



STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

401 CHURCH STREET  
L & C ANNEX 6TH FLOOR  
NASHVILLE TN 37243  
January 10, 2010

Ms. B. Marie Moore  
Environmental Protection & Safety Manager  
Nuclear Fuel Services, Inc.  
1205 Banner Hill Rd.  
Erwin, TN 37650

Subject: **Draft of NPDES Permit No. TN0002038**  
**Nuclear Fuel Services**  
**Erwin, Unicoi County, Tennessee**

Dear Ms. Moore:

Enclosed please find a draft copy of the NPDES permit which the Division of Water Pollution Control (the division) proposes to issue. This draft copy is furnished to you solely for your review of its provisions. This permit authorizes no wastewater discharges. The issuance of an official permit is contingent upon your meeting all of the requirements of the Tennessee Water Quality Control Act and the Rules and Regulations of the Tennessee Water Quality Control Board.

Also enclosed is a copy of the public notice that announces our intent to issue this permit. The notice affords the public an opportunity to review the draft permit and, if necessary, request a public hearing on this issuance process. If you disagree with the provisions and requirements contained in the draft permit, you have twenty-five (25) days from the date of this correspondence to notify the division of your objections. If your objections cannot be resolved, you may appeal this permit upon issuance. This appeal should be filed in accordance with Section 69-3-110 of the Tennessee Code Annotated.

If you have questions, please contact the division at the Johnson City Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Miss Julie Harse at (615) 532-0682 or by E-mail at [Julie.Harse@tn.gov](mailto:Julie.Harse@tn.gov).

Sincerely,

Vojin Janjić  
Manager, Permit Section  
Division of Water Pollution Control

cc: DWPC, Permit Section & Johnson City Environmental Field Office  
Ms. Claudia Schenck, Office Manager, Tennessee Environmental Council, [claudia@tectn.org](mailto:claudia@tectn.org)  
Ms. Connie A. Kagey, NPDES Permit Section, [Kagey.Connie@epamail.epa.gov](mailto:Kagey.Connie@epamail.epa.gov)  
Ms. Joyce Griffith, Environmental Scientist, Nuclear Fuel Services, [jgriffith@nuclearfuelservices.com](mailto:jgriffith@nuclearfuelservices.com)  
Ms. Beverly Taylor Brown, Env Specialist 3, TDEC-WPC, [Beverly.Brown@tn.gov](mailto:Beverly.Brown@tn.gov)  
Ms. Park Overall, [olparko@aol.com](mailto:olparko@aol.com)



# STATE OF TENNESSEE



## NPDES PERMIT

**No. TN0002038**

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

Issued By

**Tennessee Department of Environment and Conservation  
Division of Water Pollution Control  
401 Church Street  
6th Floor, L & C Annex  
Nashville, Tennessee 37243-1534**

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:

**in 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:

This permit shall expire on:

Issuance date:

**Draft**

\_\_\_\_\_  
Paul E. Davis, Director  
Division of Water Pollution Control

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## PART I

### A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

Nuclear Fuel Services is authorized to discharge fenton's process wastewater, laboratory facilities, laundry facility, fuel production facilities, CDL, miscellaneous, BPF, development laboratories and decommissioning activities through Outfall 001 to Nolichucky River at mile 94.6.

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

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/batch	Estimate
pH	Range 6.0 - 9.0**				1/batch	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30	--	40	--	1/batch	Grab
SOLIDS, SETTLEABLE	--	--	0.5 ml/l	--	1/batch	Grab
CHLORINE, TOTAL RESIDUAL (TRC)****	--	--	2.0	--	1/batch	Grab**
COD	--	--	370	--	1/Month	Grab
NITROGEN, AMMONIA TOTAL	20	--	30	--	1/batch	Grab
NITRITE PLUS NITRATE NITROGEN	--	--	--	420	1/batch	Grab
FLUORIDE, Soluble	15	--	20	--	1/batch	Grab
ARSENIC, TOTAL	--	--	Report	--	1/quarter	Grab
CADMIUM, TOTAL	--	--	0.01	--	1/Month	Grab
CHROMIUM, TOTAL	--	--	Report	--	1/quarter	Grab
COPPER, TOTAL	--	--	1.0	--	1/Month	Grab
LEAD, TOTAL	--	--	0.1	--	1/Month	Grab
MERCURY, TOTAL***	0.00037	--	0.050	--	1/batch	Grab
NICKEL, TOTAL	--	--	Report	--	1/quarter	Grab
SILVER, TOTAL	--	--	0.05	--	1/Month	Grab
URANIUM, TOTAL	2.0	--	4.0	--	1/batch	Grab
TETRACHLOROETHYLENE	--	--	Report	--	1/quarter	Grab

\* Flow shall be reported in Million Gallons per Batch.  
 \*\* pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.  
 \*\*\* 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.  
 \*\*\*\* The total residual chlorine limit is only applicable when chlorine is used in the treatment process.

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.

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.

### **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 1200-4-3-.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;
- b. The exact person(s) collecting samples;
- 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 Pollution Control.

### 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 or removal of habitat.

**De Minimis** – Alterations, other than those resulting in the condition of pollution or new domestic wastewater discharges, that represent either a small magnitude or a short duration shall be considered a *de minimis* impact and will not be considered degradation for purposes of implementing the antidegradation policy. Discharges other than domestic wastewater will be considered *de minimis* if they are temporary or use less than five percent of the available assimilative capacity for the substance being discharged. If more than one activity has been authorized in a segment and the total of the impacts uses no more than ten percent of the assimilative capacity, available habitat, or 7Q10 low flow, they are presumed to be *de minimis*. Where total impacts use more than ten percent of the assimilative capacity, available habitat, or 7Q10 low flow they may be treated as *de minimis* provided that the division finds on a scientific basis that the additional degradation has an insignificant effect on the resource and that no single activity is allowed to consume more than five percent of the assimilative capacity, available habitat or 7Q10 low flow.

**Discharge** or “discharge of a pollutant” refers to the addition of pollutants to waters from a source.

**Dry Weather Flow** shall be construed to represent discharges consisting of process and/or non-process wastewater only.

An **ecoregion** is a relatively homogeneous area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

The **geometric mean** of any set of values is the  $n^{\text{th}}$  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 **rainfall event** is defined as any occurrence of rain, preceded by 10 hours without precipitation that results in an accumulation of 0.01 inches or more. Instances of rainfall occurring within 10 hours of each other will be considered a single rainfall event.

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.

A **reference site** means least impacted waters within an ecoregion that have been monitored to establish a baseline to which alterations of other waters can be compared.

A **reference condition** is a parameter-specific set of data from regional reference sites that establish the statistical range of values for that particular substance at least-impacted streams.

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.

A **subcoregion** is a smaller, more homogenous area that has been delineated within an ecoregion.

**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.

The **weekly 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 week when the measurements were made.

The **weekly average concentration**, is the arithmetic mean of all the composite samples collected in a one-week period. The permittee must report the highest weekly average in the one-month period.

**Wet Weather Flow** shall be construed to represent storm water runoff which, in combination with all process and/or non-process wastewater discharges, as applicable, is discharged during a qualifying storm event.

#### D. ACRONYMS AND ABBREVIATIONS

1Q10 – 1-day minimum, 10-year recurrence interval  
30Q20 – 30-day minimum, 20-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  
BOD<sub>5</sub> – five day biochemical oxygen demand  
BPT – best practicable control technology currently available  
CBOD<sub>5</sub> – 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  
IC<sub>25</sub> – inhibition concentration causing 25% reduction in survival, reproduction and growth of the test organisms  
IU – industrial user  
IWS – industrial waste survey  
LC<sub>50</sub> – 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  
NODI – no discharge  
NOEC – no observed effect concentration  
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  
WQBEL – water quality based effluent limit

## **E. REPORTING**

### **1. Monitoring Results**

Monitoring results shall be recorded monthly and submitted monthly using Discharge Monitoring Report (DMR) forms supplied by the Division of Water Pollution Control. Submittals shall be postmarked no later than 15 days after the completion of the reporting period. A completed DMR with an original signature shall be submitted to the following address:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION  
DIVISION OF WATER POLLUTION CONTROL  
ENFORCEMENT & COMPLIANCE SECTION  
L & C ANNEX 6TH FLOOR  
401 CHURCH STREET  
NASHVILLE TN 37243**

A copy of the completed and signed DMR shall be mailed to the Johnson City Environmental Field Office (EFO) at the following address:

**TENNESSEE DEPT. OF ENVIRONMENT & CONSERVATION  
DIVISION OF WATER POLLUTION CONTROL  
JOHNSON CITY ENVIRONMENTAL FIELD OFFICE  
2305 SILVERDALE ROAD  
JOHNSON CITY TN 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 specifically limited by this permit 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 Water Pollution Control (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. To inspect at reasonable times any monitoring equipment or method or any collection, treatment, pollution management, or discharge facilities required under this permit; and
- c. To sample at reasonable times any discharge of pollutants.

#### **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 Pollution Control. 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 1200-4-5-.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).



## **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**

All discharges shall be consistent with the terms and 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 Pollution Control 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 are not reported under subparagraph 2.a. above, 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 events 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 Pollution Control 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 Pollution Control 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 Pollution Control 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 "**Bypassing**," "**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

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### OTHER REQUIREMENTS

#### A. TOXIC POLLUTANTS

The permittee shall notify the Division of Water Pollution Control 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 Pollution Control. The following is given as an example of the minimal amount of information that must be included on the sign:

<p><b>TREATED INDUSTRIAL WASTEWATER</b> <b>Nuclear Fuel Services</b> <b>(Permittee's Phone Number)</b> <b>NPDES Permit NO. TN0002038</b> <b>TENNESSEE DIVISION OF WATER POLLUTION CONTROL</b> <b>1-888-891-8332 ENVIRONMENTAL FIELD OFFICE - Johnson City</b></p>
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### D. ANTIDegradation

Pursuant to the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06, titled "Tennessee Antidegradation Statement," and in consideration of the Department's directive in attaining the greatest degree of effluent reduction achievable in municipal, industrial, and other wastes, 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.

## RATIONALE

**Nuclear Fuel Services**  
**NPDES PERMIT NO. TN0002038**  
**Erwin, Unicoi County, Tennessee**

Permit Writer: Miss Julie Harse

### I. DISCHARGER

**Nuclear Fuel Services**  
**1205 Banner Hill Road**  
**Erwin, Unicoi County, Tennessee**  
**Site Longitude: -82.433889 Site Latitude: 36.133611**

**Official Contact Person:**  
**Ms. B. Marie Moore**  
**Environmental Protection & Safety Manager**  
**(423) 743-9141**

**Nature of Business:**  
**Nuclear fuel manufacturing and uranium recovery facility. Also conducts decommissioning/remediating and groundwater treatment activities related to past activities.**

**SIC Code(s): 2819**  
**Industrial Classification: Primary**  
**Discharger Rating: Major**

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

**Issued June 30, 2006**  
**Expired August 31, 2010**  
**Application for renewal received February 25, 2010**

#### **Watershed Scheduling**

**Environmental Field Office: Johnson City**  
**Hydrocode: 6010108 Watershed Group: 5**  
**Watershed Identification: Nolichucky**  
**Target Reissuance Year: 2010**



### **III. FACILITY DISCHARGES AND RECEIVING WATERS**

Nuclear Fuel Services discharges wastewater from Fenton's process, laboratory facilities, laundry facility, fuel production facilities, CDL, miscellaneous, BPF, development laboratories and decommissioning activities through Outfall 001 to Nolichucky River at mile 94.6. Appendix 1 summarizes facility discharges and the receiving stream information for Outfall 001.

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.

### **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 17, 2009. The inspection report stated that "A review of the permits, associated records, and the facilities did not reveal any deficiencies".

### **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 1200-4-5-.03(2); or by way of operational and/or treatability data. Furthermore, effluent limitations in this permit must comply with any approved Total Maximum Daily Load (TMDL) studies. Appendix 6 lists all proposed effluent limitations and monitoring requirements to be included in the new permit. 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.

**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.

**pH**

According to the State of Tennessee Water Quality Standards [Chapter 1200-4-3-.03(3) (b)], the receiving stream 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. The Erwin STP and Nuclear Fuel Services permits will limit both effluents to a pH range of 6.0 to 9.0. In order to demonstrate that the expanded pH range for Nuclear Fuel Services will not cause the receiving stream to have a pH outside of the range of 6.5 to 9.0, the calculation below demonstrates the most conservative scenario. The scenario assumes that the receiving stream has a pH of 7.46 and the effluents from Nuclear Fuel Services and Erwin STP have a pH of 6.0. The upstream pH is the average of the division's instream sampling data at river mile 97.5. The downstream pH of 7.3 demonstrates that the effluent from Nuclear Fuel Services will not cause a violation in water quality for pH. The sample type will be grab and the monitoring frequency will be once per batch.

Parameter	Nolichucky River Upstream	Nuclear Fuel Services	Erwin STP
Flow Rate (MGD)	124.1	0.0198	1.9
pH	7.46	6	6

$$10^{-(pH)} \frac{g}{L} \times \frac{1 \text{ mol H}^+}{1 \text{ g H}^+} \times \frac{1 \text{ Liter}}{0.264172 \text{ Gall}} \times \frac{1,000,000 \text{ Gall}}{1 \text{ MGD}} \times \text{Flow MGD} = \text{Moles H}^+$$

$$10^{-(7.46)} \frac{g}{L} \times \frac{1 \text{ mol H}^+}{1 \text{ g H}^+} \times \frac{1 \text{ Liter}}{0.264172 \text{ Gall}} \times \frac{1,000,000 \text{ Gall}}{1 \text{ MGD}} \times 124.1 \text{ MGD} = 16.3 \text{ Nolichucky River Upstream Moles H}^+$$

$$10^{-(6.0)} \frac{g}{L} \times \frac{1 \text{ mol H}^+}{1 \text{ g H}^+} \times \frac{1 \text{ Liter}}{0.264172 \text{ Gall}} \times \frac{1,000,000 \text{ Gall}}{1 \text{ MGD}} \times 0.0198 \text{ MGD} = 0.07495 \text{ Nuclear Fuel Services Moles H}^+$$

$$10^{-(6.0)} \frac{g}{L} \times \frac{1 \text{ mol H}^+}{1 \text{ g H}^+} \times \frac{1 \text{ Liter}}{0.264172 \text{ Gall}} \times \frac{1,000,000 \text{ Gall}}{1 \text{ MGD}} \times 1.9 \text{ MGD} = 7.1922 \text{ Erwin STP Moles H}^+$$

(Nolichucky River Upstream Moles H+) + (Nuclear Fuel Services Moles H+) + (Erwin STP Moles H+) = **Total Moles H+**  
 16.3 Moles + 0.07495 Moles + 7.1922 Moles = 23.6 Moles H+

$$-\log \left| \frac{\text{Total Moles H}^+ \times [1 \text{ g H}^+ / 1 \text{ mol H}^+]}{\text{Total Flow MGD} \times 1,000,000 \times [1 \text{ Liter} / 0.264172 \text{ Gall}]} \right| = \text{Downstream pH}$$

$$-\log \left| \frac{23.6 \text{ Moles H}^+ \times [1 \text{ g H}^+ / 1 \text{ mol H}^+]}{126.0198 \text{ MGD} \times 1,000,000 \times [1 \text{ Liter} / 0.264172 \text{ Gall}]} \right| = 7.3$$

**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 State of Tennessee Water Quality Standards for the protection of Fish & Aquatic Life [Chapter 1200-4-3-.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 previous permit's limits will be retained in the new permit based on the anti-backsliding requirements. Considering the nature of wastewater collection and discharge system, the sample type will be grab and the monitoring frequency will be once per batch.

### **Settleable Solids**

Settleable solids is a test that measures the amount of solids that will settle from stagnant wastewater. Wastewater that is adequately treated for solids removal should not produce significant amounts of sediment. The previous permit limit will be retained in the new permit based on the anti-backsliding requirement. The sample type will be grab and the monitoring frequency will once per batch.

### **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.

### **Chemical Oxygen Demand and Ammonia**

Measurement of COD is an indicator of the oxygen demanding compounds present in the discharge, and the efficiency of the treatment system. The previous permit had a daily maximum concentration limit of 370 mg/L. Utilizing the COD/BOD5 ratio from the application, a COD limit of 370 mg/L results in a BOD5 concentration of 59 mg/L. A discharge of 59 mg/L at 0.0155 MGD combined with an Erwin STP discharge of 30 mg/L at 1.9 MGD would only change the effluent by 0.2 mg/L. Since dissolved oxygen modeling for Erwin STP has already projected an oxygen sag of 7.01 mg/L, the permit writer does not believe that the current permit limit for COD will cause a dissolved oxygen problem in the stream. It is the permit writer's best professional judgment that the previous daily maximum concentration limit is reasonable; therefore the previous permit limit will be retained in the new permit.

*BOD5 Concentration*

$$(30 \text{ mg/L})(8.34)(1.9 \text{ MGD}) + (59 \text{ mg/L})(8.34)(0.0155) = (x)(8.34)(1.9155 \text{ MGD})$$

$$X = 30.2 \text{ mg/L}$$

The previous permit limited ammonia with a monthly average concentration of 20 mg/L and a daily maximum concentration of 30 mg/L. In analyzing the ammonia limit, the two issues of concern are ammonia toxicity and reduction of dissolved oxygen in the receiving stream. The question of ammonia toxicity is resolved through the temperature and pH calculations that are based on a 1999 EPA document (see chart below). The below calculations demonstrate that ammonia toxicity will not exist even for the combined flow rate of Nuclear Fuel Services and Erwin STP (1.9155 MGD). The question of reduction of dissolved oxygen can be resolved by demonstrating that the ammonia added to the amount discharged from the Erwin STP is insignificant. A NFS ammonia discharge of 20 mg/L combined with an ammonia discharge of 5.5 mg/L from Erwin STP would only change the combined effluent by 0.12 mg/L. It is the permit writer's best professional judgment that the previous permit limits are protective of instream water quality criteria and will be retained in the new permit.

*Ammonia Concentration*

$$(5.5 \text{ mg/L})(8.34)(1.9 \text{ MGD}) + (20 \text{ mg/L})(8.34)(0.0155) = (x)(8.34)(1.9155 \text{ MGD})$$

$$X = 5.62 \text{ mg/L}$$

**Ammonia as Nitrogen Calculations**

The State utilizes the EPA document, 1999 Update to Ambient Water Quality Criteria for Ammonia and assumed temperatures of 25°C and 15°C and stream pH of 8 to derive an allowable instream protection value. A mass balance with plant and stream flows and this allowable value determines the monthly average permit limit. Seasonal limits may also be allowed due to ambient temperature variations between the summer and winter seasons.

East TN- 25°C, 15°C  
 Middle TN- 27°C, 17°C  
 West TN- 30°C, 20°C

A pH value of 8 (instead of historically used 7.5) was chosen for two reasons: 1.) ambient monitoring in west TN showed that a pH often exceeds 7.5, and is up to 8 sometimes 2.) this assumption is more conservative.

Winter				Summer			
Temp (°C)=	15			Temp (°C)=	25		
pH=	8			pH=	8		
Min (2.85, 1.45*10 <sup>4</sup> 0.028*(25-T))	2.76	2.85	2.76	Min (2.85, 1.45*10 <sup>4</sup> 0.028*(25-T))	1.45	2.85	1.45

$$CCC = \left( \frac{0.0577}{1+10^{(7.688-pH)}} + \frac{2.487}{1+10^{(pH-7.688)}} \right) * \text{Min} (2.85, 1.45*10^4 0.028*(25-T))$$

CCC = **2.36** CCC = **1.24**

CCC - Contionuous Chronic Criterion Allowable instream NH3 concentration [mg/l]

$$CCC = \frac{(\text{Critical Low Flow [MGD]} * \text{Background Ammonia [mg/L]}) + (\text{Design Flow [MGD]} * \text{Effluent Concentration [mg/L]})}{(\text{Critical Low Flow [MGD]} + \text{Design Flow [MGD]})}$$

where: 122.8 Critical Low Flow [MGD] (7Q10 value)  
 0.1 Background Ammonia Concentration [mg/L]  
 1.9155 WWTP Design Flow or long-term average flow [MGD]

Therefore, the Allowable **Effluent Concentrations** and corresponding **Amounts** in winter and summer are:

Winter	Summer
<b>147.19</b> Concentration [mg/L]	<b>74.203</b> Concentration [mg/L]
<b>2351.5</b> Amount [lb/day]	<b>1185.4</b> Amount [lb/day]

### **Nitrite plus Nitrate**

The treatment system treats individual batches of wastewater, each of which can differ in quantity and nitrite-nitrate concentration. During the 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 nitrite-nitrate data and supporting calculations are provided in Appendix 5. The instream domestic water supply water quality criteria for nitrite-nitrate is 10 mg/L. The total loading capacity for the stream is 15012 lb/day. The Erwin STP and Nuclear Fuel Services combined loading is 485 lb/day which accounts for 3.2% of the total stream loading. The current permit limit should not create the reasonable potential to violate water quality and will be retained in the new permit.

Total Stream Capacity	180 MGD X 8.34 X 10 mg/L = 15012 lb/day
Erwin STP Loading	1.9 MGD X 8.34 X 4.10 mg/L = 65 lb/day (4.10 mg/L taken from NPDES application)
Nuclear Fuel Services Loading	420 lb/day (Previous permit limit)

### **Alpha Particles, Beta Particles and Uranium**

The only designated use for the Nolichucky River that contains standards for radionuclides is domestic water supply. The division's rules state that "The waters shall not contain toxic substances, whether alone or in combination with other substances, which will produce toxic conditions that materially affect the health and safety of man or animals, or impair the safety of conventionally treated water supplies." (TN Rule 1200-4-3-.03(1)(j)). Conventional water treatment is defined as coagulation, sedimentation, filtration, and chlorination or disinfection in TN Rule 1200-4-3-.04(2). The division's rules state that "if more than one activity has been authorized in a segment and the total of the impacts uses no more than ten percent of the assimilative capacity, available habitat, or 7Q10 low flow, they are presumed to be de minimis." (TN Rule 1200-4-3-.04(4)). The assumption that a conventional water treatment plant is not designed to remove radionuclides results in the primary drinking water standards being applied directly to the Nolichucky River. The division of water supply's primary drinking water standards for radionuclides (Reference: TN Rule 1200-05-01-.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

uranium. The federal (40 CFR 141.25) and state regulations (TN Rule 1200-05-01-.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 2008/2009 calendar year.

1. NFS WWTF TN00002038 ~14.3 uCi/g of U → 14.3 pCi/ug → 14300 pCi/mg
2. NFS Sewer EPOTW 013 ~3.6 uCi/g of U → 3.6 pCi/ug → 3600 pCi/mg
3. NFS/AREVA EPOTW 019 ~1.3 uCi/g of U → 1.3 pCi/ug → 1300 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/mg, an MCL of 30 mg/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/mg) 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 1'10'4, EPA recommends that drinking water systems subject to extreme pCi/mg 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)*

Nuclear Fuel Services sends wastewater to the Nolichucky River through its NPDES permitted outfall and through the Erwin STP. In addition to Nuclear Fuel Services' wastewater, the Erwin STP also accepts wastewater with radionuclides from Areva. The current NPDES permit TN0002038 limits total natural uranium in wastewater effluents. In addition, the facility's NRC license 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; and by demonstrating that if an individual were continually present in an unrestricted area, the dose

from external sources would not exceed 0.002 rem in an hour and 0.05 rem in a year. The federal values specified in 10 CFR 20 Appendix B are also included in the rules for TDEC's Division of Radiological Health (1200-02-05-.161, Schedule RHS 8-30). Erwin STP has pretreatment limits for the radionuclides in the wastewater and requires Nuclear Fuel Services to comply with the statutes and rules administered by TDEC's Division of Radiological Health.

The radionuclide loading to the stream is calculated based on the wastewater discharged from both NFS (River Mile 94.6) and the Erwin STP (River Mile 94.4). The effluent data that is utilized in the calculations is listed below in Table 1. The calculations for the alpha particle loading which utilizes the NFS daily maximum application value and the pretreatment limit for Erwin STP result in a utilization of the 1.2% of the total stream capacity (See Table 2). The uranium calculations were first performed utilizing the daily maximum permit limit of 4 mg/L with the facility's specific activity of 14300 pCi/mg and the Erwin STP pretreatment limit of 300 pCi/L. The combination of the two effluent streams resulted in a utilization of 16.7% of the total stream capacity (See Table 3). The uranium calculations were also performed utilizing the values listed in 10 CFR 20 Appendix B and 1200-02-05-.161, Schedule RHS 8-30 for the various isotopes in conjunction with the Erwin STP pretreatment limits. The combination of the two effluent streams resulted in a utilization of 0.7% of the total stream capacity (See Table 4). The beta calculations were performed based on the semiannual effluent reports submitted to the Nuclear Regulatory Commission for 2007 and 2008 (<http://www.nrc.gov/materials/fuel-cycle-fac/fuel-fab/nfs-effluent-reports.html>). The semiannual reports provided the sampled concentrations sent through the NFS individual permit and the Erwin STP. The total actual concentrations sent to the Nolichucky River were below the instream water quality criteria of 4 millirem/year at the discharge point. After calculating the actual discharges to the river, the calculations were redone with the Erwin STP pretreatment limits of 5000 pCi/L and the NFS maximum beta concentration of 787 pCi/L. The results still accounted for less than 1% of the stream capacity (See Table 5). The division does not believe that the discharges from NFS and the Erwin STP are creating the reasonable potential to violate the domestic water quality criterion.

**Table 1 - Overall Facility Data**

Nuclear Fuel Services				
	Average		Maximum	
Alpha - Application Value	186.13	pCi/L	982	pCi/L
Beta - Application Value	312	pCi/L	787	NA
Uranium - 234 - Federal/Division of Rad. Health	300	pCi/L	NA	NA
Uranium - 235 - Federal/Division of Rad. Health	300	pCi/L	NA	NA
Uranium - 238 - Federal/Division of Rad. Health	300	pCi/L	NA	NA
Total Uranium - Permit Limit	2	mg/L	4	mg/L
Flow Rate - DMR Data	0.0144	MGD	0.0155	MGD

Erwin STP		
	Average	
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 - Application Values	0.047395	MGD
	0.007297	MGD
		NFS
		NFS/AREVA

**Table 2 - Gross Alpha Particle Reasonable Potential Calculations**

<b>Alpha Particles</b>					
<b>Nolichucky River</b>					
<b>Drinking Water Standard</b>	15	pCi/L			
<b>30Q5 Flow Rate</b>	180	MGD			
	$\frac{180 \text{ Million Gallons}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$
		$\frac{15 \text{ pCi}}{\text{L}}$	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$	=	$\frac{1.02195 \times 10^{10} \text{ pCi}}{\text{Day}}$
<b>Nuclear Fuel Services</b>					
	$\frac{982 \text{ pCi}}{\text{L}}$	$\frac{0.0155 \text{ Mill Gal.}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	= $\frac{5.761 \times 10^7 \text{ pCi}}{\text{Day}}$
<b>Erwin STP</b>					
	$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.054692 \text{ Mill Gal.}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	= $\frac{6.21 \times 10^7 \text{ pCi}}{\text{Day}}$
<b>Total Discharge</b>					
	$\frac{5.761 \times 10^7 \text{ pCi}}{\text{Day}}$	+	$\frac{6.21 \times 10^7 \text{ pCi}}{\text{Day}}$	=	$\frac{1.1971 \times 10^8 \text{ pCi}}{\text{Day}}$
		$\frac{1.1971 \times 10^8 \text{ pCi}}{\text{Day}}$	X 100 %	=	1.2 % of Stream Capacity
		$\frac{1.02195 \times 10^{10} \text{ pCi}}{\text{Day}}$			

**Table 3 - Uranium Reasonable Potential Calculations Based on Mass Limit**

<b>Uranium Calculations with Mass Based Limit</b>									
<b>Nolichucky River</b>									
<b>Drinking Water Standard</b>	30	pCi/L							
<b>30Q5 Flow Rate</b>	180	MGD							
	$\frac{180 \text{ Million Gallons}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$				
		$\frac{30 \text{ pCi}}{\text{L}}$	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$	=	$\frac{2.0439 \times 10^{10} \text{ pCi}}{\text{Day}}$				
<b>Nuclear Fuel Services</b>									
	$\frac{4 \text{ mg}}{\text{L}}$	$\frac{1 \text{ g}}{1000 \text{ mg}}$	$\frac{14.3 \text{ uCi}}{\text{g}}$	$\frac{1 \times 10^6 \text{ pCi}}{1 \text{ uCi}}$	$\frac{0.0155 \text{ Mill Gal.}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{3.35578 \times 10^9 \text{ pCi}}{\text{Day}}$
<b>Erwin STP</b>									
<b>Nuclear Fuel Services Sewer Discharge</b>									
	$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.047395 \text{ Mill Gal.}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{5.3817 \times 10^7 \text{ pCi}}{\text{Day}}$			
<b>Areva Sewer Discharge</b>									
	$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.007297 \text{ Mill Gal.}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{8.2857 \times 10^6 \text{ pCi}}{\text{Day}}$			
<b>Total Discharge</b>									
	$\frac{3.35578 \times 10^9 \text{ pCi}}{\text{Day}}$	+	$\frac{5.3817 \times 10^7 \text{ pCi}}{\text{Day}}$	+	$\frac{8.2857 \times 10^6 \text{ pCi}}{\text{Day}}$	=	$\frac{3.4179 \times 10^9 \text{ pCi}}{\text{Day}}$		
			$\frac{3.4179 \times 10^9 \text{ pCi}}{\text{Day}}$	X 100 %	=	16.7 % of Stream Capacity			
			$\frac{2.0439 \times 10^{10} \text{ mg}}{\text{Day}}$						



**Table 4 - Uranium Reasonable Potential Calculations Based on Summation of Isotopes**

<b>Uranium Particles Based on Isotopes and Division of Radiological Health Limits</b>						
<b>Nolichucky River</b>						
<b>Drinking Water Standard</b>	30	pCi/L				
<b>30Q5 Flow Rate</b>	180	MGD				
	$\frac{180 \text{ Million Gallons}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$	
		$\frac{30 \text{ pCi}}{\text{L}}$	$\frac{6.813 \times 10^8 \text{ L}}{\text{Day}}$	=	$\frac{2.0439 \times 10^{10} \text{ pCi}}{\text{Day}}$	
<b>Nuclear Fuel Services</b>						
<b>Uranium 234</b>						
$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.0155 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{1.76 \times 10^7 \text{ pCi}}{\text{Day}}$	
<b>Uranium 235</b>						
$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.0155 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{1.76 \times 10^7 \text{ pCi}}{\text{Day}}$	
<b>Uranium 238</b>						
$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.0155 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{1.76 \times 10^7 \text{ pCi}}{\text{Day}}$	
<b>Erwin STP</b>						
<b>Uranium 234</b>						
$\frac{300 \text{ pCi}}{\text{L}}$	$\frac{0.054692 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{6.21 \times 10^7 \text{ pCi}}{\text{Day}}$	
<b>Uranium 235</b>						
$\frac{50 \text{ pCi}}{\text{L}}$	$\frac{0.054692 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{10350461 \text{ pCi}}{\text{Day}}$	
<b>Uranium 238</b>						
$\frac{50 \text{ pCi}}{\text{L}}$	$\frac{0.054692 \text{ Mill Gal}}{\text{Day}}$	$\frac{1000000 \text{ Gallons}}{1 \text{ Million Gallons}}$	$\frac{3.785 \text{ L}}{1 \text{ Gallon}}$	=	$\frac{10350461 \text{ pCi}}{\text{Day}}$	
<b>Total Discharge</b>						
$\frac{(1.76 \times 10^7 \text{ pCi}) \times 3}{\text{Day}}$	+	$\frac{6.21 \times 10^7 \text{ pCi}}{\text{Day}}$	+	$\frac{(10350461 \text{ pCi}) \times 2}{\text{Day}}$	=	$\frac{1.356 \times 10^8}{\text{Day}}$
		$\frac{1.356 \times 10^8}{\text{Day}}$	X 100 %	=	0.7% of Stream Capacity	
		$\frac{2.0439 \times 10^{10} \text{ pCi}}{\text{Day}}$				



Nuclear Fuel Services (Rationale)  
 NPDES Permit TN0002038  
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2008	11/1/2008 to 6/30/2008				7/1/2008 to 12/31/2008				Conversion to 4 mrem/yr (pCi/4mrem) Reference: EPA 816-D-00-002 December 2000 Appendix H	Fraction of 4 millirem/yr		
	Area (BLEU Sewer)	Volume	Activity Concentration	Volume	Activity Concentration	Volume	Activity Concentration	Average Concentration pCi/L				
NPDES Permit TN0023001	Pu-238	Liter	MGD	uCi/mL	pCi/L	Liter	MGD	uCi/mL	pCi/L			
		5958057	0.0087	1.58E-11	0.0158	7954996	0.0117	0.00E+00	0	0.0079	NA	
	Pu-239/240		5958057	0.0087	0.00E+00	0	7954996	0.0117	2.71E-11	0.0271	NA	
	Tc-99		5958057	0.0087	5.59E-09	5.59	7954996	0.0117	8.87E-09	8.87	900	
	Th-228		5958057	0.0087	5.22E-11	0.0522	7954996	0.0117	5.64E-11	0.0564	NA	
	Th-230		5958057	0.0087	2.98E-10	0.298	7954996	0.0117	1.64E-10	0.164	NA	
	Th-232		5958057	0.0087	4.57E-11	0.0457	7954996	0.0117	1.64E-11	0.0164	NA	
	U-232		5958057	0.0087	3.69E-11	0.0369	7954996	0.0117	0.00E+00	0	0.01845	
	U-233/234		5958057	0.0087	5.54E-10	0.554	7954996	0.0117	6.91E-10	0.691	NA	
	U-235/236		5958057	0.0087	7.18E-11	0.0718	7954996	0.0117	2.30E-10	0.23	NA	
	U-238		5958057	0.0087	1.05E-10	0.105	7954996	0.0117	4.56E-10	0.456	NA	
	NFS Wastewater to Erwin STP											
	NPDES Permit TN0023001											
	Pu-238		34065895	0.0500	2.01E-11	0.0201	47074022	0.0691	0.00E+00	0	0.01005	NA
	Pu-239/240		34065895	0.0500	0.00E+00	0	47074022	0.0691	3.14E-11	0.0314	0.0157	NA
	Tc-99		34065895	0.0500	0.00E+00	0	47074022	0.0691	1.90E-08	19	9.5	0.0105555556
	Th-228		34065895	0.0500	3.16E-10	0.316	47074022	0.0691	1.40E-10	0.14	0.228	NA
	Th-230		34065895	0.0500	0.00E+00	0	47074022	0.0691	4.54E-10	0.454	0.227	NA
	Th-232		34065895	0.0500	4.64E-11	0.0464	47074022	0.0691	4.67E-11	0.0467	0.04655	NA
	U-232		34065895	0.0500	4.15E-11	0.0415	47074022	0.0691	2.12E-11	0.0212	0.03135	NA
U-233/234		34065895	0.0500	8.74E-09	8.74	47074022	0.0691	6.77E-09	6.77	7.755	NA	
U-235/236		34065895	0.0500	9.17E-10	0.917	47074022	0.0691	6.72E-10	0.672	0.7945	NA	
U-238		34065895	0.0500	1.89E-09	1.89	47074022	0.0691	1.18E-09	1.18	1.535	NA	
NFS WWTP (NPDES permit TN002038)												
Am-241		3683433	0.0054	0.00E+00	0	3640728	0.0053	0.00E+00	0	0	NA	
Cs-137		3683433	0.0054	3.45E-09	3.45	3640728	0.0053	9.23E-10	0.923	2.1865	200	
Na-22		3683433	0.0054	6.34E-11	0.0634	3640728	0.0053	0.00E+00	0	0.0317	400	
Np-237		3683433	0.0054	3.72E-11	0.0372	3640728	0.0053	7.89E-11	0.0789	0.05805	NA	
Pb-212		3683433	0.0054	2.46E-10	0.246	3640728	0.0053	4.63E-10	0.463	0.3545	NA	
Pu-238		3683433	0.0054	9.76E-12	0.00976	3640728	0.0053	0.00E+00	0	0.00488	NA	
Pu-239/240		3683433	0.0054	3.09E-11	0.0309	3640728	0.0053	0.00E+00	0	0.01545	NA	
Pu-241		3683433	0.0054	0.00E+00	0	3640728	0.0053	5.67E-10	0.567	0.2835	NA	
Ra-224		3683433	0.0054	1.71E-08	17.1	3640728	0.0053	1.91E-08	19.1	18.1	NA	
Tc-99		3683433	0.0054	2.60E-09	2.6	3640728	0.0053	6.51E-09	6.51	4.555	900	
Th-228		3683433	0.0054	1.77E-10	0.177	3640728	0.0053	1.10E-10	0.11	0.1435	NA	
Th-230		3683433	0.0054	5.45E-11	0.0545	3640728	0.0053	1.42E-10	0.142	0.09825	NA	
Th-231		3683433	0.0054	3.32E-09	3.32	3640728	0.0053	0.00E+00	0	1.66	NA	
Th-232		3683433	0.0054	0.00E+00	0	3640728	0.0053	1.41E-12	0.00141	0.000705	NA	
U-232		3683433	0.0054	1.18E-10	0.118	3640728	0.0053	3.86E-11	0.0386	0.0783	NA	
U-233/234		3683433	0.0054	6.26E-08	62.6	3640728	0.0053	8.43E-08	84.3	73.45	NA	
U-235/236		3683433	0.0054	6.21E-09	6.21	3640728	0.0053	5.40E-09	5.4	5.805	NA	
U-238		3683433	0.0054	8.21E-10	0.821	3640728	0.0053	1.06E-09	1.06	0.9405	NA	
									<b>Sum of Fractions</b>	<b>0.03466175</b>		
									<b>Sum of Frac. X.4</b>	<b>0.138647</b>		

### Beta Particle Reasonable Potential Calculations Based on Erwin STP Pretreatment Limits and Daily Maximum Beta Concentration in NFS Application

2007	1/1/2007 to 6/30/2007				7/1/2007 to 12/31/2007				Conversion to 4 mrem/yr (pCi/4mrem) Reference: EPA 816-D-00-002 December 2000 Appendix H	Fraction of 4 millirem/yr	
	Volume Liter	Activity Concentration uCi/mL	Volume MGD	Activity Concentration pCi/L	Volume Liter	Activity Concentration uCi/mL	Volume MGD	Activity Concentration pCi/L			
Area (BLEU Sewer) NPDES Permit TN0023001	7238980	0.0106	0.00E+00	0	6674205	0.0098	1.31E-08	13.1	5000	900	5.56
Tc-99								100	5000	900	5.56
Average Concentration pCi/L											
6.55											
Total Conc.											
6.55											
NFS Wastewater to Erwin STP NPDES Permit TN0023001											
Tc-99	23888742	0.0351	0.00E+00	0	17543391	0.0257	1.98E-09	1.98	5000	900	5.56
Total Conc.											
0.99											
NFS WWTP (NPDES permit TN002038)											
Cs-137	3782157	0.0056	4.00E-10	0.4	3452942	0.0051	5.91E-10	0.591	787.00	200	0.35
Na-22	3782157	0.0056	2.00E-10	0.2	3452942	0.0051	0.00E+00	0	787.00	400	0.04
Tc-99	3782157	0.0056	1.38E-09	1.38	3452942	0.0051	8.49E-09	8.49	787.00	900	0.78
Total Conc.											
5.5305											

Sum of Fractions	12.28
Sum of Frac. X 4	49.12

$(49.12 \text{ millirem/year}) \times 0.070192 \text{ MGD} \times 100\% = 0.48\% \text{ of Stream Capacity}$   
 $4 \text{ millirem/year} \times 180 \text{ MGD}$

2008	1/1/2008 to 6/30/2008				7/1/2008 to 12/31/2008				Conversion to 4 mrem/yr (pCi/4mrem) Reference: EPA 816-D-00-002 December 2000 Appendix H	Fraction of 4 millirem/yr	
	Volume Liter	Activity Concentration uCi/mL	Volume MGD	Activity Concentration pCi/L	Volume Liter	Activity Concentration uCi/mL	Volume MGD	Activity Concentration pCi/L			
Area (BLEU Sewer) NPDES Permit TN0023001	5958057	0.0087	5.59E-09	5.59	7954996	0.0117	8.87E-09	8.87	5000	900	5.56
Tc-99								7.23	5000	900	5.56
Average Concentration pCi/L											
7.23											
Total Conc.											
7.23											
NFS Wastewater to Erwin STP NPDES Permit TN0023001											
Tc-99	34065895	0.0500	0.00E+00	0	47074022	0.0691	1.90E-08	19	5000	900	5.56
Total Conc.											
9.5											
NFS WWTP (NPDES permit TN002038)											
Cs-137	3683433	0.0054	3.45E-09	3.45	3640728	0.0053	9.23E-10	0.923	787	254.1	1.27
Na-22	3683433	0.0054	6.34E-11	0.0634	3640728	0.0053	0.00E+00	0	787	3.7	0.01
Tc-99	3683433	0.0054	2.60E-09	2.6	3640728	0.0053	6.51E-09	6.51	787	529.3	0.59
Total Conc.											
6.7732											

Sum of Fractions	12.98
Sum of Frac. X 4	51.91

$(61.91 \text{ millirem/year}) \times 0.070192 \text{ MGD} \times 100\% = 0.51\% \text{ of Stream Capacity}$   
 $4 \text{ millirem/year} \times 180 \text{ MGD}$



### **Tetrachloroethylene (PCE)**

The permit application has requested that the facility have the option of discharging treated groundwater through its NPDES permit outfall. The primary chemical of concern is tetrachloroethylene (PCE). The instream domestic water supply standard for tetrachloroethylene is 0.005 mg/L. The sampling data for PCE was below the instream standard of 0.005 mg/L in the previous monitoring period. In the new permit, the facility will only be required to report the concentration for PCE

### **IX. ANTIDegradation**

Tennessee's Antidegradation Statement is found in the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.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 determination of the receiving waters associated with the subject discharge(s) and has found the (stream or river) to be an Exceptional Tennessee Water. No permanent degradation of water quality will be allowed unless the applicant demonstrates to the Water Quality Control Board that the degradation is for necessary economic or social development and will not interfere with or become injurious to any existing uses. The specific requirements for this demonstration are described in the Rules of the Tennessee Department of Environment and Conservation, Chapter 1200-4-3-.06(4).

### **X. 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 2015.

## APPENDIX 1

### FACILITY DISCHARGES AND RECEIVING WATERS

OUTFALL 001		RECEIVING STREAM DISCHARGE ROUTE				
LONGITUDE	LATITUDE	Nolichucky River at mile 94.6				
82-26-00	36-08-06	STREAM LOW FLOW (CFS) *		7Q10	1Q10	30Q5
		192.0	NA	278.0		
		(MGD)	124.1	NA	179.7	

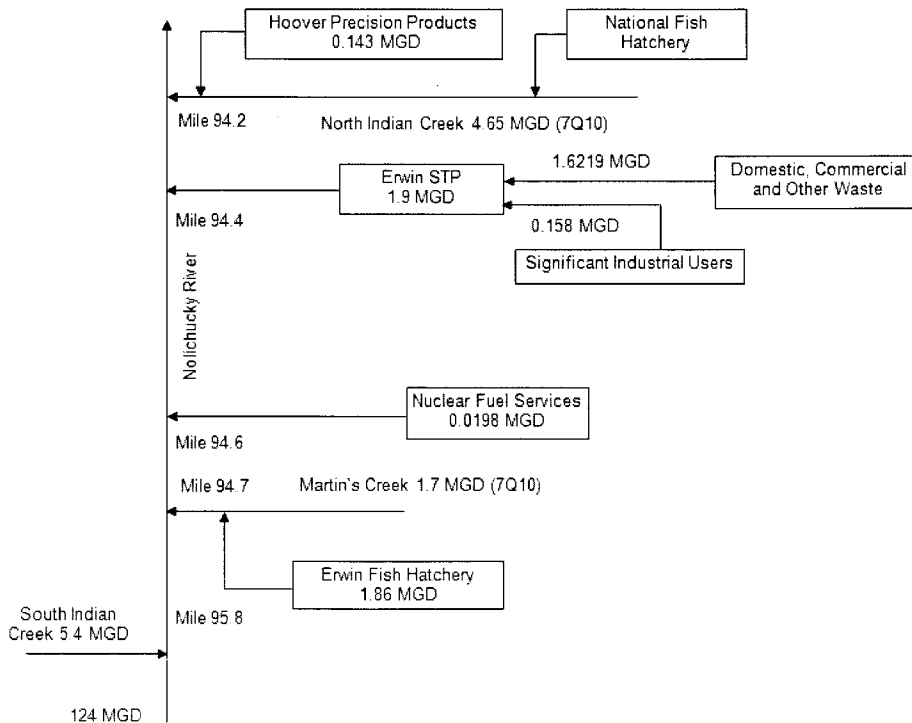
FLOW (MGD)	DISCHARGE SOURCE
0.002130	Fenton's Process Wastewater
0.001191	Laboratory Facilities
0.005697	Laundry Facility
0.002679	Fuel Production Facilities
0.000312	CDL
0.002344	Miscellaneous
0.000405	BPF
0.000038	Development Laboratory
0.005000	Decommissioning Activities
<b>0.0198</b>	<b>TOTAL DISCHARGE</b>

STREAM USE CLASSIFICATIONS (WATER QUALITY)				
FISH & AQUATIC LIFE	RECREATION	IRRIGATION	LIVESTOCK & WILDLIFE	DOMESTIC WATER SUPPLY
X	X	X	X	X
INDUSTRIAL	NAVIGATION			
X				

Treatment: Waste segregation, Ammonia Stripping, Chemical Precipitation, Flocculation, Pressure Filtration  
 Dollinger Filter, Ion Exchange, Neutralization

\* Reference: Streamflow -Characteristic Estimation Methods for Unregulated Streams of Tennessee 2009-5159 Station #618



# APPENDIX 2A

## METALS AND TOXICS CONSIDERATIONS

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

FACILITY: Nuclear Fuel Services  
 PERMIT #: TN0002038

Stream (7010) (MCD)	Waste Flow (MCD)	Ttl. Susp Solids (mg/l)	Hardness (as CaCO3) (mg/l)	Stream Allocation (%)
135.75	180	0.000	29	100

EFFLUENT CHARACTERISTIC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Stream Background	Fish/Aqua Life Water Quality Criteria		Effluent Fraction	Fish & Aquatic Life Water Quality Criteria (7010)			Human Health Water Quality Criteria (3005)			Human Health Water Quality Criteria (3005)			Nuclear Fuels Services Application Value/Permit Limit			Erwin STP	
	Conc (ug/l)	Chronic (ug/l)	Acute (ug/l)	Dissolved Fraction	Chronic (ug/l)	Acute (ug/l)	In-Stream Allowable	Organisms (ug/l)	Water/Organisms (ug/l)	DV/S (ug/l)	In-Stream Criteria	Monthly Average (ug/l)	Daily Maximum (ug/l)	Application Value/Permit Limit	Monthly Average (ug/l)	Daily Maximum (ug/l)	Application	
<b>Cadmium*</b>	0.206	0.104	0.603	0.252	0.412	2.390		NA	NA	5.0					1.2	10.0	0.5	0.5
<b>Copper*</b>	4.473	3.110	4.186	0.348	8.946	12.044		NA	NA	NA					7.3	1000.0	9.0	11.0
<b>Lead*</b>	1.738	0.639	16.404	0.184	3.476	89.200		NA	NA	5.0					5.6	100.0	1.0	1.0
<b>Nickel*</b>	21.106	18.249	164.306	0.432	42.212	380.055		4600.0	610.0	100.0					6.7	9.3	2.0	3.1
<b>Silver*</b>	0.191	NA	0.383	1.000	NA	0.383		NA	NA	NA					5.3	50.0	0.6	0.8
<b>Zinc*</b>	71.858	41.389	41.053	0.288	143.716	142.550		NA	NA	NA					34.0	40.0	40.0	48.0
<b>Mercury (T)**</b>	0.025	0.770	1.400	1.000	0.770	1.400		0.051	0.05	2.0					0.37	50.0	0.2	0.2
<b>Chromium III</b>	66.475	26.891	206.728	0.202	132.950	1022		NA	NA	100.0					1.5	2.0	1.0	1.0
<b>Chromium VI</b>	5.500	11.000	16.000	1.000	11.000	16.000		NA	NA	100.0					1.5	2.0	1.0	1.0
<b>Cyanide (T)**</b>	2.600	5.200	22.000	1.000	5.200	22.000		140.0	140.0	200.0					36.0	39.0	5.0	5.0
<b>Antimony</b>	0.000							640.0	5.6	6.0					3.0	3.0	1.0	1.0
<b>Arsenic</b>	5.000	150.0	340.0	1.000	150.000	340.000		10.0	10.0	10.0					80.6	250.0	1.0	1.0
<b>Beryllium</b>	0.000									4.0					0.5	0.5	2.0	2.0
<b>Selenium</b>	2.500	5.0	20.0	1.000	5.000	20.000				50.0					5.0	5.0	4.0	13.0
<b>Thallium</b>	0.000							6.3	1.7	2.0					2.0	2.0	1.0	1.0

\* Denotes metals for which Fish & Aquatic Life Criteria are expressed as a function of total hardness. The Fish & Aquatic Life criteria for this metal are in the dissolved form at laboratory conditions.

The in-stream allowable criteria and calculated effluent concentrations are in the total recoverable form.

\*\* The criteria for these parameters are in the total form.

NOTE: Water Quality criteria for stream use classifications other than Fish & Aquatic Life are based on the 3005 flow.



EFFLUENT CHARACTERISTIC	Nolichucky Water Quality Limitations					
	Maximum Instream Effluent Conc.			Maximum Instream Effluent Mass		
	Chronic	Acute		Chronic	Acute	
	ug/l	ug/l		lb/day	lb/day	
Cadmium *	0.412	2.390		0.466	2.706	
Copper *	8.946	12.044		10.129	13.635	
Lead *	3.476	5.000		3.935	5.661	
Nickel *	42.212	100.000		47.791	113.216	
Silver *	0.000	0.383		NA	0.433	
Zinc *	143.716	142.550		162.709	161.389	
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	1.700	1.700		1.925	1.925	

Waste Load Allocation
Upstream Background Mass Allocation
10% Reserve Allocation
South Indian Creek Water Quality Allowance
Martin's Creek Water Quality Allowance
Nuclear Fuel Services Effluent Mass Discharge
Erwin STP Effluent Mass Discharge
North Indian Creek Water Quality Allowance

EFFLUENT CHARACTERISTIC	Upstream Background Mass Allocation		10% Reserve Allocation		South Indian Creek Water Quality Allowance		Martin Creek Water Quality Allowance		Nuclear Fuel Services		Erwin STP		North Indian Creek		Remaining Allocation		Total Mass for Nolichucky River	
	ug/l	lb/day	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
			lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Cadmium *	0.206	0.21	0.047	0.27	0.019	0.11	0.007	0.04	0.001	0.001	0.008	0.017	0.10	0.156	1.966	0.466	2.706	
Copper *	2.600	2.69	1.013	1.36	0.405	0.55	0.142	0.19	0.0009	0.129	0.143	0.380	0.51	6.367	8.032	10.129	13.635	
Lead *	1.300	1.34	0.394	0.57	0.167	0.23	0.055	0.08	0.0007	0.013	0.016	0.148	0.21	1.821	3.204	3.935	5.661	
Nickel *	11.900	12.31	4.779	11.32	1.912	4.53	0.669	1.59	0.001	0.001	0.032	1.792	4.25	26.30	79.18	47.791	113.216	
Silver *	0.191	0.20	NA	0.04	NA	0.02	NA	0.01	0.0006	0.006	0.010	NA	0.02	NA	0.134	NA	0.433	
Zinc *	5.900	6.10	16.271	16.14	6.508	6.46	2.278	2.26	0.0041	0.005	0.634	6.102	6.05	124.811	123.6	162.709	161.389	
Mercury, (T) **	0.025	0.03	0.006	0.01	0.002	0.002	0.001	0.00	0.0000	0.006	0.003	0.002	0.00	0.017	0.010	0.067	0.067	
Chromium III	1.200	1.24	11.322	11.32	4.529	4.53	1.595	1.59	0.0002	0.000	0.016	4.246	4.25	90.278	90.278	113.216	113.216	
Chromium VI	1.200	1.24	1.245	1.81	0.498	0.72	0.174	0.25	0.0002	0.000	0.016	0.467	0.68	8.812	13.388	12.454	18.114	
Cyanide (T) **	2.600	2.69	0.589	2.49	0.235	1.00	0.082	0.35	0.0043	0.005	0.079	0.221	0.93	1.987	17.355	5.887	24.907	
Antimony	0.000	0.00	0.634	0.63	0.254	0.25	0.089	0.09	0.0004	0.000	0.016	0.238	0.24	5.110	5.110	6.340	6.340	
Arsenic	5.000	5.17	1.132	1.13	0.453	0.45	0.159	0.16	0.0097	0.032	0.016	0.425	0.42	3.957	3.935	11.322	11.322	
Beryllium	0.000	0.00	0.453	0.45	0.181	0.18	0.063	0.06	0.0001	0.000	0.032	0.170	0.17	3.630	3.630	4.529	4.529	
Selenium	2.500	2.59	0.566	2.26	0.226	0.91	0.079	0.32	0.0006	0.001	0.063	0.212	0.85	1.927	15.515	5.661	22.643	
Thallium	0.000	0.00	0.192	0.19	0.077	0.08	0.027	0.03	0.0002	0.000	0.016	0.072	0.07	1.540	1.540	1.925	1.925	





## APPENDIX 3

### PREVIOUS PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMNT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/batch	Estimate
pH	Range 6.0 - 9.0**				1/batch	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30	--	40	--	1/batch	Grab
SOLIDS, SETTLEABLE	--	--	0.5 ml/l	--	1/batch	Grab
CHLORINE, TOTAL RESIDUAL (TRC)****	--	--	2.0	--	1/batch	Grab**
COD	--	--	370	--	1/Month	Grab
NITROGEN, AMMONIA TOTAL	20	--	30	--	1/batch	Grab
NITRITE PLUS NITRATE NITROGEN	--	--	--	420	1/batch	Grab
FLUORIDE, Soluble	15	--	20	--	1/batch	Grab
ARSENIC, TOTAL	--	--	Report	--	1/quarter	Grab
CADMIUM, TOTAL	--	--	0.01	--	1/Month	Grab
CHROMIUM, TOTAL	--	--	Report	--	1/quarter	Grab
COPPER, TOTAL	--	--	1.0	--	1/Month	Grab
LEAD, TOTAL	--	--	0.1	--	1/Month	Grab
MERCURY, TOTAL***	0.00037	--	0.050	--	1/batch	Grab
NICKEL, TOTAL	--	--	Report	--	1/quarter	Grab
SILVER, TOTAL	--	--	0.05	--	1/Month	Grab
URANIUM, NATURAL, TOTAL	2.0	--	4.0	--	1/batch	Grab
TETRACHLOROETHYLENE	--	--	Report	--	1/quarter	Grab

\* Flow shall be reported in Million Gallons per Batch.

\*\* pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.

\*\*\* 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.

\*\*\*\* The total residual chlorine limit is only applicable when chlorine is used in the treatment process.

## APPENDIX 4

### HISTORICAL MONITORING AND INSPECTION

Date	Flow		Total Suspended Solids		Ammonia, Total Nitrogen		Soluble Fluoride		Total Mercury		Total Natural Uranium		Cadmium
	Monthly Average Amount	Daily Maximum Amount	Monthly Average Conc.	Daily Max. Conc.	Monthly Average Conc.	Daily Max. Conc.	Monthly Average Conc.	Daily Max. Conc.	Monthly Average Conc.	Daily Max. Conc.	Monthly Average Conc.	Daily Max. Conc.	Daily Max. Conc.
	MGD	MGD	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
8/31/2006	0.0142	0.0148	4	12	17	25	0	0		0.0022	0.0144	0.1300	0.0000
9/30/2006	0.0143	0.0150	2	6	20	26	0	0		0.0023	0.0338	0.1700	0.0000
10/31/2006	0.0133	0.0147	3	18	15	20	0	0		0.0010	0.0338	0.1700	0.0000
11/30/2006	0.0139	0.0150	2	18	13	20	0	0	0.00029	0.0006	0.0350	0.1500	0.0000
12/31/2006	0.0143	0.0153	1	2	13	17	0	0		0.0014	0.0000	0.0000	0.0000
1/31/2007	0.0144	0.0153	5	13	16	22	0	0		0.0029	0.0100	0.1100	0.0012
2/28/2007	0.0140	0.0154	3	14	16	26	0	0		0.0018	0.0000	0.0000	0.0000
3/31/2007	0.0141	0.0153	7	33	19	23	0	0		0.0032	0.0350	0.2600	0.0000
4/30/2007	0.0145	0.0155	5	23	14	25	0	0		0.0061	0.0492	0.2800	0.0000
5/31/2007	0.0149	0.0155	2	8	7	20	0	0		0.0038	0.0147	0.1100	0.0000
6/30/2007	0.0147	0.0155	3	10	15	27	0	0		0.0024	0.0125	0.1500	0.0017
7/31/2007													
8/31/2007	0.0145	0.0155	2	8	14	26	0	0		0.0017	0.0058	0.1100	0.0017
9/30/2007	0.0141	0.0154	3	20	14	26	0	0		0.0035	0.0538	0.6000	0.0012
10/31/2007	0.0143	0.0151	3	12	16	27	0	0		0.0010	0.0792	0.8500	0.0000
11/30/2007	0.0141	0.0152	3	10	18	28	0	0		0.0020	0.0600	0.1100	0.0000
12/31/2007	0.0138	0.0148	2	7	13	21	0	0		0.0009	0.1213	0.1700	0.0014
1/31/2008	0.0144	0.0148	1	7	11	26	0	0		0.0025	0.0788	0.1400	0.0000
2/29/2008	0.0145	0.0155	4	19	15	22	10	10		0.0018	0.0900	0.1400	0.0019
3/31/2008	0.0141	0.0141	6	9	17	28	10	10		0.0031	0.1410	0.2000	0.0016
4/30/2008	0.0142	0.0155	5	34	16	26	0	0		0.0021	0.1467	0.2100	0.0021
5/31/2008													
6/30/2008	0.0143	0.0148	3	12	10	27	0	0		0.0006	0.0567	0.1900	0.0020
7/31/2008	0.0143	0.0155	8	26	16	28	0	0		0.0027	0.0786	0.8400	0.0000
8/31/2008	0.0143	0.0152	5	11	17	28	10	10		0.0500	0.0900	0.0900	0.0100
9/30/2008	0.0145	0.0153	4	24	13	22	10	10	0.00037	0.0500	0.1100	0.3200	0.0012
10/31/2008	0.0141	0.0149	5	33	16	27	10	10		0.0026	0.0950	0.1500	0.0014
11/30/2008	0.0144	0.0153	4	12	16	24	10	10	0.00028	0.0000	0.0900	0.0900	0.0010
12/31/2008	0.0146	0.0151	4	8	14	24	10	10		0.0060	0.0900	0.0900	0.0010
1/31/2009	0.0150	0.0155	6	11	17	26	10	10	0.00035	0.0020	0.1500	0.5900	0.0010
2/28/2009	0.0150	0.0155	6	13	16	25	10	10		0.0037	0.0900	0.0900	0.0010
3/31/2009	0.0150	0.0155	5	14	17	26	11	20		0.0029	0.0900	0.0900	0.0010
4/30/2009	0.0149	0.0155	9	34	17	27	10	10	0.0002	0.0004	0.1300	0.3800	0.0011
5/31/2009	0.0151	0.0155	4	6	16	24	10	10	0	0.0079	0.3200	1.7000	0.0015
6/30/2009	0.0150	0.0155	5	10	17	29	10	10	Not Received	Not Received	0.0930	0.1200	0.0010
7/31/2009	0.0144	0.0151	4	7	14	20	10	10		0.0018	0.1400	0.5000	0.0020
8/31/2009	0.0148	0.0153	7	12	14	28	10	10		0.0012	0.3500	0.7400	0.0010
9/30/2009	0.0146	0.0155	7	11	17	18	10	10		0.0025	0.1900	0.5400	0.0010
10/31/2009	0.0147	0.0153	7	21	14	20	10	10		0.0004	0.1450	0.3200	0.0010
11/30/2009	0.0146	0.0155	12	34	18	27	10	10	0	0.0004	0.0180	0.2500	0.0010
12/31/2009	0.0145	0.0155	13	26	17	25	10	10	0	0.0004	0.2000	0.6600	0.0013
1/31/2010	0.0131	0.0146	8	15	11	27	10	10	0.00007	0.0001	0.1900	0.4100	0.0010
2/28/2010	0.0142	0.0149	7	15	4	8	10	10	0.00007	0.0001	0.2500	0.7000	0.0010
3/31/2010	0.0137	0.0147	9	18	5	10	7	10	NOD=B	NOD=B	0.4600	1.5000	0.0016
4/30/2010	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received
5/31/2010	0.0141	0.0151	13	22	10	16	1	1	0.00009	0.0002	0.2700	0.4000	0.0010
6/30/2010	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received	Not Received
Standard Dev.	0.0004	0.0003	3	9	3	5	5.0	5.5	0.0001	0.0106	0.10	0.37	0.002
Minimum	0.0131	0.0141	1	2	4	8	0.0	0.0	0.0000	0.0000	0.00	0.00	0.000
Maximum	0.0151	0.0155	13	34	20	29	11.0	20.0	0.0004	0.0500	0.46	1.70	0.010
Average	0.0144	0.0152	5	16	14	24	5.1	5.4	0.0002	0.0044	0.11	0.35	0.001
Permit Limit	Report	Report	30	40	20	30	15	20	0.00037	0.0500	2.0	4.0	0.01
Count	45	45	45	45	45	45	45	45	15	45	45	45	45



	Tetrachloro-ethylene	Nickel	Chromium	Arsenic
Date	Daily Max. Conc. mg/L	Daily Max. Conc. mg/L	Daily Max. Conc. mg/L	Daily Max. Conc. mg/L
3/31/2009	0.0005	0.0073	0.0020	0.0172
6/30/2009	0.0005	0.0041	0.0020	0.0050
9/30/2009	0.0003	0.0093	0.0010	0.0500
12/31/2009	0.0003	0.0060	0.0010	0.2500
3/31/2010	0.0003	0.0024	0.0017	0.0050
6/30/2010	Not Received	Not Received	Not Received	Not Received
<b>Standard Dev.</b>	<b>0.000</b>	<b>0.003</b>	<b>0.001</b>	<b>0.105</b>
<b>Minimum</b>	<b>0.000</b>	<b>0.002</b>	<b>0.001</b>	<b>0.005</b>
<b>Maximum</b>	<b>0.000</b>	<b>0.009</b>	<b>0.002</b>	<b>0.250</b>
<b>Average</b>	<b>0.000</b>	<b>0.006</b>	<b>0.002</b>	<b>0.065</b>
<b>Permit Limit</b>	<b>Report</b>	<b>Report</b>	<b>Report</b>	<b>Report</b>
<b>Count</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>

**APPENDIX 5**

**NITRITE-NITRATE LIMIT CALCULATIONS**

**DEEMER's 2004 Daily Submittal**

Monitoring Date	Flow (MGD)	Nitrite plus Nitrate (mg/L)
06-Jan-04	0.0139	79.5
08-Jan-04	0.0147	10.1
12-Jan-04	0.0029	0.9
13-Jan-04	0.0101	3.1
15-Jan-04	0.0097	79.7
16-Jan-04	0.0042	34.2
19-Jan-04	0.0083	10.2
20-Jan-04	0.0052	6.3
21-Jan-04	0.0042	2.6
22-Jan-04	0.0102	6.4
26-Jan-04	0.0024	21.0
27-Jan-04	0.0061	53.4
28-Jan-04	0.0045	39.5
30-Jan-04	0.0134	18.0
02-Feb-04	0.0144	34.8
05-Feb-04	0.0134	29.1
06-Feb-04	0.0133	119.4
09-Feb-04	0.0140	18.5
10-Feb-04	0.0142	22.5
12-Feb-04	0.0140	17.5
14-Feb-04	0.0145	100.3
17-Feb-04	0.0143	7.6
23-Feb-04	0.0148	9.2
24-Feb-04	0.0140	48.5
27-Feb-04	0.0147	15.7
29-Feb-04	0.0147	66.4
03-Mar-04	0.0145	8.7
05-Mar-04	0.0145	24.3
09-Mar-04	0.0154	8.8
12-Mar-04	0.0148	52.0
14-Mar-04	0.0150	11.6
19-Mar-04	0.0132	60.3
22-Mar-04	0.0138	12.8
24-Mar-04	0.0134	23.6
26-Mar-04	0.0148	20.3
30-Mar-04	0.0151	13.4
01-Apr-04	0.0146	15.7
06-Apr-04	0.0137	71.5
08-Apr-04	0.0146	12.6
12-Apr-04	0.0130	98.7
14-Apr-04	0.0107	11.6
16-Apr-04	0.0151	10.9
20-Apr-04	0.0139	7.9
21-Apr-04	0.0122	92.1
26-Apr-04	0.0148	15.0
29-Apr-04	0.0109	73.5
30-Apr-04	0.0151	23.5

05-May-04	0.0143	8.7
07-May-04	0.0148	43.2
08-May-04	0.0145	50.3
11-May-04	0.0154	34.1
13-May-04	0.0143	10.0
14-May-04	0.0141	80.1
17-May-04	0.0148	15.5
20-May-04	0.0136	71.6
21-May-04	0.0141	4.8
23-May-04	0.0141	94.8
25-May-04	0.0152	21.7
27-May-04	0.0148	16.5
28-May-04	0.0151	68.8
02-Jun-04	0.0151	12.3
04-Jun-04	0.0122	58.8
07-Jun-04	0.0143	9.7
09-Jun-04	0.0139	26.0
10-Jun-04	0.0152	11.3
14-Jun-04	0.0138	6.9
16-Jun-04	0.0137	60.1
17-Jun-04	0.0150	14.2
22-Jun-04	0.0282	82.1
24-Jun-04	0.0271	21.9
25-Jun-04	0.0123	12.3
28-Jun-04	0.0143	34.9
29-Jun-04	0.0140	2.7
30-Jun-04	0.0151	9.1
05-Jul-04	0.0148	36.8
06-Jul-04	0.0153	0.8
09-Jul-04	0.0150	97.8
11-Jul-04	0.0143	36.0
13-Jul-04	0.0145	18.1
14-Jul-04	0.0122	52.9
15-Jul-04	0.0153	14.6
17-Jul-04	0.0154	15.4
18-Jul-04	0.0145	17.4
21-Jul-04	0.0155	9.5
22-Jul-04	0.0143	42.1
23-Jul-04	0.0149	11.3
26-Jul-04	0.0154	48.7
28-Jul-04	0.0149	43.9
29-Jul-04	0.0145	8.1
30-Jul-04	0.0155	59.4
31-Jul-04	0.0147	13.4
02-Aug-04	0.0150	22.6
04-Aug-04	0.0149	6.8
05-Aug-04	0.0156	18.1
07-Aug-04	0.0154	16.8
09-Aug-04	0.0153	6.5
10-Aug-04	0.0152	5.8
12-Aug-04	0.0153	6.9
13-Aug-04	0.0299	44.9
14-Aug-04	0.0153	39.8
15-Aug-04	0.0148	56.6
17-Aug-04	0.0118	13.5
18-Aug-04	0.0141	17.4
19-Aug-04	0.0148	19.2
20-Aug-04	0.0074	193.1
21-Aug-04	0.0155	13.4
23-Aug-04	0.0155	28.6
25-Aug-04	0.0151	35.5
26-Aug-04	0.0144	101.4
28-Aug-04	0.0146	51.1
30-Aug-04	0.0149	30.9

02-Sep-04	0.0155	30.0
03-Sep-04	0.0141	14.8
04-Sep-04	0.0151	40.5
07-Sep-04	0.0151	24.3
08-Sep-04	0.0150	47.4
09-Sep-04	0.0152	13.3
14-Sep-04	0.0283	27.3
15-Sep-04	0.0155	8.6
16-Sep-04	0.0149	10.0
21-Sep-04	0.0153	31.2
22-Sep-04	0.0152	21.8
23-Sep-04	0.0155	15.2
24-Sep-04	0.0143	19.0
28-Sep-04	0.0143	25.3
29-Sep-04	0.0146	13.7
01-Oct-04	0.0155	16.0
02-Oct-04	0.0305	3.0
04-Oct-04	0.0151	78.5
05-Oct-04	0.0155	78.9
07-Oct-04	0.0301	38.5
09-Oct-04	0.0146	7.7
11-Oct-04	0.0155	86.7
12-Oct-04	0.0146	23.7
19-Oct-04	0.0307	50.8
21-Oct-04	0.0284	45.3
22-Oct-04	0.0152	13.2
23-Oct-04	0.0151	13.8
25-Oct-04	0.0154	141.7
26-Oct-04	0.0145	18.1
27-Oct-04	0.0152	28.5
28-Oct-04	0.0155	26.1
01-Nov-04	0.0145	23.3
02-Nov-04	0.0141	10.3
04-Nov-04	0.0155	10.1
05-Nov-04	0.0155	11.7
08-Nov-04	0.0146	11.9
11-Nov-04	0.0148	110.6
15-Nov-04	0.0135	19.3
17-Nov-04	0.0147	19.9
19-Nov-04	0.0132	24.6
23-Nov-04	0.0148	99.6
24-Nov-04	0.0151	31.7
02-Dec-04	0.0129	67.2
03-Dec-04	0.0104	232.9
06-Dec-04	0.0117	75.5
10-Dec-04	0.0154	27.3
12-Dec-04	0.0144	14.3
13-Dec-04	0.0147	18.4
14-Dec-04	0.0145	10.1
16-Dec-04	0.0138	15.9
20-Dec-04	0.0139	63.9
21-Dec-04	0.0134	9.2
23-Dec-04	0.0130	10.8
24-Dec-04	0.0022	1.8
<b>Average</b>	<b>0.0145</b>	<b>33.9</b>
<b>Maximum</b>	<b>0.0307</b>	<b>232.9</b>
<b>Standard Dev</b>	<b>0.00422</b>	<b>34.5</b>



**DEEMER's 2005 Daily Submittal**

Monitoring Date	Flow (MGD)	Nitrite plus Nitrate (mg/L)
03-Jan-05	0.0122	43.0
04-Jan-05	0.0020	7.2
05-Jan-05	0.0080	7.1
06-Jan-05	0.0068	6.0
07-Jan-05	0.0139	60.7
10-Jan-05	0.0105	140.8
11-Jan-05	0.0139	34.9
12-Jan-05	0.0148	109.7
13-Jan-05	0.0146	24.4
14-Jan-05	0.0136	21.1
18-Jan-05	0.0145	74.5
21-Jan-05	0.0142	81.7
26-Jan-05	0.0112	4.6
27-Jan-05	0.0146	61.6
02-Feb-05	0.0141	13.1
03-Feb-05	0.0139	69.6
07-Feb-05	0.0145	22.2
08-Feb-05	0.0151	25.8
09-Feb-05	0.0142	173.7
11-Feb-05	0.0150	23.9
15-Feb-05	0.0117	136.4
17-Feb-05	0.0139	82.5
18-Feb-05	0.0154	58.7
22-Feb-05	0.0294	47.8
24-Feb-05	0.0126	222.0
27-Feb-05	0.0139	23.5
01-Mar-05	0.0124	89.5
02-Mar-05	0.0158	104.3
04-Mar-05	0.0141	54.5
07-Mar-05	0.0153	14.3
08-Mar-05	0.0137	76.7
09-Mar-05	0.0141	15.5
10-Mar-05	0.0149	32.9
11-Mar-05	0.0146	34.3
14-Mar-05	0.0155	231.9
15-Mar-05	0.0151	64.9
16-Mar-05	0.0139	45.4
17-Mar-05	0.0148	70.3
23-Mar-05	0.0150	39.8
24-Mar-05	0.0132	95.6
28-Mar-05	0.0143	22.2
30-Mar-05	0.0150	35.3
31-Mar-05	0.0145	36.6
04-Apr-05	0.0141	18.6
05-Apr-05	0.0141	105.9
08-Apr-05	0.0131	44.5
11-Apr-05	0.0148	15.8
12-Apr-05	0.0149	244.2
15-Apr-05	0.0148	75.9
16-Apr-05	0.0142	108.6
19-Apr-05	0.0143	15.1
21-Apr-05	0.0146	73.0
22-Apr-05	0.0151	253.4
23-Apr-05	0.0144	43.3
24-Apr-05	0.0147	41.3
25-Apr-05	0.0145	25.3
27-Apr-05	0.0134	11.4
28-Apr-05	0.0124	35.6

02-May-05	0.0144	54.3
04-May-05	0.0144	75.3
05-May-05	0.0147	30.4
06-May-05	0.0145	4.7
10-May-05	0.0139	16.3
11-May-05	0.0133	102.3
12-May-05	0.0149	72.4
13-May-05	0.0141	7.4
16-May-05	0.0144	84.0
17-May-05	0.0144	25.1
19-May-05	0.0146	21.3
20-May-05	0.0147	15.9
23-May-05	0.0151	68.5
25-May-05	0.0146	75.3
27-May-05	0.0151	6.4
01-Jun-05	0.0148	64.8
02-Jun-05	0.0143	32.0
07-Jun-05	0.0146	20.3
08-Jun-05	0.0144	6.5
13-Jun-05	0.0147	14.3
14-Jun-05	0.0145	17.3
17-Jun-05	0.0147	35.4
20-Jun-05	0.0133	22.0
21-Jun-05	0.0144	58.2
23-Jun-05	0.0139	9.6
24-Jun-05	0.0147	10.0
28-Jun-05	0.0148	2.6
29-Jun-05	0.0130	15.8
30-Jun-05	0.0141	10.0
01-Jul-05	0.0144	55.5
06-Jul-05	0.0141	21.5
07-Jul-05	0.0143	24.6
08-Jul-05	0.0150	5.0
09-Jul-05	0.0148	17.8
11-Jul-05	0.0139	21.2
12-Jul-05	0.0154	85.3
14-Jul-05	0.0143	35.3
16-Jul-05	0.0141	48.9
17-Jul-05	0.0139	12.3
19-Jul-05	0.0129	30.0
20-Jul-05	0.0145	95.9
21-Jul-05	0.0148	14.5
22-Jul-05	0.0143	15.5
25-Jul-05	0.0143	58.1
26-Jul-05	0.0145	19.1
27-Jul-05	0.0152	15.0
28-Jul-05	0.0116	55.6
29-Jul-05	0.0035	16.7
30-Jul-05	0.0143	8.6
01-Aug-05	0.0148	5.0
02-Aug-05	0.0141	15.1
04-Aug-05	0.0153	68.1
05-Aug-05	0.0145	10.3
08-Aug-05	0.0145	34.8
09-Aug-05	0.0154	35.6
11-Aug-05	0.0148	77.1
12-Aug-05	0.0147	15.6
18-Aug-05	0.0151	63.4
19-Aug-05	0.0154	17.1
20-Aug-05	0.0147	15.1
22-Aug-05	0.0148	82.1
24-Aug-05	0.0151	12.8
25-Aug-05	0.0147	14.5
27-Aug-05	0.0142	79.1
31-Aug-05	0.0131	26.0

01-Sep-05	0.0143	104.6
02-Sep-05	0.0141	19.6
07-Sep-05	0.0146	9.4
09-Sep-05	0.0146	40.7
10-Sep-05	0.0145	75.9
13-Sep-05	0.0146	22.3
14-Sep-05	0.0147	16.6
15-Sep-05	0.0137	41.3
20-Sep-05	0.0155	78.8
21-Sep-05	0.0139	26.4
22-Sep-05	0.0142	25.3
23-Sep-05	0.0155	105.4
27-Sep-05	0.0149	20.8
28-Sep-05	0.0152	54.6
29-Sep-05	0.0136	26.2
30-Sep-05	0.0144	96.2
02-Oct-05	0.0134	27.1
04-Oct-05	0.0143	53.8
05-Oct-05	0.0153	54.4
06-Oct-05	0.0127	8.5
08-Oct-05	0.0145	16.2
10-Oct-05	0.0147	79.5
11-Oct-05	0.0148	42.1
12-Oct-05	0.0149	35.0
14-Oct-05	0.0148	11.9
16-Oct-05	0.0141	65.0
18-Oct-05	0.0146	15.9
20-Oct-05	0.0134	15.8
25-Oct-05	0.0106	9.3
26-Oct-05	0.0141	46.7
27-Oct-05	0.0149	49.8
29-Oct-05	0.0140	79.3
30-Oct-05	0.0143	77.8
01-Nov-05	0.0136	14.1
02-Nov-05	0.0141	31.5
04-Nov-05	0.0151	36.9
05-Nov-05	0.0143	33.1
08-Nov-05	0.0135	32.1
09-Nov-05	0.0141	72.1
10-Nov-05	0.0133	11.5
12-Nov-05	0.0141	28.8
13-Nov-05	0.0150	97.3
14-Nov-05	0.0134	25.9
16-Nov-05	0.0146	12.7
17-Nov-05	0.0131	15.6
22-Nov-05	0.0148	130.6
23-Nov-05	0.0140	12.7
28-Nov-05	0.0149	25.8
30-Nov-05	0.0133	16.6
02-Dec-05	0.0126	12.0
06-Dec-05	0.0144	83.8
07-Dec-05	0.0143	14.6
09-Dec-05	0.0148	85.4
13-Dec-05	0.0155	10.3
15-Dec-05	0.0143	77.5
17-Dec-05	0.0139	15.5
20-Dec-05	0.0133	20.7
22-Dec-05	0.0136	20.5
23-Dec-05	0.0129	8.9
<b>Average</b>	<b>0.01413</b>	<b>45.9</b>
<b>Maximum</b>	<b>0.029</b>	<b>253.4</b>
<b>Standard Dev</b>	<b>0.0020</b>	<b>43.4</b>

**DEEMER's 2006 Daily Submittal**

<b>Monitoring Date</b>	<b>Flow (MGD)</b>	<b>Nitrite plus Nitrate (mg/L)</b>
01-Feb-06	0.011455	12.41
03-Feb-06	0.013993	16
06-Feb-06	0.01505	88.66
08-Feb-06	0.014557	23.69
09-Feb-06	0.015403	77.12
10-Feb-06	0.01498	12.75
12-Feb-06	0.014416	49.44
13-Feb-06	0.01491	58.22
15-Feb-06	0.013711	28.37
17-Feb-06	0.014769	86.76
20-Feb-06	0.013077	79.66
21-Feb-06	0.014627	17.7
22-Feb-06	0.01357	31.03
24-Feb-06	0.01498	75.63
27-Feb-06	0.013077	61
28-Feb-06	0.01431	25.79
06-Mar-06	0.014346	70.75
07-Mar-06	0.014169	35.12
08-Mar-06	0.013217	14.78
10-Mar-06	0.013852	22.89
12-Mar-06	0.014064	52.57
14-Mar-06	0.013852	26.7
16-Mar-06	0.014275	196.07
19-Mar-06	0.013923	14.06
21-Mar-06	0.010821	41.53
22-Mar-06	0.002397	9.2
23-Mar-06	0.013781	15.32
25-Mar-06	0.012618	74.65
27-Mar-06	0.015121	29.78
29-Mar-06	0.013781	58.47
<b>Average</b>	<b>0.01357</b>	<b>46.9</b>
<b>Maximum</b>	<b>0.0154</b>	<b>196.1</b>
<b>Standard Dev</b>	<b>0.0023</b>	<b>38.0</b>

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Daily Maximum Permit Limit Calculations With All Measurements Greater Than Detection Limit

$X_i$	=	Daily Pollutant Measurement I	$X_i$	=	See Data
$Y_i$	=	$\ln(X_i)$	$Y_i$	=	See Data
$K$	=	sample size of data set	$K$	=	544
$\mu_y$	=	$\sum(y_i)/k$	$\mu_y$	=	3.27
$\sigma_y^2$	=	$\sum[(y_i - \mu_y)^2]/(k-1)$	$\sigma_y^2$	=	1.42
$X_{.95}$	=	$e^{(\mu_y + 1.645\sigma_y)}$	$X_{.95}$	=	186 lb/day
$X_{.99}$	=	$e^{(\mu_y + 2.326\sigma_y)}$	$X_{.99}$	=	420 lb/day

APPENDIX 6

NEW PERMIT LIMITS AND MONITORING REQUIREMENTS

PERMIT LIMITS						
OUTFALL 001						
EFFLUENT CHARACTERISTIC	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
	MONTHLY		DAILY		MSRMT. FRQNCY.	SAMPLE TYPE
	AVG. CONC. (mg/l)	AVG. AMNT. (lb/day)	MAX. CONC. (mg/l)	MAX. AMNT. (lb/day)		
FLOW	Report (MGD) *		Report (MGD) *		1/batch	Estimate
pH	Range 6.0 - 9.0**				1/batch	Grab
TOTAL SUSPENDED SOLIDS (TSS)	30	--	40	--	1/batch	Grab
SOLIDS, SETTLEABLE	--	--	0.5 ml/l	--	1/batch	Grab
CHLORINE, TOTAL RESIDUAL (TRC)****	--	--	2.0	--	1/batch	Grab**
COD	--	--	370	--	1/Month	Grab
NITROGEN, AMMONIA TOTAL	20	--	30	--	1/batch	Grab
NITRITE PLUS NITRATE NITROGEN	--	--	--	420	1/batch	Grab
FLUORIDE, Soluble	15	--	20	--	1/batch	Grab
ARSENIC, TOTAL	--	--	Report	--	1/quarter	Grab
CADMIUM, TOTAL	--	--	0.01	--	1/Month	Grab
CHROMIUM, TOTAL	--	--	Report	--	1/quarter	Grab
COPPER, TOTAL	--	--	1.0	--	1/Month	Grab
LEAD, TOTAL	--	--	0.1	--	1/Month	Grab
MERCURY, TOTAL***	0.00037	--	0.050	--	1/batch	Grab
NICKEL, TOTAL	--	--	Report	--	1/quarter	Grab
SILVER, TOTAL	--	--	0.05	--	1/Month	Grab
URANIUM, TOTAL	2.0	--	4.0	--	1/batch	Grab
TETRACHLOROETHYLENE	--	--	Report	--	1/quarter	Grab

\* Flow shall be reported in Million Gallons per Batch.

\*\* pH and TRC analyses shall be performed within fifteen (15) minutes of sample collection.

\*\*\* 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.

\*\*\*\* The total residual chlorine limit is only applicable when chlorine is used in the treatment process.