpha particle activity (including radium-226 but excluding radon and uranium):
The maximum contaminant level for gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/L.
2. The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than four (4) millirem/year
3. The maximum contaminant level for total uranium is 30 micrograms per liter. The MCL of 30 micrograms per liter is based on the composition of natural Nuclear Fuel Services (Rationale) NPDES Permit TN0002038 Page R-7 uranium. The federal (40 CFR 141.25) and state regulations (TN Rule 0400- 45-01-.14) state that "if uranium (U) is determined by mass, a 0.67 pCi/μg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U-234 and U-238 that is characteristic of naturally occurring uranium". The facility discharges processed uranium which does not have the same activity ratio as natural uranium. The facility calculated the average specific activities for their discharge to the Nolichucky River and the wastewater to the Erwin STP for the 2014 calendar year.
 - a. NFS Sewer EPOTW 013 ~2.4 uCi/g of U → 2.4 pCi/ug → 2400 pCi/mg
 - b. NFS/BLEU Complex EPOTW 019 ~1.4 uCi/g of U → 1.4 pCi/ug → 1400 pCi/mg
 - c. NFS WWTF TN00002038 ~23.5 uCi/g of U → 23.5 pCi/ug → 23500 pCi/mg

The final radionuclides rule in the federal register addresses the scenario where the uranium does not have the composition naturally occurring in the environment. The federal rule provides the below excerpt regarding this issue. The permit calculations will utilize 30 pCi/L as the instream standard instead of 30 micrograms per liter.

“Assuming a conversion factor of 0.9 pCi/ug, an MCL of 30 ug/L will typically correspond to 27 pCi/L, which has a lifetime radiogenic cancer risk of slightly less than one in ten thousand, within the Agency’s target risk range of one in one million to one in ten thousand. EPA is aware that circumstances may exist in which more extreme conversion factors (> 1.5 pCi/ug) apply. EPA does not have extensive data on these ratios at local levels, but believes these higher ratios to be rare. In these rare circumstances, uranium activities in drinking water may exceed 40 pCi/L. Although these concentrations are still within EPA’s target risk ceiling of $1 \cdot 10^4$, EPA recommends that drinking water systems subject to extreme pCi/ug conversion factors mitigate uranium levels to 30 pCi/L or less, to provide greater assurance that adequate protection from cancer health effects is being afforded.” (Federal Register Vol. 65 No. 236 December 7, 2000 page 76715)

Radionuclide loading and reasonable potential calculations were performed to check compliance for the previous permit and to ensure that the effluent limitations have resulted in water that meets all federal and state drinking water requirements. All the tables for these calculations can be found below this paragraph for both of the contributing dischargers in the area: Nuclear Fuel Services and Erwin STP. Facility information including flow rates, maximum concentrations, and permit limits are based on their respective NPDES applications and the permits’ existing limits. When no reliable data is available for actual effluent concentrations, the permit’s limit is used instead as a “worst case scenario” estimation of the actual discharge. These values can be found in Table 1.

Maximum waterbody loads were calculated in Tables 2-5 based on the maximum allowable drinking water standards for each parameter and critical low flow conditions (30Q5), this provides a conservative estimate for the maximum amount of that pollutant the receiving stream will be able to dilute while still being safe for human consumption. While useful to determine allowable discharges, the goal of the NPDES program is to limit discharge of pollutants to levels well below the calculated maximum load. Reasonable calculations for gross alpha particles (Table 2) shows that the stream is only at 0.65% of its maximum capacity. Uranium reasonable potential was calculated based on the weight of natural Uranium discharged (Table 3) and based on the radiation caused by each isotope of Uranium (Table 4). The mass-based calculations converted the amount of Uranium to the amount of radiation it would emit and resulted in a 27.3% of the maximum capacity, while the isotope-based calculations resulted in a 0.60% of the maximum allowed load. The calculations showed no reasonable for the Uranium discharged to impact the stream, considering that the sum of all Uranium discharges accounts for less than a third of the maximum allowance and the fact that the maximum concentration used was the daily maximum limit of 4 mg/L while NFS has maintained a longtime average of around 1 mg/L in their discharge.

Table 5 uses data collected as part of NFS’s bi-annual NRC effluent monitoring report, which can be found [here](#) under Operating; this table lists every radioactive substance in the effluent as well as the amount of radiation emitted by each. The Final Implementation Guidance for Radionuclides was then used to convert the radiation values of beta particle emitters to a fraction of the maximum allowable exposure to beta radiation (4 mrem/yr). The sum of all of these resulted in exposure levels well below that limit (average value was 0.05 mrem/yr).

Table 1: Facility Information

Nuclear Fuel Services (TN0002038)	Average		Maximum	
Alpha - Application Value	129.79	pCi/L	236	pCi/L
Beta - Application Value	360	pCi/L	837	pCi/L
Uranium - 234 - Federal/Division of Rad. Health	300	pCi/L	-	
Uranium - 235 - Federal/Division of Rad. Health	300	pCi/L	-	
Uranium - 238 - Federal/Division of Rad. Health	300	pCi/L	-	
Total Uranium - Permit Limit	2.0	mg/L	4.0	mg/L
Flow Rate - Application Data	0.0139	MGD	0.0155	MGD

Erwin STP (TN0023001)	Value	
Alpha - Pretreatment Limit	300	pCi/L
Beta - Pretreatment Limit	5000	pCi/L
Uranium - 234 - Pretreatment Limit	300	pCi/L
Uranium - 235 - Pretreatment Limit	50	pCi/L
Uranium - 238 - Pretreatment Limit	50	pCi/L
Total Uranium - Pretreatment Limit	300	pCi/L
Flow Rate from NFS - Application Values	0.046	MGD

Table 2: Gross Alpha Particle Reasonable Potential Calculations

Maximum Daily Alpha Load = Max. Allowable Concentration x Critical Daily Flow Rate (30Q5)

$$\begin{aligned}
 &= 15 \frac{pCi}{L} \times 180 \text{ MGD} \times \frac{1,000,000 \text{ Gal/D}}{\text{MGD}} \times \frac{3.785 \text{ L}}{\text{Gal}} \\
 &= 1.022 \times 10^{10} \frac{pCi}{D}
 \end{aligned}$$

Source	Alpha Concentration (pCi/L)	Wastewater Flow (MGD)	Wastewater Flow (L/D)	Daily Alpha Load (pCi/D)	Percentage of Maximum Capacity (%)
NFS	236	0.0155	5.87E+04	1.38E+07	0.14
Erwin STP	300	0.046	1.74E+05	5.22E+07	0.51

Total	0.65
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Table 3: Uranium Reasonable Potential Calculations, Mass Basis

Maximum Daily Uranium Load = Max. Allowable Concentration x Critical Daily Flow Rate (30Q5)

$$= 30 \frac{pCi}{L} \times 180 \text{ MGD} \times \frac{1,000,000 \text{ Gal/D}}{\text{MGD}} \times \frac{3.785 \text{ L}}{\text{Gal}}$$

$$= 2.044 \times 10^{10} \frac{pCi}{D}$$

Source	Uranium Concentration (mg/L)	Uranium Concentration (pCi/L)	Wastewater Flow (MGD)	Wastewater Flow (L/D)	Daily Uranium Load (pCi/D)	Percentage of Maximum Capacity (%)
NFS	4	94000	0.0155	5.87E+04	5.51E+09	27.03
Erwin STP	-	300	0.046	1.74E+05	5.22E+07	0.26

Total	27.29
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Table 4: Uranium Reasonable Potential Calculations, Isotope Basis

Maximum Daily Uranium Load = Max. Allowable Concentration x Critical Daily Flow Rate (30Q5)

$$= 30 \frac{pCi}{L} \times 180 \text{ MGD} \times \frac{1,000,000 \text{ Gal/D}}{\text{MGD}} \times \frac{3.785 \text{ L}}{\text{Gal}}$$

$$= 2.044 \times 10^{10} \frac{pCi}{D}$$

Source	Uranium Concentration (pCi/L)	Wastewater Flow (MGD)	Wastewater Flow (L/D)	Daily Uranium Load (pCi/D)	Percentage of Maximum Capacity (%)
NFS - U234	300	0.0155	5.87E+04	1.76E+07	0.09
NFS - U235	300	0.0155	5.87E+04	1.76E+07	0.09
NFS - U238	300	0.0155	5.87E+04	1.76E+07	0.09
Erwin STP - U234	300	0.046	1.74E+05	5.22E+07	0.26
Erwin STP - U235	50	0.046	1.74E+05	8.71E+06	0.04
Erwin STP - U238	50	0.046	1.74E+05	8.71E+06	0.04

Total	0.60
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**Table 5: Beta Particle Reasonable Potential Calculations, Based on NRC
 Semiannual Reports and Sum of Fractions Method**

Location	Jan 2020 - Jun 2020		Activity Concentration		Conversion to 4 mrem/yr Reference: EPA 816-D-00-002 December 2016 Appendix I (pCi/4mrem)	Fraction of 4 mrem/yr
	Liter	MGD	uCi/mL	pCi/L		
NFS Wastewater to Sewer (TN0023001)						
Pu-238	35,961,000	0.053	0.00E+00	0.000	-	-
Pu-239/240	35,961,000	0.053	0.00E+00	0.000	-	-
Tc-99	35,961,000	0.053	0.00E+00	0.000	900	0
Th-228	35,961,000	0.053	1.77E-11	0.018	-	-
Th-230	35,961,000	0.053	1.49E-11	0.015	-	-
Th-232	35,961,000	0.053	8.73E-12	0.009	-	-
U-232	35,961,000	0.053	0.00E+00	0.000	-	-
U-233/234	35,961,000	0.053	1.69E-08	16.900	-	-
U-235/236	35,961,000	0.053	6.33E-10	0.633	-	-
U-238	35,961,000	0.053	2.18E-09	2.180	-	-
NFS Wastewater Treatment Facility (TN0002038)	Liter	MGD	uCi/mL	pCi/L		
Am-241	4,320,076	0.006	2.21E-11	0.022	-	-
Cs-137	4,320,076	0.006	2.99E-10	0.299	200	0.001495
Na-22	4,320,076	0.006	2.78E-11	0.028	400	0.0000695
Np-237	4,320,076	0.006	0.00E+00	0.000	-	-
Pb-212	4,320,076	0.006	9.24E-10	0.924	-	-
Pu-238	4,320,076	0.006	1.84E-11	0.018	-	-
Pu-239/240	4,320,076	0.006	3.00E-11	0.030	-	-
Pu-241	4,320,076	0.006	0.00E+00	0.000	-	-
Ra-224	4,320,076	0.006	1.13E-08	11.300	-	-
Tc-99	4,320,076	0.006	0.00E+00	0.000	900	0

Th-228	4,320,076	0.006	5.75E-12	0.006	-	-
Th-230	4,320,076	0.006	1.04E-10	0.104	-	-
Th-231	4,320,076	0.006	0.00E+00	0.000	-	-
Th-232	4,320,076	0.006	2.90E-11	0.029	-	-
U-232	4,320,076	0.006	0.00E+00	0.000	-	-
U-233/234	4,320,076	0.006	2.19E-08	21.900	-	-
U-235/236	4,320,076	0.006	8.66E-10	0.866	-	-
U-238	4,320,076	0.006	1.66E-10	0.166	-	-

Sum of Fractions	0.0015645
Total Exposure (4 x Fraction) (mrem/yr)	0.006258

Location	Jul 2019 - Dec 2019				Jan 2019 - Jun 2019				Average Concentration (pCi/L)	Conversion to 4 mrem/yr Reference: EPA 816-D-00-002 December 2016 Appendix I (pCi/4mrem)	Fraction of 4 mrem/yr
	Volume		Activity Concentration		Volume		Activity Concentration				
	Liter	MGD	uCi/mL	pCi/L	Liter	MGD	uCi/mL	pCi/L			
NFS Wastewater to Sewer (TN0023001)											
Pu-238	28,576,600	0.042	0.00E+00	0.000	31,394,000	0.046	0.00E+00	0.000	0.000	-	-
Pu-239/240	28,576,600	0.042	0.00E+00	0.000	31,394,000	0.046	0.00E+00	0.000	0.000	-	-
Tc-99	28,576,600	0.042	0.00E+00	0.000	31,394,000	0.046	0.00E+00	0.000	0.000	900	0
Th-228	28,576,600	0.042	2.69E-11	0.027	31,394,000	0.046	2.24E-11	0.022	0.025	-	-
Th-230	28,576,600	0.042	2.09E-11	0.021	31,394,000	0.046	8.80E-11	0.088	0.054	-	-
Th-232	28,576,600	0.042	2.87E-11	0.029	31,394,000	0.046	3.27E-11	0.033	0.031	-	-
U-232	28,576,600	0.042	4.76E-11	0.048	31,394,000	0.046	5.18E-11	0.052	0.050	-	-
U-233/234	28,576,600	0.042	9.65E-09	9.650	31,394,000	0.046	1.73E-08	17.300	13.475	-	-
U-235/236	28,576,600	0.042	3.57E-10	0.357	31,394,000	0.046	9.76E-10	0.976	0.667	-	-
U-238	28,576,600	0.042	1.45E-09	1.450	31,394,000	0.046	2.35E-09	2.350	1.900	-	-
NFS Wastewater Treatment Facility (TN0002038)											
Am-241	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	1.52E-11	0.015	0.008	-	-
Cs-137	3,304,291	0.005	5.63E-11	0.056	4,149,746	0.006	7.37E-10	0.737	0.397	200	0.00198325
Na-22	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	0.00E+00	0.000	0.000	400	0
Np-237	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	0.00E+00	0.000	0.000	-	-
Pb-212	3,304,291	0.005	1.09E-09	1.090	4,149,746	0.006	0.00E+00	0.000	0.545	-	-
Pu-238	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	3.12E-11	0.031	0.016	-	-
Pu-239/240	3,304,291	0.005	2.30E-11	0.023	4,149,746	0.006	0.00E+00	0.000	0.012	-	-
Pu-241	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	0.00E+00	0.000	0.000	-	-
Ra-224	3,304,291	0.005	1.05E-08	10.500	4,149,746	0.006	1.31E-08	13.100	11.800	-	-
Tc-99	3,304,291	0.005	1.40E-08	14.000	4,149,746	0.006	6.62E-09	6.620	10.310	900	0.011455556

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Th-228	3,304,291	0.005	4.30E-11	0.043	4,149,746	0.006	0.00E+00	0.000	0.022	-	-
Th-230	3,304,291	0.005	4.50E-11	0.045	4,149,746	0.006	7.15E-11	0.072	0.058	-	-
Th-231	3,304,291	0.005	2.78E-09	2.780	4,149,746	0.006	5.31E-09	5.310	4.045	-	-
Th-232	3,304,291	0.005	3.29E-11	0.033	4,149,746	0.006	0.00E+00	0.000	0.016	-	-
U-232	3,304,291	0.005	0.00E+00	0.000	4,149,746	0.006	0.00E+00	0.000	0.000	-	-
U-233/234	3,304,291	0.005	1.55E-08	15.500	4,149,746	0.006	3.37E-08	33.700	24.600	-	-
U-235/236	3,304,291	0.005	7.28E-10	0.728	4,149,746	0.006	1.70E-09	1.700	1.214	-	-
U-238	3,304,291	0.005	1.92E-10	0.192	4,149,746	0.006	4.77E-10	0.477	0.335	-	-

Sum of Fractions	0.013438806
Total Exposure (4 x Fraction) (mrem/yr)	0.053755222

Location	Jul 2018 - Dec 2018				Jan 2018 - Jun 2018				Average Concentration (pCi/L)	Conversion to 4 mrem/yr Reference: EPA 816-D-00-002 December 2016 Appendix I (pCi/4mrem)	Fraction of 4 mrem/yr
	Volume		Activity Concentration		Volume		Activity Concentration				
	Liter	MGD	uCi/mL	pCi/L	Liter	MGD	uCi/mL	pCi/L			
NFS Wastewater to Sewer (TN0023001)											
Pu-238	44,502,000	0.065	0.00E+00	0.000	29,946,000	0.044	7.86E-11	0.079	0.039	-	-
Pu-239/240	44,502,000	0.065	0.00E+00	0.000	29,946,000	0.044	6.86E-12	0.007	0.003	-	-
Tc-99	44,502,000	0.065	0.00E+00	0.000	29,946,000	0.044	7.69E-09	7.690	3.845	900	0.004272222
Th-228	44,502,000	0.065	0.00E+00	0.000	29,946,000	0.044	4.08E-11	0.041	0.020	-	-
Th-230	44,502,000	0.065	2.35E-11	0.024	29,946,000	0.044	1.37E-10	0.137	0.080	-	-
Th-232	44,502,000	0.065	7.58E-11	0.076	29,946,000	0.044	2.08E-11	0.021	0.048	-	-
U-232	44,502,000	0.065	0.00E+00	0.000	29,946,000	0.044	5.92E-11	0.059	0.030	-	-
U-233/234	44,502,000	0.065	1.26E-08	12.600	29,946,000	0.044	1.23E-08	12.300	12.450	-	-
U-235/236	44,502,000	0.065	4.41E-10	0.441	29,946,000	0.044	5.84E-10	0.584	0.513	-	-
U-238	44,502,000	0.065	1.86E-09	1.860	29,946,000	0.044	1.87E-09	1.870	1.865	-	-
NFS Wastewater Treatment Facility (TN0002038)											
Am-241	3,743,014	0.005	2.27E-11	0.023	3,762,141	0.005	2.93E-11	0.029	0.026	-	-
Cs-137	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	2.71E-10	0.271	0.136	200	0.0006775
Na-22	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	1.95E-10	0.195	0.098	400	0.00024375
Np-237	3,743,014	0.005	5.64E-11	0.056	3,762,141	0.005	9.01E-11	0.090	0.073	-	-
Pb-212	3,743,014	0.005	7.97E-10	0.797	3,762,141	0.005	9.36E-10	0.936	0.867	-	-
Pu-238	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	1.62E-11	0.016	0.008	-	-
Pu-239/240	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	2.29E-11	0.023	0.011	-	-
Pu-241	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	3.67E-09	3.670	1.835	-	-

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Ra-224	3,743,014	0.005	1.09E-08	10.900	3,762,141	0.005	9.14E-09	9.140	10.020	-	-
Tc-99	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	1.49E-08	14.900	7.450	900	0.008277778
Th-228	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	1.11E-11	0.011	0.006	-	-
Th-230	3,743,014	0.005	9.40E-11	0.094	3,762,141	0.005	9.15E-11	0.092	0.093	-	-
Th-231	3,743,014	0.005	0.00E+00	0.000	3,762,141	0.005	0.00E+00	0.000	0.000	-	-
Th-232	3,743,014	0.005	2.17E-11	0.022	3,762,141	0.005	2.15E-11	0.022	0.022	-	-
U-232	3,743,014	0.005	4.81E-12	0.005	3,762,141	0.005	1.74E-11	0.017	0.011	-	-
U-233/234	3,743,014	0.005	1.42E-08	14.200	3,762,141	0.005	3.48E-08	34.800	24.500	-	-
U-235/236	3,743,014	0.005	6.71E-10	0.671	3,762,141	0.005	1.77E-09	1.770	1.221	-	-
U-238	3,743,014	0.005	2.29E-10	0.229	3,762,141	0.005	6.68E-10	0.668	0.449	-	-

Sum of Fractions	0.01347125
Total Exposure (4 x Fraction) (mrem/yr)	0.053885

Location	Jul 2017 - Dec 2017				Jan 2017 - Jun 2017				Average Concentration (pCi/L)	Conversion to 4 mrem/yr Reference: EPA 816-D-00-002 December 2016 Appendix I (pCi/4mrem)	Fraction of 4 mrem/yr
	Volume		Activity Concentration		Volume		Activity Concentration				
	Liter	MGD	uCi/mL	pCi/L	Liter	MGD	uCi/mL	pCi/L			
NFS Wastewater to Sewer (TN0023001)											
Pu-238	23,501,679	0.034	2.41E-12	0.002	16,990,351	0.025	0.00E+00	0.000	0.001	-	-
Pu-239/240	23,501,679	0.034	0.00E+00	0.000	16,990,351	0.025	0.00E+00	0.000	0.000	-	-
Tc-99	23,501,679	0.034	5.35E-09	5.350	16,990,351	0.025	1.97E-08	19.700	12.525	900	0.013916667
Th-228	23,501,679	0.034	1.37E-11	0.014	16,990,351	0.025	1.01E-11	0.010	0.012	-	-
Th-230	23,501,679	0.034	1.08E-10	0.108	16,990,351	0.025	1.98E-10	0.198	0.153	-	-
Th-232	23,501,679	0.034	1.55E-11	0.016	16,990,351	0.025	3.43E-11	0.034	0.025	-	-
U-232	23,501,679	0.034	0.00E+00	0.000	16,990,351	0.025	0.00E+00	0.000	0.000	-	-
U-233/234	23,501,679	0.034	6.28E-09	6.280	16,990,351	0.025	1.24E-08	12.400	9.340	-	-
U-235/236	23,501,679	0.034	2.21E-10	0.221	16,990,351	0.025	6.38E-10	0.638	0.430	-	-
U-238	23,501,679	0.034	9.59E-10	0.959	16,990,351	0.025	2.33E-09	2.330	1.645	-	-
NFS Wastewater Treatment Facility (TN0002038)											
Am-241	3,565,706	0.005	1.65E-11	0.017	4,070,343	0.006	0.00E+00	0.000	0.008	-	-
Cs-137	3,565,706	0.005	1.65E-10	0.165	4,070,343	0.006	6.60E-10	0.660	0.413	200	0.0020625
Na-22	3,565,706	0.005	0.00E+00	0.000	4,070,343	0.006	4.20E-10	0.420	0.210	400	0.000525
Np-237	3,565,706	0.005	1.08E-11	0.011	4,070,343	0.006	3.77E-11	0.038	0.024	-	-

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Pb-212	3,565,706	0.005	1.27E-09	1.270	4,070,343	0.006	1.44E-10	0.144	0.707	-	-
Pu-238	3,565,706	0.005	0.00E+00	0.000	4,070,343	0.006	1.21E-11	0.012	0.006	-	-
Pu-239/240	3,565,706	0.005	3.12E-11	0.031	4,070,343	0.006	2.20E-11	0.022	0.027	-	-
Pu-241	3,565,706	0.005	0.00E+00	0.000	4,070,343	0.006	8.27E-10	0.827	0.414	-	-
Ra-224	3,565,706	0.005	7.62E-09	7.620	4,070,343	0.006	1.03E-08	10.300	8.960	-	-
Tc-99	3,565,706	0.005	3.12E-09	3.120	4,070,343	0.006	4.37E-09	4.370	3.745	900	0.004161111
Th-228	3,565,706	0.005	0.00E+00	0.000	4,070,343	0.006	0.00E+00	0.000	0.000	-	-
Th-230	3,565,706	0.005	3.02E-11	0.030	4,070,343	0.006	5.83E-11	0.058	0.044	-	-
Th-231	3,565,706	0.005	6.07E-09	6.070	4,070,343	0.006	0.00E+00	0.000	3.035	-	-
Th-232	3,565,706	0.005	1.87E-12	0.002	4,070,343	0.006	2.66E-11	0.027	0.014	-	-
U-232	3,565,706	0.005	0.00E+00	0.000	4,070,343	0.006	1.87E-12	0.002	0.001	-	-
U-233/234	3,565,706	0.005	1.57E-08	15.700	4,070,343	0.006	8.08E-09	8.080	11.890	-	-
U-235/236	3,565,706	0.005	9.26E-10	0.926	4,070,343	0.006	4.71E-10	0.471	0.699	-	-
U-238	3,565,706	0.005	2.96E-10	0.296	4,070,343	0.006	2.29E-10	0.229	0.263	-	-

Sum of Fractions	0.020665278
Total Exposure (4 x Fraction) (mrem/yr)	0.082661111

Chemical Oxygen Demand (COD)

This Facility operates Fenton's Reaction, which turns hydrogen peroxide into free radicals. This process releases a large amount of product that contributes to COD, because of this continuing potential to discharge COD the limit will continue to apply.

Copper, Chromium, Nickel, Arsenic, Lead, Mercury, Silver, Cadmium, and Zinc

In assessing the stream capacity for various pollutants, the cumulative effect of multiple dischargers in close proximity must be considered in the analysis. The facility discharges to the Nolichucky River at mile 94.6 and the Erwin STP discharges at mile 94.4. The application for the Erwin STP listed several industries as sending process wastewater to the plant. Since the discharges for these two permits are 0.2 miles from each other, the water quality calculations for industrial pollutants (metals, volatiles, acids, base/neutral) in Appendix 2a considers the total effect of both dischargers. It was found that these facilities discharge well below the maximum allowable load for metals and toxics. The only toxic material which reached close to the maximum allocation (around 50%) was Mercury, and this is because a very conservative estimate was used to estimate the amount of Mercury discharged by Erwin STP. Considering these facilities are the two largest dischargers of Mercury, this allocation is protective of water quality.

The possible organic compound that do have a reasonable potential to impact the stream are not found in the effluent and therefore not applicable. The previous permit limits and monitoring requirements for copper, chromium, nickel, arsenic, lead, mercury, silver, cadmium, and zinc will be retained in the new permit.

Fluoride

The applicable water quality criteria for fluoride is the domestic water supply standard of 4 mg/L. The total stream capacity is 6005 lb/day with the NFS loading accounting for less than 1% of the stream loading. The previous permit limits will be retained based on antibacksliding

Total Stream Capacity $180 \text{ MGD} \times 8.34 \times 4 \text{ mg/L} = 6005 \text{ lb/day}$
Nuclear Fuel Services Loading $0.0155 \text{ MGD} \times 8.34 \times 20 \text{ mg/L} = 2.6 \text{ lb/day}$

Tetrachloroethylene (PCE)

The facility has partially shut down the groundwater system which accounted for most of the PCE concentration in the wastewater. The facility will only be required to test and report the concentration for PCE if a groundwater system is activated and discharging through Outfall 001

VIII. BIOMONITORING REQUIREMENTS, ACUTE

The discharge of industrial wastewater from Outfall 001 may contain several different pollutants, the combined effect of which has a reasonable potential to be detrimental to fish and aquatic life. The Tennessee Water Quality Standards criteria stipulates that "*The waters shall not*

contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions...".

Considering that this is a batch discharger with a combination of several different pollutants that can pose a threat to fish and aquatic life, acute biomonitoring shall continue to apply to the effluent from Outfall 001.

IX. ANTIDegradation

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 0400-40-03-.06. It is the purpose of Tennessee's standards to fully protect existing uses of all surface waters as established under the Act.

Stream determinations for this permit action are associated with the waterbody segment identified by the division as segment ID# TN06010108010_5000.

The division has made a water quality assessment of the receiving waters associated with the subject discharge and has found the receiving stream to be neither an exceptional nor outstanding national resource water. Additionally, this water partially supports designated uses due to Mercury, lacking its use for Recreation. This Mercury has been deposited from the atmosphere rather than from a point source. The discharge approved by this permit will not further contribute to the Mercury levels in the receiving stream because, based on DMR forms and the permit application, effluent concentrations of Mercury are well below the permit limit.

X. ELECTRONIC REPORTING

Starting on December 21, 2016, all Individual NPDES Permit holders will be required to submit Discharge Monitoring Reports (DMRs) electronically through NetDMR. Prior to 21 December 2016, the permittee may elect to electronically submit DMRs instead of mailing paper DMRs.

EPA published the National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, which will modernize Clean Water Act reporting for municipalities, industries and other facilities. The rule was published in the Federal Register on October 22, 2015 and became effective on December 22, 2015. The rule replaces most paper-based NPDES reporting requirements with electronic reporting.

More information is available at <http://www.tn.gov/environment/topic/wr-netdmr-and-electronic-reporting>:

- Getting Started on NetDMR,
- Electronic reporting schedule,
- Training Opportunities,
- NetDMR User Guide and other supporting information

XI. PERMIT DURATION

The proposed limitations meet the requirements of Section 301(b)(2)(A), (C), (D), (E), and (F) of the Clean Water Act as amended. It is the intent of the division to organize the future issuance and expiration of this particular permit such that other permits located in the same watershed and group within the State of Tennessee will be set for issuance and expiration at the same time. In order to meet the target reissuance date for the Nolichucky watershed and following the directives for the Watershed Management Program initiated in January 1996, the permit will be issued to expire in 2025.

APPENDIX 1

FACILITY DISCHARGES AND RECEIVING WATERS

FACILITY DISCHARGES AND RECEIVING WATERS																													
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<p>Treatment: Waste segregation, Ammonia Stripping, Chemical Precipitation, Flocculation, Pressure Filtration Dollinger Filter, Neutralization, Fenton Process</p>																													
<p>* Reference: Streamflow -Characteristic Estimation Methods for Unregulated Streams of Tennessee 2009-5159 Station #618</p>																													

APPENDIX 2A

METALS AND TOXICS CONSIDERATIONS

The following procedure is used to calculate the allowable instream concentrations for pass-through guidelines and permit limitations.

- a. The most recent background conditions of the receiving stream segment are compiled. This information includes:
 - * 7Q10 of receiving stream (124.1 MGD, USGS)
 - * Calcium hardness (32 mg/L)
 - * Total suspended solids (14 mg/L)
 - * Background metals concentrations (½ water quality criteria)
 - * Other dischargers impacting this segment (none)
 - * Downstream water supplies, if applicable
- b. The chronic water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel and zinc. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions.
- c. The acute water quality criteria are converted from total recoverable metal at lab conditions to dissolved lab conditions for the following metals: cadmium, copper, trivalent chromium, lead, nickel, zinc and silver. Then translators are used to convert the dissolved lab conditions to total recoverable metal at ambient conditions for the following metals: cadmium, copper, lead, nickel and silver.
- d. The resulting allowable trivalent and hexavalent chromium concentrations are compared with the effluent values characterized as total chromium on permit applications. If reported total chromium exceeds an allowable trivalent or hexavalent chromium value, then the calculated value will be applied in the permit for that form of chromium unless additional effluent characterization is received to demonstrate reasonable potential does not exist to violate the applicable state water quality criteria for chromium.
- e. A standard mass balance equation determines the total allowable concentration (permit limit) for each pollutant. This equation also includes a percent stream allocation of no more than 90%.

The following formulas are used to evaluate water quality protection:

$$C_m = \frac{Q_s C_s + Q_w C_w}{Q_s + Q_w}$$

where:

Cm = resulting in-stream concentration after mixing
Cw = concentration of pollutant in wastewater
Cs = stream background concentration
Qw = wastewater flow
Qs = stream low flow

to protect water quality:

$$C_w \leq \frac{(S_A) [C_m (Q_s + Q_w) - Q_s C_s]}{Q_w}$$

where (S_A) is the percent "Stream Allocation".

Calculations for this permit have been done using a standardized spreadsheet, titled "Water Quality Based Effluent Calculations." Division policy dictates the following procedures in establishing these permit limits:

1. The critical low flow values are determined using USGS data:

Fish and Aquatic Life Protection

7Q10 - Low flow under natural conditions

1Q10 - Regulated low flow conditions

Other than Fish and Aquatic Life Protection

30Q2 - Low flow under natural conditions

2. Fish & Aquatic Life water quality criteria for certain Metals are developed through application of hardness dependent equations. These criteria are combined with dissolved fraction methodologies in order to formulate the final effluent concentrations.
3. For criteria that are hardness dependent, chronic and acute concentrations are based on a Hardness of 25 mg/L and Total Suspended Solids (TSS) of 10 mg/L unless STORET or Water Supply intake data substantiate a different value. Minimum and maximum limits on the hardness value used for water quality calculations are 25 mg/L and 400 mg/L respectively. The minimum limit on the TSS value used for water quality calculations is 10 mg/L.
4. Background concentrations are determined from the division database, results of sampling obtained from the permittee, and/or obtained from nearby stream sampling data. If this background data is not sufficient, one-half of the chronic "In-stream Allowable" water quality criteria for fish and aquatic life is used. If the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, then the measured background concentration is used in lieu of the chronic "In-stream Allowable" water quality criteria for the purpose of calculating the appropriate effluent limitation (C_w). Under these circumstances, and in the event the "stream allocation" is less than 100%, the calculated chronic effluent limitation for fish and aquatic life should be equal to the chronic "In-stream Allowable" water quality criteria. These guidelines should be strictly followed where the

industrial source water is not the receiving stream. Where the industrial source water is the receiving stream, and the measured background concentration is greater than the chronic "In-stream Allowable" water quality criteria, consideration may be given as to the degree to which the permittee should be required to meet the requirements of the water quality criteria in view of the nature and characteristics of the receiving stream.

The spreadsheet has fifteen (15) data columns, all of which may not be applicable to any particular characteristic constituent of the discharge. A description of each column is as follows:

Column 1: The "Stream Background" concentrations of the effluent characteristics.

Column 2: The "Chronic" Fish and Aquatic Life Water Quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Continuous Concentration (CCC) is calculated using the equation:

$$CCC = (\exp \{ m_c [\ln (\text{stream hardness})] + b_c \}) (CCF)$$

CCF = Chronic Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent; no chronic criterion exists for silver. Published criteria are used for non-metal parameters.

Column 3: The "Acute" Fish and Aquatic Life Water Quality criteria. For cadmium, copper, trivalent chromium, lead, nickel, silver, and zinc, this value represents the criteria for the dissolved form at laboratory conditions. The Criteria Maximum Concentration (CMC) is calculated using the equation:

$$CMC = (\exp \{ m_A [\ln (\text{stream hardness})] + b_A \}) (ACF)$$

ACF = Acute Conversion Factor

This equation and the appropriate coefficients for each metal are from Tennessee Rule 0400-40-03-.03 and the EPA guidance contained in *The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From a Dissolved Criterion* (EPA 823-B-96-007, June 1996). Values for other metals are in the total form and are not hardness dependent. Published criteria are used for non-metal parameters.

Column 4: The "Fraction Dissolved" converts the value for dissolved metal at laboratory conditions (columns 2 & 3) to total recoverable metal at in-stream ambient conditions (columns 5 & 6). This factor is calculated using the linear partition coefficients found in *The Metals Translator: Guidance For Calculating A Total*

Recoverable Permit Limit From a Dissolved Criterion (EPA 823-B-96-007, June 1996) and the equation:

$$\frac{C_{\text{diss}}}{C_{\text{total}}} = \frac{1}{1 + \{ [K_{\text{po}}] [\text{ss}^{(1+a)}] [10^{-6}] \}}$$

ss = in-stream suspended solids concentration [mg/L]

Linear partition coefficients for streams are used for unregulated (7Q10) receiving waters, and linear partition coefficients for lakes are used for regulated (1Q10) receiving waters. For those parameters not in the dissolved form in columns 2 & 3 (and all non-metal parameters), a Translator of 1 is used.

- Column 5:** The "Chronic" Fish and Aquatic Life Water Quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 2 by the value in column 4.
- Column 6:** The "Acute" Fish and Aquatic Life Water Quality criteria at in-stream ambient conditions. This criteria is calculated by dividing the value in column 3 by the value in column 4.
- Column 7:** The "Chronic" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the chronic limit.
- Column 8:** The "Acute" Calculated Effluent Concentration for the protection of fish and aquatic life. This is the acute limit.
- Column 9:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Organism Consumption (Recreation).
- Column 10:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Water and Organism Consumption. These criteria are only to be applied when the stream use classification for the receiving stream includes both "Recreation" and "Domestic Water Supply."
- Column 11:** The In-Stream Water Quality criteria for the protection of Human Health associated with the stream use classification of Domestic Water Supply.
- Column 12:** The Calculated Effluent Concentration associated with Organism Consumption.
- Column 13:** The Calculated Effluent Concentration associated with Water and Organism Consumption.
- Column 14:** The Calculated Effluent Concentration associated with Domestic Water Supply.

The calculated chronic water quality effluent concentrations from Column 7 should be compared, individually, to the values calculated in Columns 12, 13, and 14 in order to determine the most stringent chronic permit limitations. The calculated acute water quality effluent concentrations from Column 8 should then be compared, individually, to values equal to two (2) times the values presented in Columns 12, 13, and 14 in order to determine the most stringent acute permit limitations. These water quality based limits should then be compared to any technology based (CFR or Tennessee "Rules") effluent limitations, and/or any previous permit limitations, for final determination of the permit limits.

WATER QUALITY CALCULATIONS FOR METALS AND OTHER TOXIC SUBSTANCES
WATER QUALITY BASED EFFLUENT CALCULATIONS
OUTFALL 001

FACILITY: Nuclear Fuel Services **PERMIT #:** TN0002038

Stream (7Q10)	Stream (30Q5)	Waste Flow	Ttl. Susp. Solids	Hardness (as CaCO3)	Margin of Safety
[MGD]	[MGD]	[MGD]	[mg/l]	[mg/l]	[%]
124.100	180.000	100.000	14	32	50

PARAMETER	1	2		3	4	5		6		7		8		9			10			11			12			13			14			PARAMETER
	Stream Bckgmd. Conc.	Fish/Aqua. Life (F & AL) WQC lab conditions		Chronic	Acute	Fraction Dissolved	F & AL- instream allowable ambient conditions (Tot)		Chronic	Acute	Calc. Effluent Concentration based on F & AL		In-Stream Criteria		Human Health Water Quality Criteria *			Calc. Effluent Concentration **			In-Stream Criteria			Calc. Effluent Concentration **								
	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[Fraction]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS	Organisms	Water/Organisms	DWS					
													[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]	[ug/l]				
Copper (a,b)	5.152	3.383	4.593	0.328	10.303	13.991	8.35	12.48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Copper (a,b)			
Chromium III	73.418	29.149	224.085	0.199	146.836	1128.822	118.97	1219.29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chromium III				
Chromium VI	5.500	11.000	16.000	1.000	11.000	16.000	8.91	14.52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chromium VI				
Chromium, Total	78.918	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Chromium, Total				
Nickel (a,b)	24.957	19.834	178.575	0.397	49.914	449.392	40.44	488.06	4600.0	610.0	100.0	6417.54	831.54	117.54	Nickel (a,b)																	
Cadmium (a,b)	0.213	0.305	0.620	0.261	1.168	2.375	1.18	2.53	N/A	N/A	5.0	N/A	N/A	6.81	Cadmium (a,b)																	
Lead (a,b)	2.051	0.714	18.319	0.174	4.102	105.275	3.32	116.69	N/A	N/A	5.0	N/A	N/A	5.15	Lead (a,b)																	
Mercury (T) (c)	0.020	0.770	1.400	1.000	0.770	1.400	0.85	1.56	0.051	0.05	2.0	0.05	0.05	2.78	Mercury (T) (c)																	
Silver (a,b,e)	0.227	N/A	0.453	1.000	N/A	0.453	N/A	0.37	N/A	N/A	N/A	N/A	N/A	N/A	Silver (a,b,e)																	
Zinc (a,b)	83.937	44.989	44.624	0.268	167.874	166.512	136.02	134.49	26000.0	7400.0	N/A	36324.46	10284.46	N/A	Zinc (a,b)																	
Cyanide (d)	2.600	5.200	22.000	1.000	5.200	22.000	4.21	23.04	140.0	140.0	200.0	193.66	193.66	277.66	Cyanide (d)																	
Chlorine (T. Res.)	5.500	11.000	19.000	1.000	11.000	19.000	17.83	35.75	N/A	N/A	N/A	N/A	N/A	N/A	Chlorine (T. Res.)																	

- a Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness.
- b The criteria for this metal is in the dissolved form at lab conditions. The calculated effluent concentration is in the total recoverable form.
- c The chronic criteria for mercury is not converted to dissolved, since it is based on fish tissue data rather than toxicity.
- d The criteria for this parameter is in the total form.
- e Silver limit is daily max if column 8 is most stringent.
- f When columns 7 or 8 result in a negative number, use results from columns 5 or 6, respectively.
- g When columns 12, 13 or 14 result in a negative number, use results from columns 9, 10 or 11, respectively, as applicable.

* Domestic supply included in river use so pick from columns 7,8,12,13,14,15 or Domestic supply not included in river use so pick from columns 7, 8, 12 or 15.
 ** Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 30Q5 flow.

The maximum instream effluent mass were calculated using Fish & Aquatic Life criteria and the instream flow before any flow contributions from dischargers. The mass loads for these metals discharged by NFS and Erwin STP were calculated based on the values in the application and compared to these maximum loading rates. 100% of the MDL was used if the values are below detection, this provides a very conservative estimate for the total mass loading.

EFFLUENT CHARACTERISTIC	Nolichucky Water Quality Limitations			
	Maximum Instream Effluent Conc.		Maximum Instream Effluent Mass	
	Chronic ug/l	Acute ug/l	Chronic lb/day	Acute lb/day
Cadmium *	0.427	2.546	0.483	2.883
Copper *	10.303	13.991	11.665	15.840
Lead *	4.102	5.000	4.645	5.661
Nickel *	49.914	100.000	56.510	113.216
Silver *	0.000	0.453	NA	0.513
Zinc *	167.874	166.512	190.060	188.518
Mercury, (T) **	0.050	0.050	0.057	0.057
Chromium III	100.000	100.000	113.216	113.216
Chromium VI	11.000	16.000	12.454	18.114
Cyanide (T) **	5.200	22.000	5.887	24.907
Antimony	5.600	5.600	6.340	6.340
Arsenic	10.000	10.000	11.322	11.322
Beryllium	4.000	4.000	4.529	4.529
Selenium	5.000	20.000	5.661	22.643
Thallium	0.240	0.240	0.272	0.272

	NFS Daily Mass Discharge				Erwin STP Daily Mass Discharge		Total Daily Mass Discharge		Percentage of Max. Chronic Allocation (%)	Percentage of Max. Acute Allocation (%)
	Average (g/day)	Daily Max. (g/day)	Average (lb/day)	Daily Max. (lb/day)	Average (lb/day)	Daily Max. (lb/day)	Average (lb/day)	Daily Max. (lb/day)		
Cadmium	0.0636	0.0871	0.00014	0.000192	0.012	0.012	0.01214	0.012192	2.51	0.42
Copper	0.1948	0.7655	0.000429	0.001688	0.34	0.461	0.340429	0.462688	2.92	2.92
Lead	0.0613	0.1451	0.000135	0.00032	0.013	0.013	0.013135	0.01332	0.28	0.24
Nickel	0.2232	0.5355	0.000492	0.001181	0.017	0.013	0.017492	0.014181	0.03	0.01
Silver	0.0752	0.0871	0.000166	0.000192	0.013	0.013	0.013166	0.013192	-	2.57
Zinc	0.704	0.867	0.001552	0.001911	0.49	0.63	0.491552	0.631911	0.26	0.34
Mercury	0.0062	0.0062	1.37E-05	1.37E-05	0.03	0.03	0.030014	0.030014	52.66	52.66
Chromium	0.4725	0.7914	0.001042	0.001745	0.012	0.012	0.013042	0.013745	0.01	0.01
Cyanide	0.434	0.741	0.000957	0.001634	0.14	0.18	0.140957	0.181634	2.39	0.73
Antimony	0.158	0.492	0.000348	0.001085	0.025	0.025	0.025348	0.026085	0.40	0.41
Arsenic	0.158	0.492	0.000348	0.001085	0.012	0.012	0.012348	0.013085	0.11	0.12
Beryllium	0.419	0.5276	0.000924	0.001163	0.012	0.012	0.012924	0.013163	0.29	0.29
Selenium	0.317	0.525	0.000699	0.001157	0.025	0.025	0.025699	0.026157	0.45	0.12
Thallium	0.095	0.158	0.000209	0.000348	0.012	0.012	0.012209	0.012348	4.49	4.54

PENTACHLOROPHENOL	0.0	10.0	5.0	15	19	60055.9	76070.8	30.0	2.7	1.0	174208.5	15678.8	5807.0
PHENOL	0.0	10.0	*					1700000	21000.0		9871817741.9	121945983.9	
2,4,6-TRICHLOROPHENOL	0.0	10.0	2.7					24.0	14.0		193366.8	81297.3	
ACENAPHTHENE	0.0	10.0	*					990.0	670.0		5748882.1	3890557.6	
ACENAPHTHYLENE	0.0	10.0	2.3										
ANTHRACENE	0.0	10.0	0.7					40000	8300.0		232278064.5	48197698.4	
BENZIDINE	0.0	50.0	*					0.0020	0.0009		11.614	5.0	
BENZO(A)ANTHRACENE	0.0	10.0	0.3					0.18	0.038		1045.3	220.7	
BENZO(A)PYRENE	0.0	10.0	0.3					0.18	0.038	0.2	1045.3	220.7	1161.4
3,4 BENZO-FLUORANTHENE	0.0	10.0	0.3					0.18	0.038		1045.3	220.7	
BENZO(GH)PERYLENE	0.0	10.0	*										
BENZO(K)FLUORANTHENE	0.0	10.0	0.3					0.18	0.038		1045.3	220.7	
BIS (2-CHLOROETHOXY) METHANE	0.0	10.0	*										
BIS (2-CHLOROETHYL)-ETHER	0.0	10.0	1.0					5.3	0.30		30776.8	1742.1	
BIS (2-CHLOROISO-PROPYL) ETHER	0.0	10.0	*					65000	1400.0		377451854.8	8129732.3	
BIS (2-ETHYLHEXYL) PHTHALATE	0.0	10.0	2.5					22.0	12.0	6.0	127752.9	69683.4	34841.7
4-BROMOPHENYL PHENYL ETHER	0.0	10.0	*										
BUTYL BENZYL PHTHALATE	0.0	10.0	*					1900.0	1500.0		11033208.1	8710427.4	
2-CHLORONAPHTHALENE	0.0	10.0	*					1600.0	1000.0		9291122.6	5806951.6	
4-CHLORPHENYL PHENYL ETHER	0.0	10.0	*										
CHRYSENE	0.0	10.0	2.5					0.18	0.038		1045.3	220.7	
DI-N-BUTYL PHTHALATE	0.0	10.0	2.5					4500.0	2000.0		26131282.3	11613903.2	
DI-N-OCTYL PHTHALATE	0.0	10.0	*										
DIBENZO(A,H) ANTHRACENE	0.0	10.0	*					0.18	0.038		1045.3	220.7	
1,2-DICHLOROBENZENE	0.0	1.0	2.0					1300.0	420.0		7549037.1	2438919.7	
1,3-DICHLOROBENZENE	0.0	5.0	2.0					960.0	320.0		5574673.5	1858224.5	
1,4-DICHLOROBENZENE	0.0	5.0	2.0					190.0	63.0		1103320.8	365838.0	
3,3-DICHLOROBENZIDINE	0.0	10.0	*					0.28	0.2		1625.9	1219.5	
DIETHYL PHTHALATE	0.0	10.0	1.9					44000	17000.0		255505871.0	98718177.4	
DIMETHYL PHTHALATE	0.0	10.0	1.6					1100000	270000.0		6387846774.2	1567876935.5	
2,4-DINITROTOLUENE	0.0	10.0	1.0					34.0	1.1		197436.4	6387.6	
2,6-DINITROTOLUENE	0.0	10.0	*										
1,2 DIPHENYLHYDRAZINE	0.0	10.0	*					2.0	0.4		11613.9	2090.5	
FLUORANTHENE	0.0	10.0	2.2					140.0	130.0		812973.2	754903.7	
FLUORENE	0.0	10.0	0.3					5300.0	1100.0		30776843.5	6387646.8	
HEXACHLOROBENZENE	0.0	10.0	1.9					0.0029	0.0028	1.0	16.840	16.3	5807.0
HEXACHLOROBUTADIENE	0.0	10.0	5.0					180.0	4.4		1045251.3	25550.6	
HEXACHLOROCYCLO-PENTADIENE	0.0	10.0	*					1100.0	40.0	50.0	6387646.8	232278.1	290347.6
HEXACHLOROETHANE	0.0	10.0	0.5					33.0	14.0		191629.4	81297.3	
INDENO(1,2,3-CD)PYRENE	0.0	10.0	*					0.18	0.038		1045.3	220.7	
ISOPHORONE	0.0	10.0	*					9600	350.0		55746735.5	2032433.1	
NAPHTHALENE	0.0	10.0	*										
NITROBENZENE	0.0	10.0	10.0					690.0	17.0		4006796.6	98718.2	
N-NITROSODI-N-PROPYLAMINE	0.0	10.0	*					5.1	0.050		29615.5	290.3	
N-NITROSODI- METHYLAMINE	0.0	10.0	*					30.0	0.0089		174208.5	40.1	
N-NITROSODI-PHENYLAMINE	0.0	10.0	*					60.0	33.0		348417.1	191629.4	
PHENANTHRENE	0.0	10.0	0.7										
PYRENE	0.0	10.0	0.3					4000.0	830.0		23227806.5	4819769.8	
1,2,4-TRICHLOROBENZENE	0.0		*					70.0	35.0	70.0	406486.6	203243.3	406486.6

- Columns 7-8, and 12-14 are the effluent concentrations allowable to prevent exceedence of water quality criteria.
- Potential to exceed criteria exists if the measured quantity in column 15 exceeds, or could exceed, the calculated allowable concentrations in columns 7-8, and 12-14.
- Additional testing is required if the detection level used in the scan is higher than the state RDL and/or the MDL of the approved EPA scan method and industry is known to have that pollutant.
- All background concentrations for these volatile organic, acid-extractable, and base-neutral compounds are assumed zero in the absence of supporting monitoring data.
- Other metals for which data were provided on the application are evaluated on the Metals & Toxics spreadsheet.
- The downstream hardness was calculated based on an application effluent hardness of 133 mg/L and an upstream hardness of 66 mg/L.
- Reasonable potential does not exist for the following reason(s):
 The required MDL has been used and resulted in non-detection (BDL) or the contributing industrial processes are NOT likely to contain them.

APPENDIX 3

PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

Outfall 001, Effluent Gross, All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00340	Oxygen demand, chem. (high level) (COD)	<=	370	mg/L	Grab	Monthly	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Once Per Batch	Daily Minimum
00400	pH	<=	9.0	SU	Grab	Once Per Batch	Maximum
00530	Total Suspended Solids (TSS)	<=	40	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00545	Settleable Solids	<=	0.5	mL/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	30	mg/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	20	mg/L	Grab	Once Per Batch	Monthly Average
00630	Nitrite plus Nitrate (as N)	<=	420	lb/d	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01027	Cadmium, total (as Cd)	<=	0.01	mg/L	Grab	Monthly	Daily Maximum
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01042	Copper, total (as Cu)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
01051	Lead, total (as Pb)	<=	0.1	mg/L	Grab	Monthly	Daily Maximum
01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01077	Silver, total (as Ag)	<=	0.05	mg/L	Grab	Monthly	Daily Maximum
22708	Uranium, natural, total	<=	4.0	mg/L	Grab	Once Per Batch	Daily Maximum
22708	Uranium, natural, total	<=	2.0	mg/L	Grab	Once Per Batch	Monthly Average
34475	Tetrachloroethylene	Report	-	mg/L	Grab	Quarterly	Daily Maximum

50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Daily Maximum
50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Monthly Average
50060	Chlorine, total residual (TRC)	<=	2.0	mg/L	Grab	Once Per Batch	Daily Maximum
70295	Total Dissolved Solids (TDS)	Report	-	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.05	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.00037	mg/L	Grab	Once Per Batch	Monthly Average
TAA3B	LC50 Static 48Hr Acute Ceriodaphnia	Report	-	%	Grab	Annual	Minimum
TAA6C	LC50 Static 48Hr Acute Pimephales promelas	Report	-	%	Grab	Annual	Minimum

- 1) Flow shall be reported in Million Gallons per Batch.
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The chronic mercury limit shall apply only if the discharge of batches containing mercury occur four (4) or more consecutive days/week during the monitoring period; otherwise, only the daily maximum limit for batches containing mercury shall apply. If any individual analytical test result for mercury is less than the minimum quantification level (0.0002 mg/L), then a value of zero (0) may be used for DMR calculations and reporting requirements.
- (4) The total residual chlorine limit is only applicable when chlorine is used in the treatment process.
- (5) Tetrachloroethylene (PCE) is only required to be sampled when a groundwater treatment system that contains PCE is discharging through Outfall 001.

APPENDIX 4

HISTORICAL MONITORING AND INSPECTION

Outfall 001

	Arsenic, total [as As], Effluent Gross	Cadmium, total [as Cd], Effluent Gross	Chlorine, total residual, Effluent Gross	Chromium, total [as Cr], Effluent Gross	Copper, total [as Cu], Effluent Gross	Flow, in conduit or thru treatment plant, Effluent Gross		Fluoride, total [as F], Effluent Gross	
	Daily max. (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)	Monthly or total (MGD)	Weekly or daily (MGD)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)
10/31/2020		< .0003	Not Required		< .0003	0.013558	0.014769	< 1	< 1
09/30/2020	< .01	< .0015	Not Required	< .015	< .0003	0.01393	0.01491	< 1.4	< 5
08/31/2020		< .0003	Not Required		0.000541	0.013839	0.014733	< 1	< 1
07/31/2020		< .0015	Not Required		< .0015	0.013899	0.014698	< 1.7	< 5
06/30/2020	< .01	< .0003	Not Required	< .003	0.000509	0.014144	0.01491	< 1	< 1
05/31/2020		< .0015	Not Required		< .0015	0.014268	0.01505	< 1	< 1
04/30/2020		< .0003	Not Required		0.00584	0.014008	0.01491	< 1	< 1
03/31/2020	< .002	< .0015	Not Required	< .003	0.00998	0.014082	0.015192	< 1	< 5
02/29/2020		< .0003	Not Required		0.00911	0.014118	0.01491	< 1	< 5
01/31/2020		< .0003	Not Required		< .0003	0.013902	0.01491	< 1	< 1
12/31/2019	< .01	< .0015	Not Required	< .015	0.00448	0.013648	0.014275	< 1	< 1
11/30/2019		< .0015	Not Required		< .0015	0.014046	0.015333	< 1	< 1
10/31/2019		< .0015	Not Required		0.00264	0.013706	0.014627	< 1	< 1
09/30/2019	< .01	< .0015	Not Required	< .015	< .0015	0.013617	0.014698	< 1	1.02
08/31/2019		< .0015	Not Required		0.000428	0.013803	0.014839	< 1	< 1
07/31/2019		< .0015	Not Required		< .0015	0.014393	0.015403	< 1	< 1
06/30/2019	< .002	< .0003	Not Required	< .003	0.00785	0.01405	0.01491	< 1	< 1
05/31/2019		< .0015	Not Required		0.0146	0.01389	0.014627	< 1	< 1
04/30/2019		< .0003	Not Required		< .0003	0.014145	0.01505	< 1	< 1
03/31/2019	< .01	< .0015	Not Required	< .003	0.00838	0.013872	0.014769	< 1	< 1
02/28/2019		< .0015	Not Required		< .0003	0.013723	0.01505	< 1	1.28
01/31/2019		< .0003	Not Required		< .0003	0.01361	0.014487	< 1	< 1
12/31/2018	< .01	< .0015	Not Required	< .003	< .0015	0.013605	0.014769	< 1	< 1
11/30/2018		< .0003	Not Required		0.0076	0.013605	0.014416	< 1	< 1
10/31/2018		< .0003	Not Required		0.00661	0.013598	0.014557	< 1	< 5
09/30/2018	< .002	< .0015	Not Required	< .003	< .0015	0.013697	0.014698	< 1.5	< 5
08/31/2018		< .0015	Not Required		< .0015	0.013608	0.014557	< 1	< 1
07/31/2018		< .0003	Not Required		< .0003	0.013037	0.014134	< 1.4	< 5
06/30/2018	< .01	< .0003	Not Required	< .015	0.00396	0.013228	0.014346	< 1	1
05/31/2018		< .0003	Not Required		0.00849	0.01373	0.014557	< 1.3	< 5
04/30/2018		< .0015	Not Required		< .0015	0.013605	0.014275	< 1	< 1

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03/31/2018	< .002	< .0015	Not Required	< .003	0.0015	0.013262	0.013993	< 1	< 1
02/28/2018		< .0003	Not Required		0.00339	0.013548	0.014346	< 1	< 1
01/31/2018		< .0003	Not Required		0.00592	0.013238	0.014134	< 1.3	< 5
12/31/2017	0.00755	< .0003	Not Required	< .003	0.00522	0.013045	0.014204	< 1	< 1
11/30/2017		< .0003	Not Required		0.0128	0.012982	0.013923	< 1	< 3.944
10/31/2017		< .0003	Not Required		0.0118	0.013388	0.01431	< 2	< 5
09/30/2017	< .002	< .0015	Not Required	< .003	0.00164	0.013356	0.014204	< 2.3	< 5
08/31/2017		< .0015	Not Required		< .0015	0.013081	0.014416	< 1.3	< 5
07/31/2017		< .0003	Not Required		0.0081	0.013929	0.015107	< 2.3	< 5
06/30/2017	0.00204	< .0003	Not Required	< .0003	0.00491	0.013874	0.014627	< 1.31	< 5
05/31/2017		< .0015	Not Required		< .0015	0.013489	0.014487	< 1.7	< 5
04/30/2017		< .0003	Not Required		0.00976	0.013686	0.014557	< 1	< 1
03/31/2017	< .0017	< .0003	Not Required	< .003	0.00388	0.013575	0.014487	< 1	< 1
02/28/2017		< .0003	Not Required		0.000671	0.013394	0.014134	< 1	< 1
01/31/2017		< .0003	Not Required		0.00808	0.013602	0.014557	< 1	< 1
12/31/2016	< .0085	< .0006	Not Required	< .003	0.000371	0.014234	0.014487	< 1	< 1
11/30/2016		< .0003	Not Required		0.00465	0.013689	0.014451	< 1	< 1
10/31/2016		< .0015	Not Required		< .00175	0.014279	0.01491	< 1	1
09/30/2016	< .0017	< .0003	Not Required	< .002	0.0138	0.014119	0.015015	< 2.1	< 5
08/31/2016		< .00011	Not Required		0.00871	0.014153	0.014769	< 2.2	< 5
07/31/2016		< .00011	Not Required		0.00502	0.014446	0.014698	< 1.6	< 5
06/30/2016	BDL	BDL	Not Required	BDL	0.00157	0.014198	0.01498	BDL	BDL
05/31/2016		BDL	Not Required		0.00596	0.014147	0.014769	BDL	4
04/30/2016		BDL	Not Required		BDL	0.014162	0.014733	BDL	BDL
Std. dev.	0.004	-	-	-	0.004	0.000	0.000	-	-
Min:	0.00204	-	-	-	0.000371	0.012982	0.013923	0	1
Max:	0.00755	-	-	-	0.0146	0.014446	0.015403	0	4
Count:	18	55	55	18	55	55	55	55	55
Average:	0.005	-	-	-	0.006	0.014	0.015	-	1.660
Permit limit:	-	0.01	2.0	-	1.0	-	-	15	20
Ratio of long term average to limit	-	-	-	-	0.005964857	-	-	-	0.083

	LC50 Static 48Hr Acute Ceriodaphnia, Effluent Gross	LC50 Static 48Hr Acute Pimephales, Effluent Gross	Lead, total [as Pb], Effluent Gross	Mercury, total [as Hg], Effluent Gross		Nickel, total [as Ni], Effluent Gross	Nitrite + Nitrate total [as N], Effluent Gross	Nitrogen, ammonia total [as N], Effluent Gross	
	Monthly average or min. (%)	Monthly average or min. (%)	Daily max. (mg/L)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)	Weekly or daily (lb/d)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)
10/31/2020			< .0005	Not Required	0.000279		58.86	10.54	15
09/30/2020			< .0005	Not Required	< .000293	< .003	60.36	13.4	24
08/31/2020			< .0005	Not Required	0.000274		82.43	12.31	25
07/31/2020			< .0025	Not Required	0.00017		52.19	13.6	22
06/30/2020			< .0005	Not Required	0.000287	0.0221	82.2	15.45	24
05/31/2020			< .0005	Not Required	0.000508		72.58	9.94	18
04/30/2020			< .0005	Not Required	0.000495		58.58	11.75	18
03/31/2020			< .0005	Not Required	0.000194	0.00223	87.16	10.3	19
02/29/2020			< .0005	Not Required	0.000096		95.4	6.2	14
01/31/2020			< .0005	Not Required	0.000085		59.82	9.3	19
12/31/2019	25	69.49	< .0025	Not Required	0.000074	< .003	68.55	10.3	15
11/30/2019			< .0025	Not Required	< .00007		91.46	11.6	16
10/31/2019			< .0025	Not Required	< .000065		72.11	13.38	20
09/30/2019			< .0025	Not Required	< .000065	< .003	85.08	13.67	25
08/31/2019			< .0005	Not Required	0.000065		88.44	11.23	19
07/31/2019			< .0005	Not Required	< .000065		100.41	14.6	21
06/30/2019			< .0005	Not Required	0.00009	0.000765	93.66	12.08	17
05/31/2019			< .0005	Not Required	0.00011		62.32	13.58	22
04/30/2019			< .0005	Not Required	< .000065		99.02	13.46	19
03/31/2019			< .0005	Not Required	0.000069	0.0103	85.66	10	17
02/28/2019			< .0005	Not Required	0.00012		99.57	7.8	14
01/31/2019			< .0005	Not Required	0.0001		70.02	9.1	16
12/31/2018	35.41	69.34	< .0025	Not Required	0.00011	0.0101	88.43	12.1	23
11/30/2018			< .0005	Not Required	0.00008		123.98	11	18
10/31/2018			< .0005	Not Required	0.00021		91.84	13.13	25
09/30/2018			< .0005	Not Required	0.00238	0.00388	53.25	15.45	23
08/31/2018			< .0005	Not Required	0.0004		98.54	8.47	18
07/31/2018			< .0005	Not Required	0.00014		68.28	13.2	23
06/30/2018			< .0005	Not Required	0.00035	0.0155	67.57	9.23	18
05/31/2018			< .0005	Not Required	0.0005		63.67	11.69	20
04/30/2018			< .0025	Not Required	0.0002		76.79	14.5	24
03/31/2018			< .0025	Not Required	0.00015	0.00686	62.64	12.3	23
02/28/2018			< .0005	Not Required	0.00014		71.98	6.6	11
01/31/2018			< .0005	Not Required	0.00014		58.95	10.2	19
12/31/2017	20.56	69.23	< .0005	Not Required	0.0002	0.0124	59.14	11.2	19

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11/30/2017			< .0005	Not Required	0.00025		75.12	10.77	17
10/31/2017			< .0025	Not Required	0.0002		51.71	13.92	22
09/30/2017			< .0025	Not Required	0.00037	0.0208	79.15	12.5	23
08/31/2017			< .0025	Not Required	0.0002		122.19	7.6	14
07/31/2017			< .0005	Not Required	0.00016		119.79	13	21
06/30/2017			< .0005	Not Required	0.00021	0.0125	108.31	12.31	17
05/31/2017			< .0005	Not Required	0.00013		110.16	14.07	22
04/30/2017			< .0005	Not Required	0.00038		67.94	11.73	19
03/31/2017			< .0005	Not Required	0.00019	0.0105	116.88	8.4	19
02/28/2017			< .0005	Not Required	0.00024		77.57	10	22
01/31/2017			< .0005	Not Required	0.00032		84.44	12.2	19
12/31/2016	35.4	-	< .0005	Not Required	0.00017	0.00266	63.81	12.7	20
11/30/2016			< .0005	Not Required	0.00025		137.44	11.25	24
10/31/2016			< .0005	Not Required	0.00018		107.54	15.44	23
09/30/2016			< .0005	Not Required	0.00014	0.0176	77.61	13.1	24
08/31/2016			< .0025	Not Required	0.00014		24.57	4.31	14
07/31/2016			< .0005	Not Required	< .0001		2.99	< 2	2
06/30/2016			BDL	Not Required	0.0009	0.0145	14.68	BDL	8
05/31/2016			BDL	Not Required	0.00019		103.78	6.64	25
04/30/2016			BDL	Not Required	0.00018		96.2	12.7	21
Std. dev.	7.511	0.131	-	-	0.000	0.007	25.774	2.495	4.444
Min:	20.56	69.23	-	-	0.000065	0.000765	2.99	4.31	2
Max:	35.41	69.49	-	-	0.00238	0.0221	137.44	15.45	25
Count:	4	4	55	55	55	18	55	55	55
Average:	29.093	69.353	-	-	0.000	0.011	79.142	11.421	19.255
Permit limit:	-	-	0.1	0.00037	0.05	-	120	20	30
Ratio of long term average to limit	-	-	-	-	0.00534	-	0.659518182	0.57103774	0.641818182

	pH, Effluent Gross		Silver, total [as Ag], Effluent Gross	Solids, settleable, Effluent Gross	Solids, total dissolved, Effluent Gross	Solids, total suspended, Effluent Gross		Tetrachloroethylene, Effluent Gross
	Monthly average or min. (SU)	Daily max. (SU)	Daily max. (mg/L)	Daily max. (mL/L)	Daily max. (mg/L)	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)
10/31/2020	6.66	8.31	< .0003	< .1	9586.9	< 10	16	
09/30/2020	6.91	8.29	< .0015	< .1	9074	9.7	16	< .000333
08/31/2020	7.35	8.3	< .0003	< .1	9007	12.08	18	
07/31/2020	6.62	8.24	< .0015	< .1	9924	10.67	18	
06/30/2020	7.01	8.21	< .0003	< .1	11631.8	12.73	18	< .000333
05/31/2020	6.83	8.7	< .0015	< .1	10502.5	12.69	22	
04/30/2020	6.88	8.44	< .0003	< .1	11888	11.83	18	
03/31/2020	7.19	8.3	< .0015	< .1	9949.7	< 9.2	17	< .000333
02/29/2020	7.16	8.53	< .0003	< .1	8906.1	8.15	10	
01/31/2020	7.02	8.49	< .0003	< .1	12321	9.57	18	
12/31/2019	6.86	8.58	< .0015	< .1	11812.8	12.22	17	< .000333
11/30/2019	7.01	8.56	< .0015	< .1	12813	13.2	20	
10/31/2019	6.95	8.06	< .0015	< .1	12278.8	12.38	30	
09/30/2019	7.29	8.12	< .0015	< .1	12091	10.11	15	< .000333
08/31/2019	6.97	8.14	< .0015	< .1	9910	10.31	14	
07/31/2019	7.08	8.19	< .0015	< .1	9641	10.11	15	
06/30/2019	6.83	8.95	< .0003	< .1	10817.3	9.85	20	< .000333
05/31/2019	7.59	8.36	< .0015	< .1	10677.9	10.33	16	
04/30/2019	7.47	8.69	< .0003	< .1	10754	9.46	15	
03/31/2019	7.18	8.43	< .0015	< .1	10117.5	12.79	28	< .000333
02/28/2019	7.62	8.62	< .0015	< .1	8921.1	13.08	18	
01/31/2019	7.02	8.86	< .0003	< .1	9371	11.29	18	
12/31/2018	7.15	8.3	< .0015	< .1	12412.2	10.89	18	< .000333
11/30/2018	7.12	8.51	< .0003	< .1	12655	12.67	18	
10/31/2018	7.26	8.54	< .0003	< .1	11910.3	10.4	16	
09/30/2018	7.13	8.43	< .0015	< .1	12275	14.09	20	< .000333
08/31/2018	6.99	8.32	< .0015	< .1	10948	11.88	18	
07/31/2018	6.61	8.04	< .0003	< .1	10174	9.78	14	
06/30/2018	7.09	8.38	< .0003	< .1	12927.3	14.15	19	< .000333
05/31/2018	7.41	8.4	< .0003	< .1	14920.8	13.38	20	
04/30/2018	7.31	8.27	0.0015	< .1	13571	14.08	26	
03/31/2018	6.71	8.2	< .0015	< .1	11700.5	11.09	24	< .000333
02/28/2018	6.77	8.41	< .0003	< .1	10317	10.27	14	
01/31/2018	6.98	8.38	< .0003	< .1	11783	11.93	20	
12/31/2017	7.32	8.3	< .0003	< .1	10323.3	10.11	16	< .000333
11/30/2017	7.27	8.45	< .0003	< .1	11835	10.15	16	

10/31/2017	6.76	8.36	< .0003	< .1	13988.5	10.15	19	
09/30/2017	7.53	8.2	< .0015	< .1	11638	9.42	16	< .0003
08/31/2017	7.47	8.25	< .0015	< .1	10711	9.2	16	
07/31/2017	7.13	8.25	< .0003	< .1	13404	< 10	22	
06/30/2017	6.85	8.19	< .0003	< .1	9752.8	< 9.94	16	< .000333
05/31/2017	7.3	8.79	< .0015	< .1	11093.6	9.71	18	
04/30/2017	7.11	8.75	< .0004	< .1	11501	8.18	10	
03/31/2017	6.8	8.77	< .0004	< .1	10701.1	9.5	17	< .000333
02/28/2017	7.04	8.74	< .0004	< .1	8726.3	8.83	12	
01/31/2017	7.24	8.53	< .0004	< .1	11745	10.75	19	
12/31/2016	7.27	8.58	< .0008	< .1	9860.8	9.33	14	< .000333
11/30/2016	7.42	8.26	< .0004	< .1	12953.1	10.38	17	
10/31/2016	7.2	8.45	< .0004	< .1	12263.9	12	20	
09/30/2016	6.62	8.57	< .0004	< .1	9536	8.4	12	< .0003
08/31/2016	6.98	8.68	< .0002	< .1	5356	8.15	10	
07/31/2016	7.16	8.57	< .0002	< .1	4432	< 8	8	
06/30/2016	7.32	8.32	BDL	BDL	5206.4	BDL	8	BDL
05/31/2016	6.9	8.3	BDL	BDL	7396.8	8.27	11	
04/30/2016	6.86	8.13	BDL	BDL	10676	8.6	12	
Std. dev.	0.254	0.212	-	-	2032.911	1.694	4.354	-
Min:	6.61	8.04	0.0015	-	4432	8.15	8	-
Max:	7.62	8.95	0.0015	-	14920.8	14.15	30	-
Count:	55	55	55	55	55	5	55	18
Average:	7.083	8.418	0.002	-	10739.838	10.781	16.964	-
Permit limit:	6.0	9.0	0.05	0.5	-	30	40	-
Ratio of long term average to limit	1.180545455	0.935333333	0.03	-	-	0.35938095	0.424090909	-

	Uranium, total, Effluent Gross		Oxygen demand, chem. [high level] [COD], Effluent Gross
	Weekly average or geo. mean (mg/L)	Daily max. (mg/L)	Daily max. (mg/L)
10/31/2020	< .75	< .9	315
09/30/2020	< .76	< .9	242
08/31/2020	< .75	< .9	186
07/31/2020	< .9	< .9	231
06/30/2020	< .77	< .9	268
05/31/2020	< .83	< 1.3	296
04/30/2020	< .83	< .9	344
03/31/2020	< .77	< .9	244
02/29/2020	< .78	< .9	260
01/31/2020	< .74	< .9	256
12/31/2019	< .74	< .9	291
11/30/2019	< .86	< .9	329
10/31/2019	< .85	< .9	268
09/30/2019	< .81	< .9	266
08/31/2019	< .78	< .9	206
07/31/2019	< .77	< .9	235
06/30/2019	< .72	< .9	250
05/31/2019	< .88	< .9	285
04/30/2019	< .81	< .9	231
03/31/2019	< .74	< .9	232
02/28/2019	< .82	< .9	286
01/31/2019	< .89	< .9	305
12/31/2018	< .79	< .9	330
11/30/2018	< .72	< .9	292
10/31/2018	< .75	< .9	294
09/30/2018	< .79	< .9	256
08/31/2018	< .79	< .9	213
07/31/2018	< .81	< .9	168
06/30/2018	< .79	< .9	281
05/31/2018	< .76	< .9	309
04/30/2018	< .72	0.9	358
03/31/2018	< .74	< .9	332
02/28/2018	< .79	< .9	216

01/31/2018	< .87	< .9	252
12/31/2017	< .81	< .9	370
11/30/2017	< .83	< .9	323
10/31/2017	< .9	< .9	360
09/30/2017	< .9	< .9	278
08/31/2017	< .9	< .9	274
07/31/2017	< .9	< .9	311
06/30/2017	< .9	< .9	278
05/31/2017	< .9	< .9	257
04/30/2017	< .9	< .9	304
03/31/2017	< .9	< .9	288
02/28/2017	< .9	< .9	294
01/31/2017	< .9	< .9	256
12/31/2016	< .9	< .9	216
11/30/2016	< .9	< .9	334
10/31/2016	< .9	< .9	292
09/30/2016	< .9	< .9	259
08/31/2016	< .9	< .9	163
07/31/2016	< .9	< .9	50
06/30/2016	BDL	BDL	72
05/31/2016	BDL	BDL	167
04/30/2016	BDL	BDL	296
Std. dev.	-	-	62.287
Min:	-	-	50
Max:	-	-	370
Count:	55	55	55
Average:	-	-	264.891
Permit limit:	2.0	4.0	370
Ratio of long term average to limit	-	-	0.715921376

APPENDIX 5

NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

Outfall 001, Effluent Gross, All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00340	Oxygen demand, chem. (high level) (COD)	<=	370	mg/L	Grab	Monthly	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Once Per Batch	Daily Minimum
00400	pH	<=	9.0	SU	Grab	Once Per Batch	Maximum
00530	Total Suspended Solids (TSS)	<=	40	mg/L	Grab	Once Per Batch	Daily Maximum
00530	Total Suspended Solids (TSS)	<=	30	mg/L	Grab	Once Per Batch	Monthly Average
00545	Settleable Solids	<=	0.5	mL/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	30	mg/L	Grab	Once Per Batch	Daily Maximum
00610	Nitrogen, Ammonia total (as N)	<=	20	mg/L	Grab	Once Per Batch	Monthly Average
00630	Nitrite plus Nitrate (as N)	<=	420	lb/d	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	20	mg/L	Grab	Once Per Batch	Daily Maximum
00951	Fluoride, total (as F)	<=	15	mg/L	Grab	Once Per Batch	Monthly Average
01002	Arsenic, total (as As)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01027	Cadmium, total (as Cd)	<=	0.01	mg/L	Grab	Monthly	Daily Maximum
01034	Chromium, total (as Cr)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01042	Copper, total (as Cu)	<=	1.0	mg/L	Grab	Monthly	Daily Maximum
01051	Lead, total (as Pb)	<=	0.1	mg/L	Grab	Monthly	Daily Maximum
01067	Nickel, total (as Ni)	Report	-	mg/L	Grab	Quarterly	Daily Maximum
01077	Silver, total (as Ag)	<=	0.05	mg/L	Grab	Monthly	Daily Maximum
22708	Uranium, natural, total	<=	4.0	mg/L	Grab	Once Per Batch	Daily Maximum
22708	Uranium, natural, total	<=	2.0	mg/L	Grab	Once Per Batch	Monthly Average
34475	Tetrachloroethylene	Report	-	mg/L	Grab	Quarterly	Daily Maximum
50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Daily Maximum

50050	Flow	Report	-	MGD	Estimate	Once Per Batch	Monthly Average
50060	Chlorine, total residual (TRC)	<=	2.0	mg/L	Grab	Once Per Batch	Daily Maximum
70295	Total Dissolved Solids (TDS)	Report	-	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.05	mg/L	Grab	Once Per Batch	Daily Maximum
71900	Mercury, total (as Hg)	<=	0.00037	mg/L	Grab	Once Per Batch	Monthly Average
TAA3B	LC50 Static 48Hr Acute Ceriodaphnia	Report	-	%	Grab	Annual	Minimum
TAA6C	LC50 Static 48Hr Acute Pimephales promelas	Report	-	%	Grab	Annual	Minimum

- 1) Flow shall be reported in Million Gallons per Batch.
- (2) pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.
- (3) The chronic mercury limit shall apply only if the discharge of batches containing mercury occur four (4) or more consecutive days/week during the monitoring period; otherwise, only the daily maximum limit for batches containing mercury shall apply. If any individual analytical test result for mercury is less than the minimum quantification level (0.0002 mg/L), then a value of zero (0) may be used for DMR calculations and reporting requirements.
- (4) The total residual chlorine limit is only applicable when chlorine is used in the treatment process.
- (5) Tetrachloroethylene (PCE) is only required to be sampled when a groundwater treatment system that contains PCE is discharging through Outfall 001.

ENCLOSURE C

NPDES PERMIT TNR050873

**STORM WATER DISCHARGES ASSOCIATED WITH
INDUSTRIAL ACTIVITIES**

(3 pages to follow)

Tennessee Division of Water Resources (DWR)

[Permits](#)
[Documents](#)
[Permit Appeals](#)
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[Complaints](#)
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DWR Permits in Tennessee

Rows 50

- Row text contains 'TNR050873'
- Status not in 'Inactive, Withdrawn'

1 - 1 of 1

<u>Permit No</u>	<u>Site Name</u>	<u>Permittee Name</u> ↑	<u>Project Name</u>	<u>Permit Type</u>	<u>Status</u>	<u>Rating</u>	<u>Location</u>	<u>City</u>	<u>County</u>	<u>EFO Name</u>	<u>Issuance</u>	<u>Effective</u>	<u>Expiration</u>
TNR050873	Nuclear Fuel Services, Inc.	Nuclear Fuel Services, Inc.	-	TMSP	Active	N/A	1205 Banner Hill Road	Erwin	Unicoi	Johnson City	19-JUL-2020	20-JUL-2020	30-JUN-2025

1 - 1 of 1



If you have any questions or comments, email our staff at Water.Permits@tn.gov or call at (888) 891-TDEC (8332).

State of Tennessee
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

15N200054
GOV0501
NPDES PERMIT TNR050873
EFFECTIVE: 7/21/2020
EXPIRES: 7/20/2022

DISTRIBUTION: _____
REG SVS BULLETIN BOARD NDA LEB RJF RJFr JMG
DRH RMK DAL FXM BWM MW/M BMM AAM CSM
JWN RKR DMR WRS JAS MIT ROW

MS. B. MARIE MOORE
NUCLEAR FUEL SERVICES, INC.
e-copy: bmmoore@nuclearfuelservices.com

Tennessee Multi-Sector Permit (TMSP) Notice of Coverage Fact Sheet

New Tennessee's general industrial stormwater discharge permit, also known as the Tennessee Multi Sector Permit (TMSP), became effective on July 20, 2020, for a period of two years. You are receiving this document because your name has been associated as an 'official contact' or 'facility contact,' affiliated with the TMSP permit tracking number TNR050873. If you receive more than one email from us, it means you are affiliated with more than one tracking number.

Previous TMSP reflected the 2015 federal Multi Sector General Permit (MSGP), which expired on June 4, 2020. EPA has proposed a 2020 MSGP that is fundamentally different from the previous permit and from Tennessee's 2015 TMSP. The comment period for the federal MSGP ended June 1, 2020, and the final permit is not anticipated until November 12, 2020.

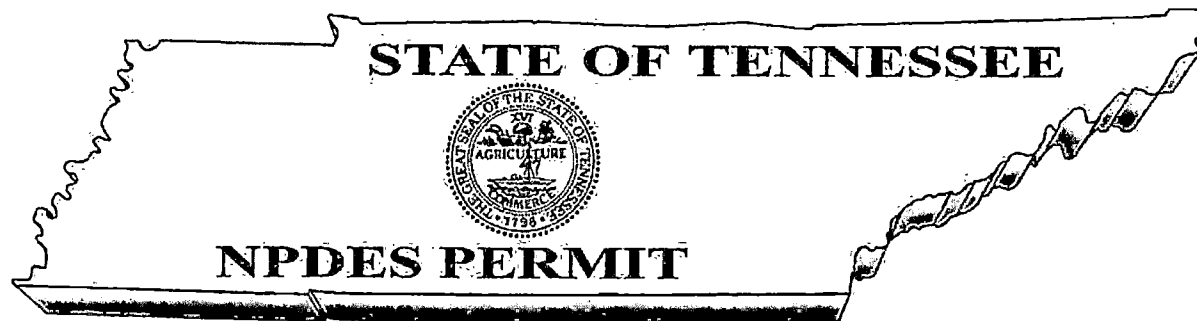
Rather than wait for EPA's final 2020 permit to inform Tennessee's new permit, we decided to reissue the 2015 TMSP, unchanged, for a term of two years. This will provide an opportunity to review the final federal permit prior to proposing any changes to the TMSP. Reissuing the 2020 TMSP for a two-year term will avoid impacting new industrial facilities who would be unable to receive permit coverage without an active TMSP in Tennessee.

If you have coverage under the current TMSP and plan to maintain it in this permit cycle, we are providing you with an updated Notice of Coverage (NOC) for the two-year reissuance period.

If you have coverage under the current TMSP but no longer need it, submit the appropriate documentation (No Exposure Certification Form or Notice of Termination) immediately. If you have coverage under the current TMSP, but realize that NOC information should be updated (e.g., facility name, location, receiving stream, contacts), submit an updated Notice of Intent (NOI) form to Water.Permits@tn.gov. All TMSP forms and links to other resources can be found here: <https://www.tn.gov/environment/permit-permits/water-permits/1/npdes-permits/1/npdes-stormwater-permitting-program/npdes-industrial-stormwater-general-permit.html>

If you have any questions, contact us at 1-888-891-TDEC or by email at Water.Permits@tn.gov.

Sincerely,
Water-Based Systems Unit
Division of Water Resources



Tracking No. TNR050873

Notice of Coverage under the General NPDES Permit for
**STORM WATER DISCHARGES ASSOCIATED WITH
INDUSTRIAL ACTIVITY (TMSP)**

**DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES**
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and the delegation of authority from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.):

Discharger: **Nuclear Fuel Services, Inc.**
is authorized to discharge: storm water associated with industrial activity
from a facility located at: **1205 Banner Hill Road in Erwin, Unicoi County**
to receiving waters named: **Martins Creek (mile marker N/A), and Nolichucky River (mile marker 95)**
in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

Coverage under this general permit shall become effective on **July 21, 2020**, and shall expire on **June 30, 2022**.

Notice of Coverage Issuance date: **July 20, 2020**

Applicable Sector(s): **C P**

A link to the copy of the TMSP, as well as permit requirements is at:
<https://www.tn.gov/environment/permit-permits/water-permits/npdes-permits/npdes-stormwater-permitting-program/npdes-industrial-stormwater-general-permit.html>

21G-22-0079
GOV-01-55-04
ACF-22-0150

ENCLOSURE D

**TENNESSEE DEPARTMENT OF ENVIRONMENT
AND CONSERVATION**

RARE SPECIES DATABASE REVIEW

AUGUST 20, 2021

(5 PAGES TO FOLLOW)



STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Natural Areas
Natural Heritage Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 2nd Floor
Nashville, Tennessee 37243
Phone 615/532-0431 Fax 615/532-0046

August 20, 2021

Bessie Marie Moore
Nuclear Fuel Services, Inc.
1205 Banner Hill Road
Erwin, TN 37650

Subject: Nuclear Regulatory Commission Supplemental Environmental Report
(36.130327, -82.43312)
Unicoi County, TN
Rare Species Database Review

Dear Ms. Moore:

Thank you for your correspondence of 15 July 2021 requesting a rare species database review for your Nuclear Regulatory Commission Supplemental Environmental Report for Nuclear Fuel Services, Inc. in Erwin, Unicoi County, Tennessee. The property boundaries for this project are delimited by Berkshire Drive to the southwest, Carolina Avenue to the east, Banner Springs Road to the north, and the CSX railway/Oxide Lane to the west. The property area also includes Parcel No. 086 031H A 004.07 on the west side of the CSX railway, at the end of Banner Springs Road. No new operations or development are planned outside of the boundaries described above.

Per your submittal:

The Supplemental Environmental Report is being prepared to support NFS' SNM-124 license amendment request to include NFS' Uranium Purification and Conversion Services. The SNM-124 license allows the operation of the NFS Erwin facility. The primary licensed activity is the production of nuclear fuel for the United States Navy.

We have reviewed the state's natural heritage database with regard to the project boundaries, and we find that the following rare species have been observed previously within one mile of the project area:

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Vascular Plant	<i>Diervilla sessilifolia</i> var. <i>rivularis</i>	Mountain Bush-honeysuckle	G3	S2	--	T	Dry Cliffs and Bluffs
Vascular Plant	<i>Heracleum maximum</i>	Cow-parsnip	G5	S2	--	S	Moist Woods and Floodplains

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Vascular Plant	<i>Trillium rugelii</i>	Southern Nodding Trillium	G4	S2	--	E	Rich Mountain Woods
Vascular Plant	<i>Tsuga caroliniana</i>	Carolina Hemlock	G2G3	S3	--	T	Dry Ridges
Vertebrate Animal	<i>Carpiondes velifer</i>	Highfin Carpsucker	G4G5	S2S3	--	D	Large rivers, mostly in Tennessee River drainage.
Vertebrate Animal	<i>Neotoma magister</i>	Allegheny Woodrat	G3G4	S3	--	D	Outcrops, cliffs, talus slopes, crevices, sinkholes, caves & karst.
Vertebrate Animal	<i>Percina aurantiaca</i>	Tangerine Darter	G4	S3	--	D	Large-moderate size headwater tribs to Tennessee River, in clear, fairly deep, rocky pools, usually below riffles.

Within four miles of the project area the following additional rare species have been reported:

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Vascular Plant	<i>Adlumia fungosa</i>	Climbing Fumitory	G4	S2	--	T	Rich Mesic Woods
Vascular Plant	<i>Buckleya distichophylla</i>	Piratebush	G3	S2	--	T	Rocky Mountain Woods W/ Hemlock
Vascular Plant	<i>Calamagrostis porteri</i>	Porter's Reedgrass	G4	S1	--	E	Rich Mountain Woods
Vascular Plant	<i>Castanea dentata</i>	American Chestnut	G3	S2S3	--	S	Mesic to Dry Forests
Vascular Plant	<i>Corydalis sempervirens</i>	Pale Corydalis	G5	S1S2	--	S	Dry or Rocky Woods
Vascular Plant	<i>Cymophyllus fraserianus</i>	Fraser's Sedge	G4	S3	--	S	Mixed Mesophytic Forests
Vascular Plant	<i>Dryopteris carthusiana</i>	Spinulose Shield Fern	G5	S1	--	T	Bogs
Vascular Plant	<i>Goodyera repens</i>	Dwarf Rattlesnake-plantain	G5	S1	--	S	Moist Conifer/Rhododendron Woods
Vascular Plant	<i>Helianthus glaucophyllus</i>	White-leaved Sunflower	G3G4	S1	--	T	Dry Open Woods
Vascular Plant	<i>Hexastylis virginica</i>	Virginia Heartleaf	G4	S2	--	S	Sandy or Rocky Woods
Vascular Plant	<i>Lysimachia terrestris</i>	Swamp Loosestrife	G5	S1	--	E	Wet Prairies and Swamps
Vascular Plant	<i>Oenothera parviflora</i>	Northern Evening-primrose	G5	S1	--	S	Disturbed Open Areas
Vascular Plant	<i>Spiraea virginiana</i>	Virginia Spiraea	G2	S2	LT	E	Stream Bars and Ledges
Vascular Plant	<i>Stachys clingmanii</i>	Clingman's Hedge-	G2	S1S2	--	T	Mountain Clearings and Meadows

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
		nettle					
Vascular Plant	<i>Symphytotrichum ericoides</i> var. <i>ericoides</i>	White Heath Aster	G5T5	S1	--	E	Barrens
Vascular Plant	<i>Woodsia scopulina</i> ssp. <i>appalachiana</i>	Alleghany Cliff-fern	G4	S1S2	--	S	Mountain Cliffs
International Vegetation Classification - Natural	<i>Tsuga caroliniana</i> - <i>Pinus (rigida, pungens, virginiana) Forest</i>	Carolina Hemlock Foreset (Pine Type)	G2	SNR	--	Rare, Not State Listed	
International Terrestrial Ecological System Classification	<i>Southern Appalachian Spray Cliff</i>	Southern Appalachian Spray Cliff	GNR	SNR	--	Rare, Not State Listed	
Invertebrate Animal	<i>Alasmidonta ravenliana</i>	Appalachian Elktoe	G1	S1	LE	E	Large creeks/small rivers with stable coarse sand and gravel substrates with cobble & boulders; upper Tennessee River watershed.
Invertebrate Animal	<i>Inflectarius subpalliatius</i>	Velvet Covert	G2G3	S2	--	Rare, Not State Listed	Leaf litter, rotting logs, talus in mixed woodland; may be arboreal; mid to upper elevations of Blue Ridge; Carter & Unicoi counties.
Invertebrate Animal	<i>Paravitrea tridens</i>	White-foot Supercoil	G2	S2	--	Rare, Not State Listed	Moist leaf litter on wooded hillsides; northeast Tennessee; Ridge & Valley and Blue Ridge.
Invertebrate Animal	<i>Speyeria diana</i>	Diana Fritillary	G2G3	S3	--	Rare, Not State Listed	Fields, edges, and openings in moist, rich, forested mountains and valleys; Blue Ridge & Cumberland Plateau generally.
Invertebrate Animal	<i>Stenotrema altispira</i>	Highland Slitmouth	G3	S2?	--	Rare, Not State Listed	Leaf litter, logs, talus in mixed woodland, spring fed slopes; higher elevations of central & N Blue Ridge; northeast Tennessee.

Type	Scientific Name	Common Name	Global Rank	St. Rank	Fed. Prot.	St. Prot.	Habitat
Invertebrate Animal	<i>Stygobromus barryi</i>	A Cave Obligate Amphipod	G2G3	S1	--	Rare, Not State Listed	Aquatic cave obligate; northern Blue Ridge mountains; Unicoi County.
Invertebrate Animal	<i>Vertigo parvula</i>	Smallmouth Vertigo	G3	S2S3	--	Rare, Not State Listed	In leaf litter and on logs in upland forests with limestone outcrops or talus; Blue Ridge; Washington & Unicoi counties.
Vertebrate Animal	<i>Condylura cristata</i>	Star-nosed Mole	G5	S2	--	D	Hydric soils in beech-maple-birch forests at higher elevations in the Appalachians.
Vertebrate Animal	<i>Cryptobranchius alleganiensis</i>	Hellbender	G3	S3	No Status	E	Rocky, clear creeks and rivers with large shelter rocks.
Vertebrate Animal	<i>Desmognathus carolinensis</i>	Carolina Mountain Dusky Salamander	G4	S2S3	--	Rare, Not State Listed	Seepage areas, springs, small streams, & wet rock faces; spruce-fir forest floor; Blue Ridge; Cocke, Greene, Unicoi Cos.
Vertebrate Animal	<i>Etheostoma acuticeps</i>	Sharphead Darter	G3	S2S3	--	Rare, Not State Listed	Strongly flowing water in riffles and chutes of large upland creeks and medium-sized rivers.
Vertebrate Animal	<i>Myotis grisescens</i>	Gray Myotis	G4	S2	LE	E	Cave obligate year-round; frequents forested areas; migratory.
Vertebrate Animal	<i>Myotis leibii</i>	Eastern Small-footed Myotis	G4	S2S3	--	D	Hibernates in caves & mines; also uses abandoned buildings, bridges, and barns seasonally.
Vertebrate Animal	<i>Plethodon welleri</i>	Weller's Salamander	G3	S2	--	D	Rich woods under downed logs, rocks, leaf litter; spruce-fir, birch-hemlock, and primarily deciduous forests of NE Blue Ridge.

The Division of Natural Areas - Natural Heritage Program has reviewed the location of the proposed project workspace with respect to rare plant species. Based on the habitat within the project area and the type of project, we do not anticipate any impacts to occurrences of rare, threatened, or endangered plant species from this project.

We ask that you coordinate this project with the Tennessee Wildlife Resources Agency (Region 4, Rob Lindbom, 423-587-7037, dennis.lindbom@tn.gov) to ensure that legal requirements for protection of state

listed rare animals are addressed. Additionally, we ask that you contact the U.S. Fish and Wildlife Service Field Office, Cookeville, Tennessee (931-525-4970) for comments regarding federally listed species. Please ensure that best management practices to address erosion and sediment are implemented and maintained during construction activities. Note that the General Aquatic Resource Alteration Permit states that “use of monofilament-type erosion control netting or blanket is prohibited in the stream channel, stream banks, or any disturbed riparian areas within 30 feet of top of bank.” Where necessary and feasible, we encourage use of biodegradable netting under the CGP (Construction General Stormwater Permit) as well.

Thank you for considering Tennessee’s rare species throughout the planning of this project. Should you have any questions, please do not hesitate to contact me at 615-532-4799 or dillon.blankenship@tn.gov.

Sincerely,

Dillon

Dillon Blankenship | Environmental Review Coordinator
Tennessee Natural Heritage Program