



70-143

**Nuclear Fuel Services, Inc.**  
P.O. Box 337, MS 123  
Erwin, TN 37650

(423) 743-9141

E-Mail :<http://www.atnfs.com>

**AIRBORNE EXPRESS**

21G-02-0005  
GOV-01-55-04  
ACF-02-0002

January 15, 2002

Director  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555

- References:
- 1) Docket No. 70-143; SNM License 124
  - 2) Letter from B.M. Moore to NRC, Supplemental Environmental Report to Support Licensing Actions for the BLEU Project, dated November 12, 2001 (21G-01-0298)
  - 3) Letter from NRC to B.M. Moore, NRC Comments on the Applicability of DOE/EIS-0240 to NFS' Proposed License Amendment to Construct and Operate a New Oxide Conversion Facility (TAC No. L31299), dated July 25, 2000
  - 4) Department of Energy, Office of Fissile Materials Disposition, Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement, DOE/EIS-0240, June 1996

**Subject: Additional Information to Support an Environmental Review for BLEU Project**

Dear Sir:

Nuclear Fuel Services, Inc. (NFS) hereby submits additional information (Attachment) to support an environmental review for the BLEU Project. As you are aware, NFS submitted a Supplemental Environmental Report (ER) for the BLEU Project (Reference 2) as required under Title 10 Code of Federal Regulations (CFR) Part 51.60(b)(2)(i) concerning a significant expansion of the site. The information contained herein was not included in the Supplemental ER, but was previously identified in Reference 3 as needing to be reviewed by your staff to complete an Environmental Assessment for the BLEU Project.

NMSS01 Public

To assist your staff in the review of this submittal, a cross-walk has been prepared that specifies which of the following documents contain the information needed to complete this portion of the environmental review:

- Nuclear Regulatory Commission's (NRC) Environmental Assessment (January 1999) that was issued to support renewal of SNM-124;
- NFS' Environmental Report submitted in 1996 to support renewal of SNM-124;
- NFS' Supplemental Environmental Report (Reference 2); and
- Additional Information contained herein.

A comparison between the environmental impacts attributable to the BLEU Project and the Environmental Impact Statement (EIS) (Reference 4) that was prepared by the Department of Energy (DOE) is contained in Attachment 24 of this submittal. NFS believes that this comparison is useful in demonstrating that environmental impacts identified in the DOE's EIS are bounding for the limited scope of work that will be conducted at NFS. NFS appreciates the opportunity to discuss the environmental review being conducted by your staff at the meeting scheduled in Rockville, Maryland on January 24, 2002.

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me, or Mr. Rik Droke, Licensing and Compliance Director at (423) 743-1741. Please reference our unique document identification number (21G-02-0005) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.



B. Marie Moore  
Vice President  
Safety and Regulatory

JSK/lsm

B.M. Moore to Dir., NMSS  
Page 3  
January 15, 2002

21G-02-0005  
GOV-01-55-04  
ACF-02-0002

cc:

Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23T85  
Atlanta, GA 30303

Mr. William Gloersen  
Project Inspector  
U.S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23T85  
Atlanta, GA 30303

Mr. Dan Rich  
Senior Resident Inspector  
U.S. Nuclear Regulatory Commission

### *Attachments 1-27*

#### Additional Information to Support an Environmental Review for the BLEU Project

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**Attachment 1**  
**Additional Information for Site Infrastructure**  
**(Table 2.4-2 of DOE/EIS-0240)**

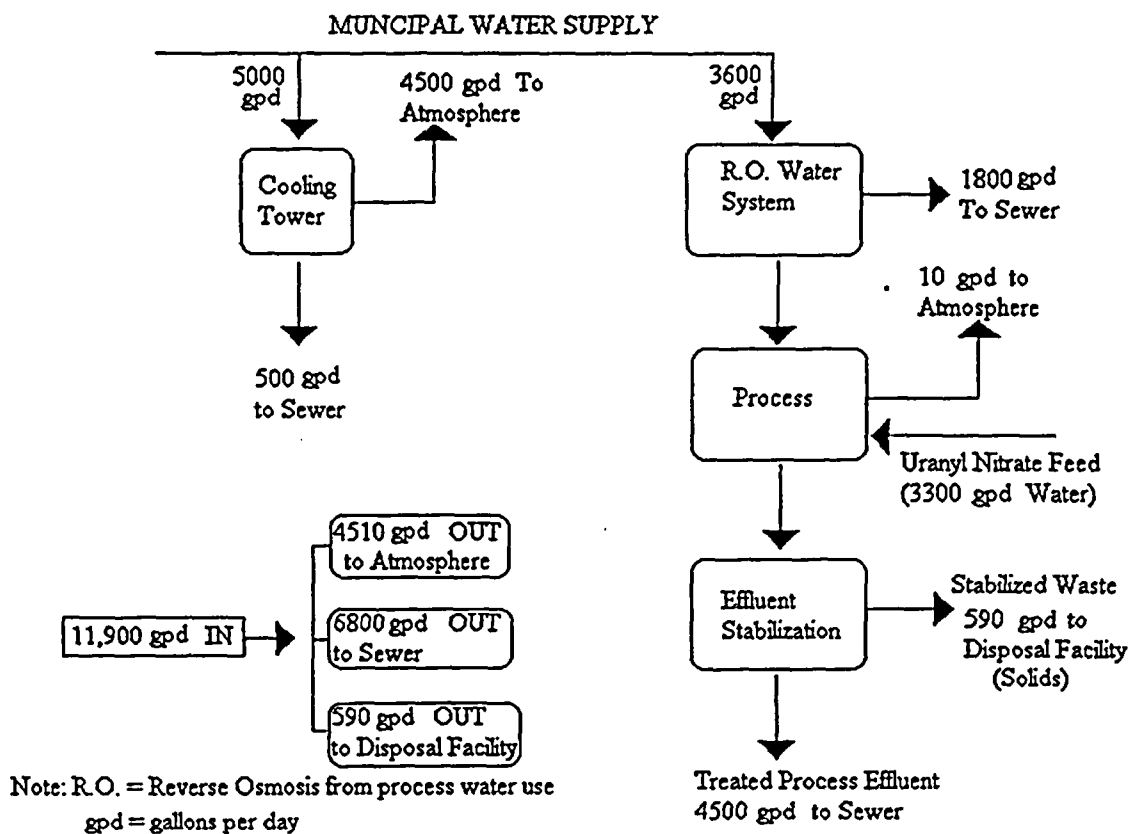
	<b>NFS Current Operations</b>	<b>Down Blending (BPF)</b>	<b>BLEU Complex</b>	<b>DOE/EIS-0240<sup>c</sup> Incremental / Site</b>
Water Usage (million l / yr)	59	<3	5.7	19 / 76
Electrical Usage (MWh/yr)	18,260 <sup>a</sup>	3,000	3,800	4,011 / 25,811
Diesel/Oil (l/yr)	21,505 <sup>a</sup>	0	1,893 <sup>b</sup>	335,880 / 371,880
Natural Gas (m <sup>3</sup> /yr)	7,813 <sup>a</sup>	0	266,208	17,028 / 29,928
Coal (t/yr)	0	0	0	0 / 0
Steam (kg/hr)	6,260	0 <sup>c</sup>	0 <sup>d</sup>	1.25 / 6,261

- a. The values are from actual NFS billing data for 2000.
- b. The quantity of diesel fuel is a stored volume for emergency power generation.
- c. The electrically heated steam boiler used in the BPF facility will be a closed loop system with no liquid discharge.
- d. The gas-fired steam boiler used at the BLEU Complex will be a closed loop system with no liquid discharge.
- e. The values were calculated from Table 4.3.1.1-1 (p. 4-24), "Annual Changes to Site Infrastructure for Blending (10 t/yr) Highly Enriched Uranium to 4-Percent Low-Enriched Uranium as Uranyl Nitrate Hexahydrate".

BPF = BLEU Preparation Facility  
BLEU = Blended Low Enriched Uranium

**Attachment 2**  
**Additional Information to update Figure 2.2**  
**of the NRC Environmental Assessment – January 1999**

**Figure 1:**  
**BLEU Complex Water Balance Diagram**

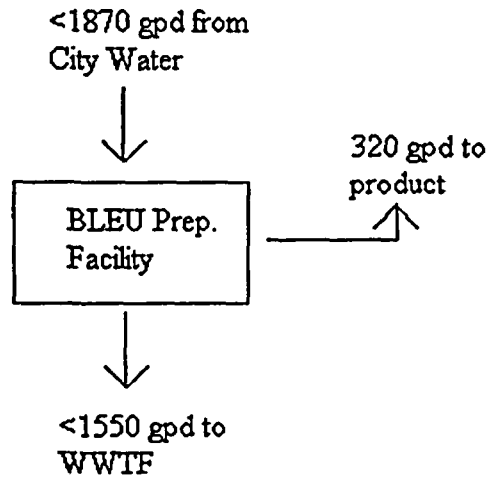


**Additional information to add to Baseline Figure 2.2 of the NRC EA –1999**

The following items need to be deleted from Figure 2.2 of the NRC EA – 1999.

1. Low Enriched Uranium Recovery Facility (60 gpd).
2. High Enriched Uranium Recovery Facility (50 gpd).
3. Banner Spring Branch (62,340 gpd) through Cooling System (62,240 gpd).

**Figure 2:**  
**BLEU Preparation Facility (BPF) Water Balance Diagram**



Water estimates represent bounding conditions  
gpd = gallons per day

Note: The usage associated with the BLEU Program is consistent with the DOE/EIS-0240 assumed quantity of 19 million liters of water usage per year.

**Attachment 3**  
**Additional Information to update Table 1-3**  
**of the NFS Emergency Plan Revision 5 (10/12/01)**

**Table 1:**  
**BLEU Complex Chemical List**

<b>Chemical</b>	<b>Quantity (gallons)</b>	<b>Storage Location</b>	<b>Classification</b>
Anhydrous Ammonia	[REDACTED]	BLEU Complex Bulk Chemical Storage Area	Corrosive, Irritant, Toxic, Explosive
Aqueous Ammonia (23%)	[REDACTED]	BLEU Complex Bulk Chemical Storage Area	Corrosive, Irritant, Toxic, Explosive
Nitric Acid (50%)	[REDACTED]	BLEU Complex Bulk Chemical Storage Area	Corrosive, Toxic, Oxidizer, Irritant, EPA Listed Hazardous Waste
Nitric Acid (7%)	[REDACTED]	BLEU Complex Bulk Chemical Storage Area	Corrosive, Toxic, Oxidizer, Irritant, EPA Listed Hazardous Waste
Liquid Nitrogen	[REDACTED]	Exterior South side of Oxide Conversion Building	Compressed Gas, Asphyxiant
Sodium Hydroxide (50%)	[REDACTED]	BLEU Complex Bulk Chemical Storage Area	Corrosive, Irritant, Toxic, Explosive
Liquefied Petroleum (LP) Gas (Propane)	[REDACTED]	BLEU Complex - South Eastern Corner	Explosive, Flammable, Asphyxiant, Irritant, Compressed Gas
Diesel Fuel	[REDACTED]	Emergency Generator adjacent to BLEU Complex Bulk Chemical Storage Area	Irritant, Combustible, Neurotoxin
Uranyl Nitrate	[REDACTED]	BLEU Complex - Uranyl Nitrate Building	Corrosive



**Table 2:**  
**Current list (Table 1-3 Bulk Chemical Storage)**  
 from the NFS Emergency Plan Revision 5,  
 September 2001, Chapter 1, page 1-15 and 1-16

Chemical	Quantity (gallons)	Storage Location	Classification
Aluminum Nitrate	[REDACTED]	[REDACTED]	Oxidizer
Ammonium Hydroxide	[REDACTED]	[REDACTED]	Corrosive, Toxic, Explosive, Irritant, EPA Listed Hazardous Waste
Argon	[REDACTED]	[REDACTED]	Asphyxiant
Carbon Dioxide	[REDACTED]	[REDACTED] [REDACTED]	Asphyxiant
Diesel Fuel	[REDACTED]	[REDACTED]	Irritant, Combustible, Neurotoxin
Ferric Nitrate	[REDACTED]	[REDACTED]	Oxidizer, Irritant, Explosive, Corrosive
Fuel Oil	[REDACTED]	[REDACTED]	Irritant, Combustible, Toxic
Gasoline	[REDACTED]	[REDACTED]	Explosive, Flammable
Hexanol (Inactive)	[REDACTED]	[REDACTED]	Combustible, Irritant, Corrosive
Hydrochloric Acid	[REDACTED]	[REDACTED]	Corrosive, Irritant
Hydrofluoric Acid	[REDACTED]	[REDACTED]	Corrosive, Toxic, Irritant
Hydrogen (gaseous) Hydrogen (liquid)	[REDACTED]	[REDACTED]	Compressed Gas, Explosive, Flammable
Hydrogen Peroxide Hydrogen Peroxide Hydrogen Peroxide (drum)	[REDACTED] [REDACTED] [REDACTED]	[REDACTED] [REDACTED] [REDACTED]	Corrosive, Oxidizer, Irritant
Isopropyl Alcohol	[REDACTED]	[REDACTED]	Flammable, Irritant, Toxic
Kerosene	[REDACTED]	[REDACTED]	Irritant, Flammable, Neurotoxin
Liquefied Petroleum (LP) Gas (Propane)	[REDACTED]	[REDACTED]	Explosive, Flammable, Asphyxiant, Irritant, Compressed Gas
Methanol (Inactive)	[REDACTED]	[REDACTED]	Explosive, Flammable, Irritant, Neurotoxin, EPA Listed Hazardous Waste

**Table 1-3  
Bulk Chemical Storage  
(cont.)**

Chemical	Quantity (gallons)	Storage Location	Classification
Methyltrichlorosilane	[REDACTED]	[REDACTED]	Flammable, Explosive, Irritant
Nitric Acid	[REDACTED]	[REDACTED]	Corrosive, Toxic, Oxidizer, Irritant, EPA Listed Hazardous Waste
Nitrogen (Liquid)	[REDACTED]	[REDACTED]	Compressed Gas, Asphyxiant
	[REDACTED]	[REDACTED]	Compressed Gas, Asphyxiant
	[REDACTED]	[REDACTED]	Compressed Gas, Asphyxiant
Norpar-12	[REDACTED]	BCSA	Flammable, Irritant
Sodium Hydroxide	[REDACTED]	[REDACTED]	Corrosive, Irritant, Toxic, Explosive
Sulfuric Acid	[REDACTED]	[REDACTED]	Corrosive, Reactive, Oxidizer
Tributyl Phosphate	[REDACTED]	BCSA	Irritant, Hemotopoletic, Neurotoxin

**BCSA: Bulk Chemical Storage Area**

**Note:** No additional bulk chemical storage requirements are anticipated as a result of BLEU Preparation Facility (BPF) activities.

**Attachment 4**  
**Additional information to update Table 2.2 of the NRC EA – January 1999**  
**Physical characteristics of exhaust stacks at the NFS Erwin Plant**  
**Specifically addressing the BLEU Complex**

Building	Stack No.	Effective Diameter (m)	Stack Height (m)	Gas Exit Velocity (m/s)	Potential Contaminant Exhausted
510 (UNB)	501	0.35	15.2	9.6	U
520 (OCB)	502	0.66	16	9.4	U, NO <sub>x</sub> , N <sub>2</sub>
530 (EPB)	503	0.008	13.7	9.5	NH <sub>3</sub>

UNB = Uranyl Nitrate Building  
 OCB = Oxide Conversion Building  
 EPB = Effluent Processing Building

**Attachment 5**  
**Additional Information discussing fugitive dust control measures,**  
**air quality impacts and excavation activities during construction**  
**of the OCF (BLEU Complex)**

The BLEU Complex site area was scanned for gamma-emitting radionuclides using a sodium iodide detector as part of NFS' decommissioning activities. The northwest corner was elevated in gross gamma activity. In May and June of 2001, soil samples were collected from the area with the highest gamma scan readings, and were analyzed for radionuclides present at NFS. Results from the soil sampling indicate the presence of select radionuclides at elevated levels. The elevated area was excavated (0.5 feet) in September 2001, rescanned and sampled. Two small areas were further excavated (0.5 feet) in October 2001, rescanned and sampled. The two areas were again excavated (0.5 feet), rescanned and sampled. The total excavation depth was approximately 1.5 feet and contamination levels decreased with each excavation but remained above background levels. Results of the soil sampling are provided in Attachment 5 (Table 1) and Attachment 12 of this document. No other elevated areas were identified. The Southeast corner was identified as the location for the background sampling effort in support of final status survey and the North Site Decommissioning Plan. The background sampling occurred in June 2001 and no elevated concentrations of any radionuclides were identified.

Since a fraction of the 4.5-acre construction site will involve soil that has radionuclide concentrations above naturally occurring soil concentrations, radioactive fugitive emissions were estimated for the elevated portion of the construction site. The total estimated volume of soil to be disturbed during construction of the BLEU Complex ( $90,000 \text{ ft}^3$ ) was divided by 4.5 acres to determine the average depth of excavation, which was 0.46 ft. The average excavation depth was multiplied by the elevated area involved ( $11,540 \text{ ft}^2$ ) resulting in a volume of  $5,308 \text{ ft}^3$  ( $150 \text{ m}^3$ ). Excavation for the BLEU Complex is estimated to last 90 days, once construction begins. Table 1 details the dose assessment resulting from fugitive dust emissions due to the BLEU Complex construction activities.

**Table 1:**  
**Fugitive Dust Assessment for BLEU Complex Construction**  
 Volume of Soil Disturbed: 150 m<sup>3</sup>  
 Soil Density: 1.6036 MT/m<sup>3</sup> and/or g/cm<sup>3</sup>  
 (Obtained from section 2.1.4.1 of the 1999 E.A.)  
 Mass of Soil Disturbed: 240,540 kg

Nuclide	Average Soil Conc. (pCi/g)	Activity Disturbed (Ci)	Respirable Fugitive Emissions (Ci) (uCi)		CAP88-PC Dose Factor (mrem/Ci)	TEDE (mrem)
U-234	2.0E+01	4.81E-03	1.92E-09	1.92E-03	8.09E+02	1.6E-03
U-235	1.3E+00	3.13E-04	1.25E-10	1.25E-04	7.64E+02	9.6E-05
U-238	3.7E+00	8.90E-04	3.56E-10	3.56E-04	7.20E+02	2.6E-04
Tc-99	6.5E-01	1.56E-04	6.25E-11	6.25E-05	2.86E+00	1.8E-07
Th-228	3.8E+00	9.14E-04	3.66E-10	3.66E-04	1.49E+03	5.4E-04
Th-230	5.6E+00	1.35E-03	5.39E-10	5.39E-04	1.85E+03	1.0E-03
Th-232	4.0E+00	9.62E-04	3.85E-10	3.85E-04	1.68E+03	6.5E-04
Pu-238	1.3E+00	3.13E-04	1.25E-10	1.25E-04	2.88E+03	3.6E-03
Pu-239/240	1.3E+01	3.13E-03	1.25E-09	1.25E-03	3.21E+03	4.0E-04
Pu-241	1.8E+01	4.33E-03	1.73E-09	1.73E-03	6.46E+01	1.1E-04
Am-241	8.1E+00	1.95E-03	7.79E-10	7.79E-04	3.30E+03	2.6E-03
Sum:						0.0112
Airborne Release Fraction:		4.0E-07 (Obtained from Section 2.1.4.1 of the 1999 E.A.)				
Respirable Fraction:		1.00				
Total Emission Period:		90 days				

Fugitive dust emissions from the BLEU Complex construction activities will have a negligible impact on radiological dose (0.0112 mrem). This estimation does not factor wet suppression techniques that will be used to minimize fugitive dust. As stated in the NFS Supplemental Environmental Report – 2001 submitted to the NRC November 11, 2001, wet suppression or equivalent methods will be used to control fugitive dust emissions and silt fencing with straw bales or equivalent will be used as necessary for erosion control. The dose estimate for fugitive dust emissions was not included in the gaseous release estimate because it is a short duration one-time release estimate due to construction activities rather than operations of the BLEU Complex.

**Attachment 6**  
**Additional Information updating Tables 3.1 - 3.4 of the NRC EA – 1999**

1. Local Climatological Data for the Bristol, Johnson City, Kingsport, Tennessee (TRI) Area is attached.
2. No additional information is available for Tables 3.3 and 3.4.

SSIC

2000

# LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

BRISTOL, JOHNSON CITY, KINGSPORT,  
TENNESSEE (TRI)

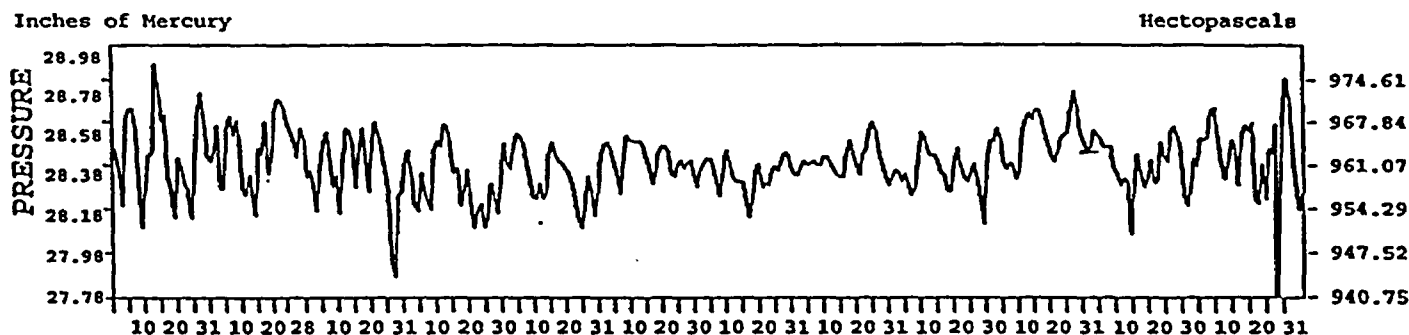
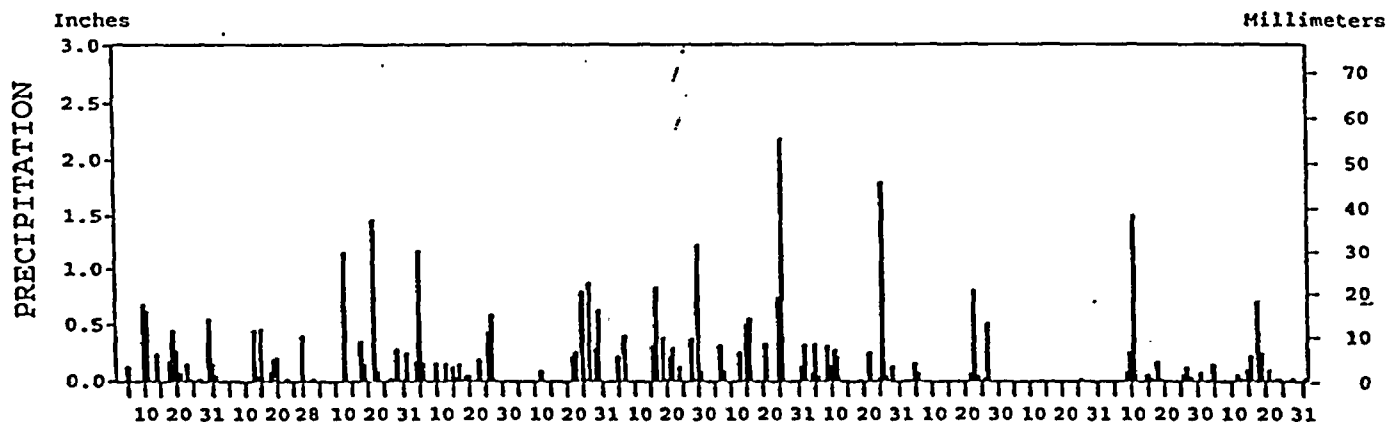
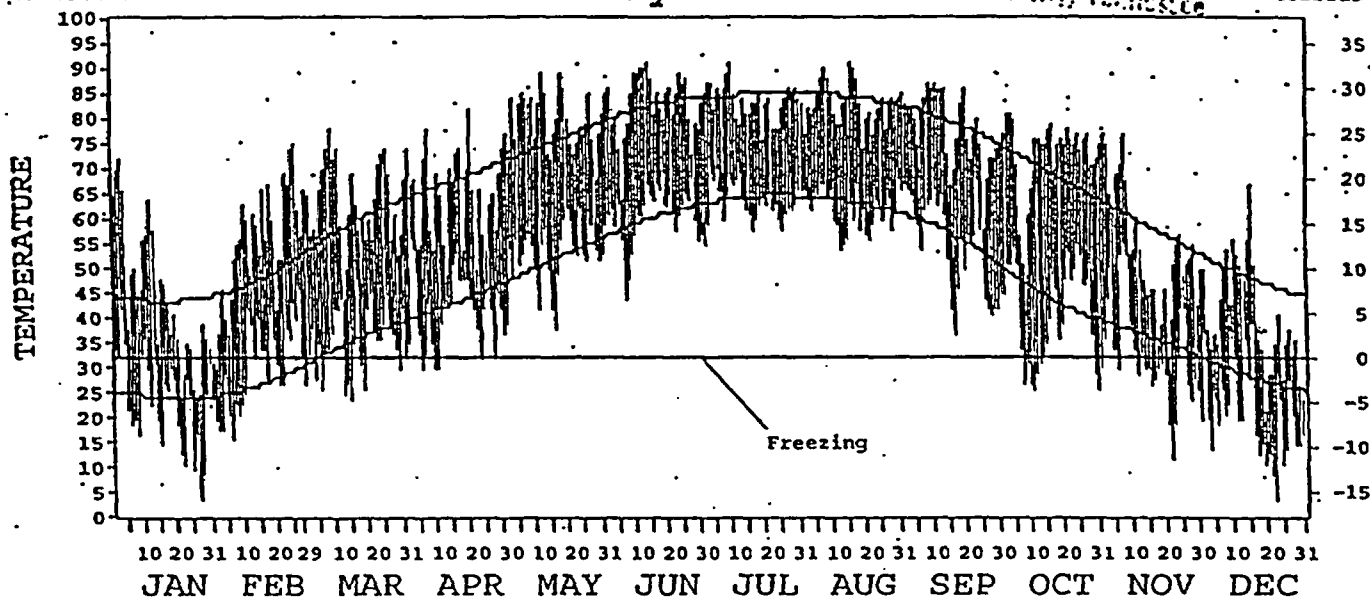


ISSN 0198-4764

Fahrenheit

Daily Data

Celsius



I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,  
AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER.

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ATMOSPHERIC ADMINISTRATION

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NATIONAL  
CLIMATIC DATA CENTER  
ASHEVILLE, NORTH CAROLINA

DIRECTOR  
NATIONAL CLIMATIC DATA CENTER

*Thomas R. Karl*

# METEOROLOGICAL DATA FOR 2000

## BRISTOL-JHNSN CTY-KN, TN (TRI)

LATITUDE: 36° 28' 47" N LONGITUDE: 82° 23' 56" W ELEVATION (FT): GRND: 1556 BARO: 1556 TIME ZONE: EASTERN (UTC + 5) WBAN: 13877

	ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	MEAN DAILY MAXIMUM	43.9	55.4	63.0	64.3	79.5	82.8	83.4	82.9	78.4	72.6	55.0	40.8	66.8
	HIGHEST DAILY MAXIMUM	72	75	78	82	89	91	91	91	87	81	77	67	91
	DATE OF OCCURRENCE	03	26	08	20	18+	14	10	16	11+	04+	08+	16	AUG 16
	MEAN DAILY MINIMUM	23.8	30.6	35.5	41.4	53.0	61.0	63.2	61.9	55.7	41.1	33.2	20.7	43.4
	LOWEST DAILY MINIMUM	4	16	24	30	38	44	55	54	37	26	12	4	4
	DATE OF OCCURRENCE	27	06	14	10+	16	07	02	13	17	31+	22	23	DEC 23
	AVERAGE DRY BULB	33.9	43.0	49.3	52.9	66.3	71.9	73.3	72.4	67.1	56.9	44.1	30.8	55.2
	MEAN WET BULB	30.4	38.0	43.8	47.9	60.2	65.9	67.2	66.9	61.0	49.5	39.3		
	MEAN DEW POINT	23.5	32.1	37.1	43.0	55.5	62.7	64.2	64.4	57.4	43.2	33.1		
	NUMBER OF DAYS WITH:													
	MAXIMUM ≥ 90°	0	0	0	0	0	3	1	3	0	0	0	0	7
	MAXIMUM ≤ 32°	6	1	0	0	0	0	0	0	0	0	1	6	14
	MINIMUM ≤ 32°	25	16	10	5	0	0	0	0	0	8	18	26	108
	MINIMUM ≤ 0°	0	0	0	0	0	0	0	0	0	0	0	0	0
H/C	HEATING DEGREE DAYS	956	631	480	356	36	11	0	0	75	253	619	1053	4470
	COOLING DEGREE DAYS	0	0	0	0	80	226	263	237	144	6	1	0	957
RH	MEAN (PERCENT)	69	69	66	72	71	77	77	80	75	68	69	71	72
	HOURLY 01 LST	79	80	78	83	87	92	91	92	89	86	78	77	84
	HOURLY 07 LST	78	84	85	87	89	91	91	95	93	93	83	81	88
	HOURLY 13 LST	57	55	52	58	50	58	60	62	55	41	54	59	55
	HOURLY 19 LST	62	60	54	62	59	65	69	71	70	59	64	67	64
S	PERCENT POSSIBLE SUNSHINE													
W/O	NUMBER OF DAYS WITH:													
	HEAVY FOG (VISBY ≤ 1/4 MI)	3	0	3	4	5	5	2	8	5	6	0	3	44
	THUNDERSTORMS	1	1	2	2	6	8	9	10	4	0	2	1	46
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)													
	CEILOMETER (≤ 12,000 FT.)													
	SATELLITE (> 12,000 FT.)													
	MIDNIGHT-MIDNIGHT: (OKTAS)													
	CEILOMETER (≤ 12,000 FT.)													
PR	SATELLITE (> 12,000 FT.)													
	NUMBER OF DAYS WITH:													
	CLEAR													
	PARTLY CLOUDY													
	CLOUDY													
PR	MEAN STATION PRESS. (IN.)	28.48	28.52	28.40	28.34	28.38	28.45	28.38	28.45	28.42	28.57	28.42		
	MEAN SEA-LEVEL PRESS. (IN.)	30.17	30.18	30.04	29.98	29.99	30.06	29.99	30.05	30.03	30.21	30.08		
WINDS	RESULTANT SPEED (MPH)	3.2	2.5	1.3	2.6	3.2	2.4	0.5	0.2	0.8	1.0	2.6		
	RES. DIR. (TENS OF DEGS.)	28	26	26	26	25	24	21	33	27	30	26		
	MEAN SPEED (MPH)	5.5	4.9	4.6	5.4	5.1	3.7	3.2	3.0	3.6	2.4	5.1	5.4	4.3
	PREVAIL. DIR. (TENS OF DEGS.)	26	28	23	26	25	23	23	24	23	36	26	24	24
	MAXIMUM 2-MINUTE WIND:													
	SPEED (MPH)	34	37	32	30	36	29	31	30	24	17	36	33	37
	DIR. (TENS OF DEGS.)	25	24	27	28	24	21	33	36	26	36	25	25	24
	DATE OF OCCURRENCE	11	14	28	17+	25	17	14	09+	25	28+	09	17	FEB 14
	MAXIMUM 5-SECOND WIND:													
	SPEED (MPH)	45	45	39	38	62	41	40	54	31	22	47	39	62
PRECIPITATION	DIR. (TENS OF DEGS.)	28	24	27	27	28	20	09	29	27	31	25	25	28
	DATE OF OCCURRENCE	11	14	28+	17+	28	15	30	08	25	28	09	17	MAY 28
	WATER EQUIVALENT:													
	TOTAL (IN.)	3.62	1.86	3.84	3.55	3.19	4.56	5.42	3.70	1.74	0.02	2.42	1.69	35.61
	GREATEST 24-HOUR (IN.)	1.27	0.51	1.56	1.28	0.88	1.30	2.31	1.83	0.88	0.02	1.51	0.71	2.31
	DATE OF OCCURRENCE	09-10	13-14	20-21	02-03	25	28-29	23-24	23-24	20-21	24	09	16	JUL 23-24
	NUMBER OF DAYS WITH:													
	PRECIPITATION ≥ 0.01	14	8	12	18	8	14	10	15	9	1	11	13	133
	PRECIPITATION ≥ 0.10	10	5	6	10	6	10	9	8	3	0	4	6	77
	PRECIPITATION ≥ 1.00	0	0	2	1	0	1	1	1	0	0	1	0	7
SNOWFALL	SNOW, ICE PELLETS, HAIL:													
	TOTAL (IN.)													
	GREATEST 24-HOUR (IN.)													
	DATE OF OCCURRENCE													
	MAXIMUM SNOW DEPTH (IN.)													
SNOWFALL	DATE OF OCCURRENCE													
	NUMBER OF DAYS WITH:													
	SNOWFALL ≥ 1.0													





## PRECIPITATION (inches) 2000 BRISTOL, JOHNSON CITY, KINGSPORT, TN (TRI)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1971	3.83	3.59	3.42	3.38	4.38	5.41	5.94	2.32	2.91	3.18	2.45	2.43	43.24
1972	4.87	4.81	2.86	2.92	5.92	2.97	3.18	2.70	7.09	4.57	2.85	6.43	51.17
1973	1.80	2.04	7.18	3.58	6.46	2.99	5.66	2.60	1.68	2.29	4.52	5.07	45.87
1974	5.33	4.07	4.34	3.96	8.66	4.01	1.78	1.95	3.12	2.34	3.29	3.53	46.38
1975	4.19	3.13	9.22	3.67	4.29	3.19	2.46	3.87	5.02	1.54	3.14	3.33	47.05
1976	2.60	3.07	3.24	0.21	3.31	5.62	2.14	2.27	4.44	5.30	1.41	3.80	37.41
1977	1.90	1.01	4.86	5.43	1.91	3.77	2.13	3.09	2.36	4.89	4.91	2.72	38.98
1978	4.22	0.89	3.18	2.44	4.50	5.67	4.78	3.71	3.04	0.58	2.64	4.89	40.54
1979	5.29	3.58	3.16	3.68	3.35	3.55	6.12	2.80	3.89	2.19	4.44	1.66	43.71
1980	3.91	1.39	5.68	3.56	2.69	1.10	3.82	2.54	3.01	2.09	2.10	1.38	33.27
1981	1.37	2.59	1.94	5.10	4.51	4.28	6.24	3.05	4.17	2.51	1.95	3.20	40.91
1982	4.07	5.07	3.35	2.30	2.55	5.52	9.14	4.70	5.53	2.54	4.12	2.89	51.78
1983	1.67	2.14	1.73	4.44	4.83	4.60	3.29	5.05	1.88	2.18	2.74	4.15	38.70
1984	1.79	4.50	2.73	2.85	7.42	3.86	4.63	1.23	1.43	1.14	2.61	1.76	35.95
1985	3.21	3.40	1.31	2.08	2.85	4.35	4.38	3.09	0.50	3.02	5.87	1.17	35.23
1986	1.55	4.11	1.56	0.51	4.16	0.75	5.50	3.40	3.93	1.69	2.67	3.66	33.49
1987	4.11	4.13	2.80	5.23	1.62	2.64	1.91	0.55	4.57	0.62	2.10	3.00	33.28
1988	2.74	3.20	1.54	2.69	2.48	0.89	3.20	2.78	3.20	1.79	3.44	2.73	30.68
1989	3.69	4.07	3.76	2.97	4.10	6.97	3.81	3.41	6.95	1.77	3.18	3.16	47.84
1990	3.23	5.06	4.00	2.44	6.57	2.90	3.78	3.51	1.47	5.23	1.32	4.85	44.36
1991	2.01	5.43	6.30	3.39	2.10	4.51	3.81	3.98	2.44	0.31	3.42	6.73	44.43
1992	2.42	3.52	2.62	1.53	5.46	3.44	5.11	2.41	1.49	3.42	2.25	5.05	38.72
1993	3.21	2.12	5.51	2.43	3.42	0.98	4.59	5.01	2.50	2.19	3.58	5.85	41.39
1994	4.52	7.75	7.46	4.26	3.90	4.63	4.95	4.63	1.30	2.68	2.37	1.38	49.83
1995	4.63	3.64	3.24	1.52	6.19	4.18	0.67	2.40	3.82	2.35	5.34	2.24	40.22
1996	6.51	2.51	4.10	3.54	6.76	3.36	5.74	3.64	3.79	0.97	4.82	3.90	49.64
1997	3.91	4.25	5.92	3.78	4.80	4.45	4.25	1.53	3.02	1.70	1.71	2.17	41.49
1998	5.12	2.13	3.85	7.03	4.94	7.37	1.96	2.14	0.90	1.68	1.44	5.36	43.92
1999	4.40	2.91	2.64	2.47	2.37	4.30	5.79	2.01	1.09	2.17	3.29	1.38	34.82
2000	3.62	1.86	3.84	3.55	3.19	4.56	5.42	3.70	1.74	0.02	2.42	1.69	35.61
POR- 63 YRS	3.54	3.46	3.89	3.20	3.77	3.64	4.70	3.34	2.85	2.13	2.90	3.37	40.79

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## AVERAGE TEMPERATURE (°F) 2000 BRISTOL; JOHNSON CITY, KINGSPORT, TN (TRI)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1971	35.6	36.9	43.0	55.1	61.5	73.9	74.0	73.7	72.3	63.4	46.5	47.5	57.0
1972	40.8	35.7	45.1	54.9	62.7	67.4	73.6	73.7	69.8	55.9	46.1	43.7	55.8
1973	35.8	36.9	53.9	53.9	60.7	73.1	74.7	73.4	71.4	60.3	48.8	39.3	56.9
1974	47.0	39.8	51.2	56.4	64.3	67.7	74.0	73.0	64.8	54.5	47.2	39.5	56.6
1975	40.4	42.8	44.7	54.2	67.1	71.1	74.8	76.1	67.8	59.0	49.8	40.0	57.3
1976	33.5	47.3	51.9	55.3	61.2	70.7	73.2	71.6	65.1	51.6	38.8	33.3	54.5
1977	22.1	34.5	50.0	59.4	66.8	71.2	76.8	74.8	69.6	53.3	49.9	35.3	55.3
1978	25.8	28.8	44.8	55.5	62.3	71.5	74.4	74.5	72.3	56.3	51.0	39.5	54.7
1979	30.4	31.9	48.3	55.4	63.8	68.2	70.9	73.1	66.8	54.6	48.7	38.8	54.2
1980	37.9	30.6	43.2	55.4	64.2	70.6	76.4	76.9	70.9	54.1	45.3	36.3	55.2
1981	29.3	37.9	42.6	60.4	61.3	75.1	75.3	72.1	65.0	53.7	45.8	34.5	54.4
1982	31.2	40.2	49.8	53.1	68.2	71.4	75.1	72.3	65.7	57.6	48.3	43.3	56.4
1983	35.1	38.2	46.4	50.5	60.9	69.5	74.2	74.7	65.9	57.1	45.3	34.8	54.4
1984	32.7	40.3	44.5	53.0	59.4	72.4	71.3	72.9	64.5	63.6	43.0	45.5	55.3
1985	27.6	35.5	48.2	57.0	63.8	69.5	73.2	71.2	66.1	61.4	55.3	33.9	55.2
1986	32.0	40.4	46.2	57.2	64.8	74.1	77.2	73.0	69.7	58.7	51.4	38.8	57.0
1987	34.7	39.9	47.8	52.0	69.3	73.5	77.0	77.5	68.2	50.8	48.5	41.6	56.7
1988	31.5	37.3	47.8	54.1	62.3	70.5	76.7	77.1	68.1	50.2	47.6	37.6	55.1
1989	42.3	39.5	51.2	54.7	59.8	71.9	75.1	73.3	67.8	56.6	45.6	28.1	55.5
1990	41.6	45.4	51.2	55.3	63.7	72.0	75.2	74.4	68.7	58.0	49.1	44.3	58.2
1991	38.8	41.2	49.2	59.7	69.6	72.0	76.6	73.2	67.7	58.1	46.1	40.6	57.7
1992	38.6	42.7	44.8	55.5	61.2	69.2	74.9	71.1	68.4	54.0	47.0	38.3	55.5
1993	41.7	37.4	43.6	53.2	64.7	72.7	79.6	73.8	67.1	55.3	46.8	38.3	56.2
1994	31.3	41.1	46.3	59.0	60.8	74.8	75.3	72.8	65.8	57.3	50.7	43.6	56.6
1995	38.1	37.5	50.1	57.1	64.7	71.3	77.2	78.4	67.7	56.1	41.0	34.4	56.1
1996	33.9	36.4	42.0	51.7	64.8	71.5	72.1	72.6	65.0		41.3	39.9	
1997	35.8	43.1	50.6	50.7	58.3	68.6	74.6	70.7	65.9	55.4	41.5	36.6	54.3
1998	40.3	42.7	45.3	54.3	66.0	71.1	74.4	74.3	71.6	57.7	47.7	41.6	57.3
1999	39.9	40.3	42.7	58.2	63.3	72.2	76.7	74.3	66.5	55.5	49.4	39.1	56.5
2000	33.9	43.0	49.3	52.9	66.3	71.9	73.3	72.4	67.1	56.9	44.1	30.8	55.2
POR- 63 YRS	35.9	39.2	46.6	55.5	64.2	71.9	75.0	73.9	68.1	56.2	46.3	38.3	55.9

## HEATING DEGREE DAYS (base 65°F) 2000 · BRISTOL, JOHNSON CITY, KINGSPORT, TN (TRI)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1971-72	0	0	0	87	560	537	743	844	610	307	86	36	3810
1972-73	8	0	10	281	559	652	898	779	334	333	152	0	4006
1973-74	0	0	12	169	483	792	552	700	424	257	86	14	3489
1974-75	0	0	72	326	527	785	755	616	621	328	29	1	4060
1975-76	0	0	46	188	451	768	970	509	402	297	134	9	3774
1976-77	0	0	46	409	776	973	1321	845	459	184	61	21	5095
1977-78	0	0	19	359	455	913	1207	1005	620	286	130	4	4998
1978-79	0	0	0	268	411	786	1065	920	511	283	68	11	4343
1979-80	3	3	23	323	483	804	832	990	670	285	76	4	4496
1980-81	0	0	31	337	586	882	1099	752	686	161	137	0	4671
1981-82	0	0	83	346	570	942	1042	687	465	351	32	0	4518
1982-83	0	0	66	256	494	667	922	745	570	436	140	19	4315
1983-84	0	0	98	242	583	928	995	709	627	357	199	8	4746
1984-85	0	0	91	73	652	599	1154	819	518	243	88	19	4256
1985-86	0	2	76	124	283	960	1015	681	577	240	80	0	4038
1986-87	0	19	2	227	402	804	932	698	527	393	30	0	4034
1987-88	0	0	24	436	489	718	1031	798	527	322	113	45	4503
1988-89	0	0	22	455	512	844	698	709	428	325	198	1	4192
1989-90	0	6	55	262	575	1139	718	540	423	303	93	0	4114
1990-91	0	0	48	225	474	636	806	659	483	175	32	2	3540
1991-92	0	0	68	224	562	750	813	638	617	293	148	22	4135
1992-93	0	3	32	337	532	820	714	767	657	346	65	10	4283
1993-94	0	0	59	298	537	823	1039	665	571	196	156	0	4344
1994-95	0	0	37	232	425	653	828	764	454	256	85	10	3744
1995-96	0	0	31	281	712	944	956	820	705	402	85	4	4940
1996-97	0	0	74		706	769	900	605	442	423	222	30	
1997-98	0	5	28	300	699	871	758	618	606	314	72	26	4297
1998-99	0	0	15	237	511	718	773	686	685	212	70	3	3910
1999-00	1	0	49	293	463	798	956	631	480	356	36	11	4074
2000-	0	0	75	253	619	1053							

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## COOLING DEGREE DAYS (base 65°F) 2000 BRISTOL, JOHNSON CITY, KINGSPORT, TN

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1971	0	0	0	5	32	273	285	276	228	44	10	2	1155
1972	0	0	0	11	22	113	279	274	160	3	0	0	862
1973	0	0	0	5	26	249	309	267	212	32	1	0	1101
1974	0	0	0	9	73	102	286	254	73	5	1	0	803
1975	0	0	0	12	101	190	310	353	136	7	0	0	1109
1976	0	0	2	14	24	185	262	212	54	0	0	0	753
1977	0	0	1	23	124	213	374	309	163	2	8	0	1217
1978	0	0	0	6	53	204	299	302	224	4	0	0	1092
1979	0	0	0	1	59	113	194	259	85	9	0	0	720
1980	0	0	0	6	61	179	359	377	215	5	0	0	1202
1981	0	0	0	27	30	309	325	226	87	1	0	0	1005
1982	0	0	0	0	136	199	322	232	93	36	0	0	1018
1983	0	0	2	5	21	163	294	307	131	3	0	0	926
1984	0	0	0	2	35	236	202	253	83	38	0	0	849
1985	0	0	5	11	53	159	262	201	114	22	0	0	827
1986	0	0	0	14	78	278	385	275	149	38	3	0	1220
1987	0	0	0	11	171	259	378	395	126	0	0	0	1340
1988	0	0	0	4	32	214	369	383	120	2	0	0	1124
1989	0	0	5	24	42	218	322	268	144	11	0	0	1034
1990	0	0	3	20	62	217	325	299	161	17	0	0	1104
1991	0	0	0	23	180	218	367	258	157	20	2	0	1225
1992	0	0	0	14	36	155	312	199	143	0	0	0	859
1993	0	0	0	1	62	250	460	281	131	6	0	0	1191
1994	0	0	0	21	31	298	327	247	70	0	0	0	994
1995	0	0	0	25	81	204	387	423	117	11	0	0	1248
1996	0	0	0	7	84	205	227	244	80		1	0	
1997	0	0	3	2	17	144	303	190	65	9	0	0	733
1998	0	0	3	0	111	215	297	295	219	16	0	0	1156
1999	0	0	0	11	25	225	370	294	102	4	0	0	1031
2000	0	0	0	0	80	226	263	237	144	6	1	0	957

## SNOWFALL (inches) 2000 BRISTOL, JOHNSON CITY, KINGSPORT, TN (TRI)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1971-72	0.0	0.0	0.0	0.0	0.7	4.3	T	5.3	2.4	T	0.0	0.0	12.7
1972-73	0.0	0.0	0.0	0.0	2.1	0.1	4.2	1.2	T	T	0.0	0.0	7.6
1973-74	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.9	T	T	0.0	0.0	4.2
1974-75	0.0	0.0	0.0	0.0	0.5	3.1	1.8	0.3	3.4	T	0.0	0.0	9.1
1975-76	0.0	0.0	0.0	0.0	T	T	0.5	3.2	T	0.0	0.0	0.0	3.7
1976-77	0.0	0.0	0.0	0.0	1.2	6.2	12.7	2.4	0.4	T	0.0	0.0	22.9
1977-78	0.0	0.0	0.0	0.0	1.6	0.4	13.6	6.7	3.9	T	0.0	0.0	26.2
1978-79	0.0	0.0	0.0	0.0	0.0	T	9.2	20.4	0.8	0.0	0.0	0.0	30.4
1979-80	0.0	0.0	0.0	0.0	T	0.4	7.8	5.4	3.6	0.0	0.0	0.0	17.2
1980-81	0.0	0.0	0.0	0.0	T	T	7.3	1.1	1.1	0.0	0.0	0.0	9.5
1981-82	0.0	0.0	0.0	0.0	T	7.3	3.6	2.3	2.6	0.6	0.0	0.0	16.4
1982-83	0.0	0.0	0.0	0.0	0.0	6.3	3.4	5.5	1.1	5.6	0.0	0.0	21.9
1983-84	0.0	0.0	0.0	0.0	T	0.3	4.6	3.8	1.2	T	0.0	0.0	9.9
1984-85	0.0	0.0	0.0	0.0	0.0	0.3	9.7	6.0	T	T	0.0	0.0	16.0
1985-86	0.0	0.0	0.0	0.0	0.0	3.2	10.5	7.7	T	T	0.0	0.0	21.4
1986-87	0.0	0.0	0.0	0.0	T	0.2	12.2	4.0	0.3	14.8	0.0	0.0	31.5
1987-88	0.0	0.0	0.0	0.0	0.8	0.2	7.6	T	0.4	0.0	0.0	0.0	9.0
1988-89	0.0	0.0	0.0	T	T	2.3	3.7	11.0	T	T	T	0.0	17.0
1989-90	0.0	0.0	0.0	0.1	0.9	6.9	0.7	0.4	0.5	T	0.0	0.0	9.5
1990-91	0.0	0.0	0.0	0.0	0.0	T	T	1.4	T	0.0	0.0	0.0	1.4
1991-92	0.0	0.0	0.0	0.0	T	T	0.2	T	0.1	0.4	T	0.0	0.7
1992-93	0.0	0.0	0.0	0.0	T	3.5	T	2.3	14.2	T	0.0	T	20.0
1993-94	0.0	0.0	0.0	1.3	T	1.9	3.8	0.1	0.3	T	0.0	0.0	7.4
1994-95	0.0	0.0	T	0.0	0.0	T	2.7	1.7	5.0	0.0	0.0	T	9.4
1995-96	0.0	0.0	0.0	0.0	T	3.6	17.4		3.2	0.2			
1996-97													
1997-98													
1998-99													
1999-00													
2000-													
POR=58 YRS	0.0	0.0	T	0.0	0.9	2.6	5.2	4.1	2.3	0.4	T	T	15.5

WBAN : 13877

## REFERENCE NOTES:

## PAGE 1:

THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).

## PAGE 2 AND 3:

H/C INDICATES HEATING AND COOLING DEGREE DAYS.

RH INDICATES RELATIVE HUMIDITY

W/O INDICATES WEATHER AND OBSTRUCTIONS

S INDICATES SUNSHINE.

PR INDICATES PRESSURE.

CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS (OKTAS).

## GENERAL:

T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE.

+ INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES.

BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA.

NORMALS ARE 30-YEAR AVERAGES (1961 - 1990).

ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM.

PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH.

POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA

MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING.

WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED.

0.+ OR + INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05.

CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET.

THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD.

## GENERAL CONTINUED:

CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS.

WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED.

WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH.

RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION.

AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2.

SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL.

A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65° F.

DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR.

DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY.

WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY.

ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTHS (OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.

2000  
BRISTOL, JOHNSON CITY, KINGSPORT,  
TENNESSEE (TRI)

The Weather Service Office is located an almost equal distance of 15 miles in the middle of a geographical triangle between the cities of Bristol, Tennessee-Virginia, Kingsport and Johnson City, Tennessee, and is more commonly known as the Tri-City Area. This location is situated in the extreme upper East Tennessee Valley. The terrain immediately surrounding the station ranges from gently rolling on the east and south to very hilly on the west and north. Mountain ranges begin about 10 miles to the southeast and about 15 miles to the west and north, with many peaks and ridges rising to 4,000 feet, and some to 6,000 feet toward the southeast.

This section does not lie directly within any of the principal storm tracks that cross the country, but comes under the influence of storm centers that pass along the Gulf Coast and then up the Atlantic Coast toward the northeast. Being quite varied, the topography has considerable influence on the weather. Moist air from the east is forced up the slopes of the mountains causing much of the moisture to be precipitated before the air mass reaches the Bristol area. The same process occurs to a lesser extent when air masses move over the smaller mountain ranges to the west and north. The maximum monthly precipitation occurs in July, usually from afternoon and early evening thunderstorms. A second maximum of precipitation occurs in the late winter months, due mainly to moist air associated with storm centers to the south or northeast. Annual precipitation amounts recorded in mountainous sections to the east and southeast are almost double what they are in the immediate vicinity.

Lowest temperatures normally occur during the early morning hours, but rise rapidly during the morning hours. Periods of cold weather are generally associated with air flow from winter storm centers near the northeast coast. Periods of unusually high temperatures occur most frequently when Gulf air associated with the Bermuda high pressure system dominates the area.

Snowfall seldom occurs before November and rarely remains on the ground for more than a few days. However, mountains to the east and south of the station are frequently well blanketed with snow for much longer periods of time.

Agricultural activities within this area include such staple crops as tobacco, beans, and hay which are raised in such amounts as to be important commercially. The last freezing temperature in spring normally occurs in late April, and the first in autumn around mid-October. The growing season of 180 days, usually coupled with ample sunshine and rainfall, permits a second planting and harvesting of some staple crops.

**Attachment 7**  
**Additional Information to update Table 3.5 of the NRC EA - January 1999**  
**Tennessee primary and secondary ambient air quality standards**

Pollutant	Averaging Time	Primary (ug/m <sup>3</sup> )	Secondary (ug/m <sup>3</sup> )
SO <sub>2</sub>	Annual Arith. Mean	80	
	24 hour <sup>a</sup>	365	
	3 hour <sup>a</sup>		1,300
O <sub>3</sub>	1 hour <sup>b</sup>	235	235
NO <sub>x</sub> (NO <sub>2</sub> )	Annual Arith. Mean	100	100
CO	8 hour <sup>a</sup>	10,000.	10,000
	1 hour <sup>a</sup>	40,000	40,000
Pb	Calendar quarter	1.5	1.5
PM-10 <sup>c</sup>	Annual Arith. Mean	50	50
	24 hour	150	150
Total suspended particulates	24 hour		150 <sup>d</sup>
Gaseous Fluorides (HF) <sup>e</sup>	30 days <sup>a</sup>		1.2
	7 days <sup>a</sup>		1.6
	24 hour <sup>a</sup>		2.9
	12 hour <sup>a</sup>		3.7

a. Maximum concentration not to be exceeded more than once per year.

b. Maximum 1-hour concentration not to be exceeded more than one day per year.

c. Federal standard for PM-10, 40 CFR Part 50, Appendix K.

d. Guide to be used in assessing particulate problem areas. In those areas where it is exceeded, PM-10 monitoring may be required.

e. All conditions relate to air at standard conditions of 25 °C temperature and 760 mm of mercury pressure.

Source: Tennessee Air Pollution Control Regulation, Rules of Tennessee Department of Health and Environment, Division of Air Pollution Control, Chapter 1200-3-3 – Ambient Air Quality Standards.

**Attachment 8**  
**Additional Information updating Table 3.9 of the NRC EA – 1999**  
**Places in Unicoi County listed on the National Register of Historic Places**

**Index By State County report**

Row	State	County	Resource Name	Address	City	Listed
1	TN	Unicoi	Clarksville Iron Furnace	SW of Erwin off TN 107 In Cherokee National Forest	Erwin	1973-06-04
2	TN	Unicoi	Clinchfield Depot	Jct. of Nolichucky Ave. and Union St.	Erwin	1993-06-22
3	TN	Unicoi	Tilson Farm	242 Little Branch Rd.	Flag Pond	1994-06-17

Source: National Parks Service, National Register of Historic Places. [http:// www.cr.nps.gov/nr/index.htm](http://www.cr.nps.gov/nr/index.htm). November 13, 2001.

Section 3.4.2 of the NRC EA identifies these three sites in Unicoi County, Tennessee as being listed on the National Register of Historic Places.

**Attachment 9**  
**Additional Information to update Table 3.11 of the NRC EA January 1999**  
**Monitoring wells by zone at the NFS Erwin Plant**

<b>Model Layer 1 Shallow Alluvium Zone</b>		<b>Model Layer 2 Cobble / Boulder Zone</b>	<b>Model Layer 3 Shallow Bedrock Zone</b>	<b>* Model Layer 1,2,and 3</b>	<b><sup>b</sup> Model Layer 2 and 3</b>
Well 39	PW-9	Well 38	Well 60B	Well 74	Well 60 Well 62
Well 52	PW-10	Well 63B	Well 67		
Well 55	P-1	Well 66	Well 67B		
Well 55A	P-2	Well 70A	Well 71		
Well 57	P-3	Well 91	Well 100 B		
Well 58		Well 92	Well 107B		
Well 63		Well 93	Well 118B		
Well 63A		Well 94	Well 120B		
Well 64		Well 97A	Well 121B		
Well 68		Well 100A	SC-1		
Well 75		Well 102A	SC-3		
Well 95A		Well 108A	SC-4		
Well 98A		Well 111A			
Well 99A		Well 116A			
Well 101A		Well 116B			
Well 103A		Well 117A			
Well 104A		Well 117B			
Well 105A		Well 118A			
Well 106A		Well 119A			
Well 107A		Well 120A			
Well 234-2		Well LD-1A			
Well 234-3		Well LD-2A			
PW-1		Well IW-1			
PW-2		Well OW-1			
PW-3					
PW-4					
PW-5					
PW-6					
PW-7					
PW-8					

a. Well screen crosses shallow alluvium zone, cobble / boulder zone, and shallow bedrock zone.

b. Well screen crosses cobble / boulder zone and shallow bedrock zone.

Sources: 1) ARCADIS Geraghty & Miller, Inc. "Revised Groundwater Flow and Solute -- Transport Modeling Report", Nuclear Fuel Services, Inc., Erwin, Tennessee, February 1999.

2) Nuclear Fuel Services, Inc. Environmental Database Management System.



**Attachment 10**  
**Additional Information updating Table 3.19 of the NRC EA January 1999**  
**Areas of uranium contamination in groundwater above the MCL**

Aquifer	Area	Wells Contaminated <sup>a</sup>	Uranium Activity (pCi/l)
Alluvial	Burial Ground	95A	108
	Ponds 1,2,3,and 4	P1, P2, P3	235 – 33,059
	Building 130, 120, and 131	109A, 108A, OW-1, IW -1	37 – 308
	Building 234	234-2, 234-3	111 – 888
Bedrock	Burial Ground	60B	221

a. Refer to Figure 4.3 for groundwater well locations.

Source: Nuclear Fuel Services, Inc. Environmental Database Management System.  
Second Quarter 2001 and June 2001 data .

Note: A discussion of Tc-99 in groundwater can be obtained from the following reference, which has been attached:

Subject: Proposed Revisions to NFS Commitments Concerning  
Monitoring for Tc-99 in Groundwater

Date: April 10, 2001

ID No. 21G-01-0065

GOV-01-55-04

ACF-01-0063

The acknowledgment letter from the NRC was assigned TAC No. L31519



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Nuclear Fuel Services, Inc.  
 1205 Banner Hill Road  
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21G-01-0065

GOV-01-55-04

ACF-01-0063

April 10, 2001

Director  
 Office of Nuclear Material Safety & Safeguards  
 US Nuclear Regulatory Commission  
 Attn: Document Control Desk  
 Washington, DC 20555-0001

Reference: 1) NFS letter, B.M. Moore to Director, NMSS dated July 19, 2000  
 (21G-00-0091)  
 2) NRC Inspection Report No. 70-143/2001-01 dated February 9, 2001  
 3) Docket No 70-143; SNM License 124

Subject: Proposed Revisions to NFS Commitments Concerning Monitoring  
 for Tc-99 in Groundwater

Dear Sir:

Nuclear Fuel Services, Inc. (NFS) hereby submits proposed revisions to previous commitments (Reference 1) regarding the investigation of Tc-99 groundwater contamination. As discussed with the Nuclear Regulatory Commission (NRC), recent assessments have concluded that Tc-99 groundwater contamination is localized in a small area adjacent to NFS' Waste Water Treatment Facility in proximity to Monitoring Well 38. This was confirmed in the follow-up investigation conducted by NRC Region II and the Oak Ridge Institute of Science and Education (ORISE) (Reference 2). Based on groundwater monitoring data, NFS believes that revising groundwater monitoring commitments made in Reference 1, is appropriate at this time.

NFS committed to additional monitoring for Tc-99, as stated in Reference 1, which included the following:

- analysis of Tc-99 regardless of the gross beta activity in wells 100A, 100B, 101A, 102A, 116A, 116B, 117A, 117B, 118A, 118B, 119A, 120A, and 120B,
- monthly sampling of piezometers 1, 2, and 3, and
- quarterly review, evaluation, and reporting to management of Tc-99 data.

NFS proposes to discontinue the analysis of Tc-99 in these wells, except for piezometers 1, 2 and 3. Analytical results indicate that Tc-99 has not exceeded the method detection limit (80 pCi/L) in the boundary wells (Wells 100A, 100B, 101A and 102A) or the off site wells (Wells 116A, 116B, 117A, 117B, 118A, 118B, 119A, 120A and 120B) (Tables 1, 2, and 3).

B.M. Moore to NRC, Office of NMSS  
April 10, 2001

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The monthly/quarterly sampling of these wells (boundary and off-site) and the analysis of gross beta will continue to be performed in accordance with the license requirements (Reference 3). NFS will continue performing the Tc-99 analysis on monitoring Well 38 due to the presence of Tc-99 in this area. Due to elevated activities, the gross beta and Tc-99 analyses will continue to be performed in piezometers 1, 2, and 3.

NFS will continue to review and evaluate groundwater monitoring data; however, the results will be reported semi-annually in the Safety Department Semi-Annual Report instead of on a quarterly basis as indicated in Reference 1. This report is routinely reviewed during NRC Region II inspections.

The Ground Water Treatment Facility (GWTF) has not operated since March 7, 2000; therefore, the Pond 4 drawdown wells have not been operated since that time. Once the GWTF is operational, NFS does not intend to re-activate these drawdown wells for the purpose of controlling Tc-99 migration because Tc-99 contamination is not present in the vicinity of the drawdown wells.

Therefore, the revised commitments for monitoring for Tc-99 contamination will be as follows:

- 1) Monitor groundwater in accordance with SNM-124, Chapter 5, which states that at a minimum, gross alpha and gross beta analyses will be completed for boundary wells (98A, 99A, 100A, 100B, 101A, 102A, 103A, 104A, 105A, and 106A) and one background well (52). Isotopic analysis will be performed in accordance with action levels described in SNM-124;
- 2) Continue the monthly analysis of Tc-99 for Well 38 and Piezometers 1, 2, and 3; and,
- 3) Report the groundwater results of gross beta and Tc-99 analyses in the Safety Department Semi-Annual Report.

If you or your staff have any questions, require additional information, or wish to discuss this, please contact me or Ms. Janice Greene, Environmental Safety Manager, at (423) 743-9141. Please reference our unique document identification number (21G-01-0065) in any correspondence concerning this letter.

Sincerely,  
NUCLEAR FUEL SERVICES, INC.



B. Marie Moore  
Vice President  
Safety & Regulatory

LML/mfh

B.M. Moore to NRC, Office of NMSS  
April 10, 2001

21G-01-0065  
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xc:

Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23T85  
Atlanta, GA 30303

Mr. William Gloersen  
Project Inspector  
U. S. Nuclear Regulatory Commission  
Region II  
Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23T85  
Atlanta, GA 30303

Mr. Gary Humphrey  
Senior Resident Inspector  
U. S. Nuclear Regulatory Commission

Mr. Leo Romanowski  
Waste Management Division  
U. S. Environmental Protection Agency  
Region IV  
61 Forsyth Street, Southwest  
Atlanta, GA 30303-3104

Mr. Clayton Bullington  
TN Department of Environment & Conservation  
Division of Solid Waste Management  
Fifth Floor, L & C Tower  
401 Church Street  
Nashville, TN 37243-1535

21G-01-0065  
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 ACF-01-0063

Table 1

**Third Quarter (2000) Offsite Groundwater  
 Analytical Results for Technetium-99**

Location	Tc-99 (pCi/l)		
	Result	Error	MDC
Well 116A	<	80.000	7.000 80.000
Well 116B	U	58.000	7.000 80.000
Well 117A	U	46.000	7.000 80.000
Well 117B	U	67.000	7.000 80.000
Well 118A	<	80.000	7.000 80.000
Well 118B	U	25.000	7.000 80.000
Well 119A	U	28.000	7.000 80.000
Well 120A	U	60.000	7.000 80.000
Well 120B	U	26.000	7.000 80.000
Mean	52.222		
Standard Deviation	22.106		
Observations	9		
t-value	1.860		
95% Upper Confidence Limit	65.928		
MCL	900 pCi/L		

KEY:  
 MDC - Minimum Detectable Concentration.  
 U = Below Lab Detection Limits

Produced by: Keith Martin

21G-01-0065  
GOV-01-55-04  
ACF-01-0063

**Table 2**  
**Fourth Quarter (2000) Offsite Groundwater**  
**Analytical Results for Technetium-99**

Location	Tc-99 (pCi/l)		
	Result	Error	MDC
Well 116A	<	80.000	7.000 80.000
Well 116B	<	80.000	7.000 80.000
Well 117A	U	26.000	7.000 80.000
Well 117B	U	48.000	7.000 80.000
Well 118A	<	80.000	7.000 80.000
Well 118B	<	80.000	7.000 80.000
Well 119A	<	80.000	7.000 80.000
Well 120A	<	80.000	7.000 80.000
Well 120B	<	80.000	7.000 80.000
Mean	70.444		
Standard Deviation	19.743		
Observations	9		
t-value	1.860		
95% Upper Confidence Limit	82.685		
MCL	900 pCi/L		

KEY:  
MDC - Minimum Detectable Concentration.  
U - Below Lab Detection Limits

Produced by: L. Michelle Ledford

Table 3  
Tc-99 (pCi/L) Data for Upgradient, Crossgradient, and Downgradient Monitoring Wells and I

Sampling Period	Upgradient		Crossgradient				Downgradient			
	Well 234-2	Well 234-3	Well 39	Well 70A	Well 38	PZ 1	PZ 2	PZ 3	Well 100A	Well 100B
Jan-2000	ND	ND	18	ND	6495	ND	ND	ND	21	2
Feb-2000	ND	ND	U	-6	ND	6391	ND	ND	U	13
Mar-2000	ND	ND	U	7	ND	10807	ND	ND	U	10
Apr-2000	113	U	54	U	36	ND	5287	217	80	80
May-2000	80		80		80	ND	10064	80	80	80
Jun-2000	201		80		80	ND	3111	80	U	43
Jul-2000	80		80		80	ND	5228	142	80	U
Aug-2000	80		80		80	ND	3672	U	42	80
Sep-2000	513	U	46	U	35	ND	4692	U	79	112
Oct-2000	155	U	46		80	ND	3009	U	50	114
Nov-2000	80	U	76		80	ND	2363		80	80
Dec-2000	419	U	24	U	28	ND	2864	U	34	118
Mean	191	63	50		5332	89	92	82	55	
Std. Dev.	163	21	33		2751	57	17	30	32	
Obs	9	9	12		12	9	9	9	12	
95% UCL	292	76	67	ND	6758	125	102	101	71	



MCL - 900 pCi/L  
 Negative values indicated activity is below system blank.  
 pCi/L - picocuries per liter  
 ND - No Data  
 < - Less than the detection limit; value given is the quantitation limit  
 U - Below Lab Detection Limits  
 (a) - Results not verified  
 (b) - Results not validated

Produced by: L. Michel

**Attachment 11**  
**Additional Information to update Table 3.12 of the NRC EA – 1999**

Section 3.7.3 of the NFS Supplemental Environmental Report – 2001 addresses endangered and threatened species. The NRC EA-1999 included endangered and threatened plant species in Unicoi County, which was not included in the NFS Supplemental ER- 2001. The attached information, compiled by the Tennessee Department of Environment and Conservation Division of Natural Heritage, includes the endangered and threatened plant species in Unicoi County. Also, 50 CFR Part 17 lists threatened and endangered wildlife and plants.



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## Rare Species of Unicoi County

The following is a list of the rare species found in Unicoi County. This list was compiled by the Division of Natural Heritage.

- Tennessee's Rare Plant List
- Rare and Endangered Vertebrate List of Tennessee
- Rare and Endangered Invertebrate List of Tennessee

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
** ALL PLANTS					
ABIES FRASERI	FRASER FIR		T	S1	G2
ADLUMIA FUNGOSA	CLIMBING FUMITORY		T	S2	G4
AGASTACHE	PURPLE GIANT HYSSOP		S	S1S2	G4
SCROPHULARIIFOLIA					
ASTER ERICOIDES	WHITE HEATH ASTER		T	S1	G5
BUCKLEYA DISTICHOPHYLLA	PIRATEBUSH		T	S2	G2
CAMPANULA APARINOIDES	MARSH BELLFLOWER		T	S2	G5
CARDAMINE CLEMATITIS	MOUNTAIN BITTERCRESS		T	S2	G2G3
CARDAMINE ROTUNDIFOLIA	ROUND-LEAF WATERCRESS		S	S2	G4
CAREX MISERA	WRETCHED SEDGE		T	S2	G3
CAREX PALLESCENS	PALE SEDGE		S	S1	G5
CAREX ROANENSIS	ROAN MOUNTAIN SEDGE		E	S1	G2
CAULOPHYLLUM GIGANTEUM	GIANT BLUE COHOSH		T	S1	G4G5Q
CLINTONIA BOREALIS	CLINTON'S LILY		S	S2S3	G5
COELOGLOSSUM VIRIDE VAR VIRESCENS	LONG-BRACTED GREEN ORCHIS		E	S1	G5T5
CORALLORHIZA MACULATA	SPOTTED CORALROOT		T	S1	G5
CYMOPHYLLUS FRASERIANUS	FRASER'S SEDGE		S	S3	G4
CYPRIPEDIUM ACAULE	PINK LADY'S-SLIPPER		E-CE	S4	G5
DIERVILLA SESSILIFOLIA VAR RIVULARIS	MOUNTAIN BUSH-HONEYSUCKLE		T	S2	G4?T3?
SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
DRYOPTERIS CARTHUSIANA	SPINULOSE SHIELD FERN		T	S1	G5
EPILOBIUM ANGUSTIFOLIUM	FIREWEED		S	S1	G5
EUPATORIUM STEELEI	STEELE'S JOE-PYE WEED		S	S2S3	G4
GENTIANA AUSTROMONTANA	APPALACHIAN GENTIAN		S	S2S3	G3
HELIANTHUS GLAUCOPHYLLUS	WHITE-LEAVED SUNFLOWER		T	S1	G3
HERACLEUM MAXIMUM	COW-PARSNIP		S	S1	G5
HEXASTYLIS VIRGINICA	VIRGINIA HEARTLEAF		S	S2	G4

HYDROPHYLLUM VIRGINIANUM	APPALACHIAN WATERLEAF	T	S2	G5
HYPERICUM GRAVEOLENS	MOUNTAIN ST. JOHN'S-WORT	E	S3	G3
HYPERICUM MITCHELLIANUM	BLUE RIDGE ST. JOHN'S-WORT	T	S3	G3
JUGLANS CINEREA	BUTTERNUT	T	S2S3	G3G4
JUNCUS GYMNOCARPUS	NAKED-FRUITED RUSH	S	S2S3	G4
LILIUM CANADENSE	CANADA LILY	T	S2	G5
LISTERA SMALLII	APPALACHIAN TWAYBLADE	S	S1S2	G4
LYSIMACHIA TERRESTRIS	SWAMP LOOSESTRIPE	E	S1	G5
PANAX QUINQUEFOLIUS	AMERICAN GINSENG	S-CE	S3S4	G3G4
PARONYCHIA ARGYROCOMA	SILVERLING	T	S1S2	G4

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
PLATANThERA ORBICULATA	LARGE ROUND-LEAVED ORCHID		T	S3	G5?
PLATANThERA PSYCODES	SMALL PURPLE FRINGED ORCHID		T	S2	G5
POLYGONUM CILINODE	FRINGED BLACK BINDWEED		T	S1S2	G5
POPULUS GRANDIDENTATA	LARGE-TOOTH ASPEN		S	S2	G5
POTENTILLA TRIDENTATA	THREE-TOOTHED CINQUEFOIL		S	S2	G5
PRENANTHES ROANENSIS	MOUNTAIN RATTLESNAKE-ROOT		T	S2	G3
SCUTELLARIA SAXATILIS	ROCK SKULLCAP		T	S2	G3
SENECIO SCHWEINITZIANUS	ROBBINS' RAGWORT		T	S1	G5?
SILENE OVATA	OVATE CATCHFLY		E	S2	G2G3
SPIRAEA VIRGINIANA	VIRGINIA SPIRAEA	LT	E	S2	G2
STACHYS CLINGMANII	CLINGMAN'S HEDGE-NETTLE		T	S1S2	G2Q
STREPTOPUS ROSEUS	ROSY TWISTED-STALK		S	S2	G5
TRILLIUM RUGELII	SOUTHERN NODDING TRILLIUM		E	S2	G3
TSUGA CAROLINIANA	CAROLINA HEMLOCK		T	S2S3	G3
WOODSIA SCOPULINA SSP APPALACHIANA	ALLEGHANY CLIFF-FERN		S	S2	G5T4

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
** INVERTEBRATES - MOLLUSC					
ALAS MIDONTA RAVENELIANA	APPALACHIAN ELKTOE	LE	E	S1	G1
PILSBRYNA AUREA	ORNATE BUD			S1	G?
** VERTEBRATES - BIRDS					
AEGOLIUS ACADICUS	NORTHERN SAW-WHET OWL	MC	T	S1	G5
FALCO PEREGRINUS	PEREGRINE FALCON		E	S1N	G4
LIMNOTHLYPIS SWAINSONII	SWAINSON'S WARBLER	MC	D	S3	G4
** VERTEBRATES - MAMMALS					
CONDYLURA CRISTATA	STAR-NOSED MOLE		D	S2	G5
NAPAEZAPUS INSIGNIS	WOODLAND JUMPING MOUSE		D	S4	G5
NEOTOMA MAGISTER	EASTERN WOODRAT		D	S3	G3G4

SOREX CINEREUS	COMMON SHREW	D	S4	G5	
SOREX DISPAR	LONG-TAILED OR ROCK SHREW	D	S2	G4	
SOREX FUMEUS	SMOKY SHREW	D	S4	G5	
SOREX LONGIROSTRIS	SOUTHEASTERN SHREW	D	S4	G5	
SPILOGALE PUTORIUS	EASTERN SPOTTED SKUNK		S3	G5	
ZAPUS HUDSONIUS	MEADOW JUMPING MOUSE (PS)	D	S4	G5	
SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	STATE RANK	GLOBAL RANK
** VERTEBRATES - AMPHIBIANS					
CRYPTOBRANCHUS	HELLBENDER	MC	D	S3	G4
ALLEGANIENSIS					
DESMOGNATHUS WRIGHTII	PIGMY SALAMANDER	MC	D	S2	G3G4
PLETHODON WELLERI	WELLER'S SALAMANDER		D	S1	G3
** VERTEBRATES - FISH					
CARPIODES VELIFER	HIGHFIN CARPSUCKER		D	S2S3	G4G5
PERCINA AURANTIACA	TANGERINE DARTER		D	S3	G4

Updated June 04, 2001; Send Comments to: [Environment & Conservation](#)

**Attachment 12**  
**Additional Information to update Section 3.9 of the NRC EA - 1999**

NFS has scanned the site where the BLEU Complex will be located for gamma-emitting radionuclides. Soil samples were collected from an area with the highest gamma scan readings, and were analyzed for radionuclides present at NFS. An elevated area of radiological contamination was identified which involves approximately 11,540 ft<sup>2</sup> as detailed in Attachment 5 of this document. Ten soil samples were collected at zero to three inches below the surface after removal of 0.5 to 1.5 feet of soil. Table 1 provides a summary of the average concentrations for this area.

**Table 1**

<b>Average Soil Concentrations From the Area with the Highest Gamma Scan Readings</b>	
<b>Radionuclide</b>	<b>Concentration (pCi/g)</b>
Pu-239/240	1.3E+01
Pu-238	1.3E+00
Pu-241	1.8E+01
Am-241	8.1E+00
Th-228	3.8E+00
Th-230	5.6E+00
Th-232	4.0E+00
U-233/234	2.0E+01
U-235/236	1.3E+00
U-238	3.7E+00
Tc-99	6.5E-01

Since previous environmental report submittals, no additional non-radiological data are available for the BLEU Complex Site. Groundwater Well 82 non-radiological data collected in 1988 is presented in Table 2. Soil Data around Well 82 is presented in Table 3.

**Table 2**

<b>Groundwater Well 82</b>	
<b>Samples Collected/Analyzed in 1988</b>	
<b>Parameter</b>	<b>Result</b>
1,1,1-Trichloroethane	< 5 ug/l
1,1,2,2-Tetrachloroethane	< 5 ug/l
1,1,2-Trichloroethane	< 5 ug/l
1,1-Dichloroethane	< 5 ug/l
1,1-dichloroethylene	< 5 ug/l
1,2,4-Trichlorobenzene	< 10 ug/l
1,2-Dichlorobenzene	< 10 ug/l

Table 2

Groundwater Well 82	
Samples Collected/Analyzed in 1988	
Parameter	Result
1,2-Dichloroethane	< 5 ug/l
1,2-dichloroethylene (total)	< 5 ug/l
1,2-Dichloropropane	< 5 ug/l
1,3-Dichlorobenzene	< 10 ug/l
1,4-Dichlorobenzene	< 10 ug/l
2,4,6-Trichlorophenol	< 10 ug/l
2,4-Dichlorophenol	< 10 ug/l
2,4-Dimethylphenol	< 10 ug/l
2,4-Dinitrophenol	< 50 ug/l
2,4-Dinitrotoluene	< 10 ug/l
2,6-Dinitrotoluene	< 10 ug/l
2-Chloroethyl vinyl ether	< 5 ug/l
2-Chloronaphthalene	< 10 ug/l
2-Chlorophenol	< 10 ug/l
2-methyl-4,6-dinitrophenol	< 50 ug/l
2-Nitrophenol	< 50 ug/l
3,3'-dichlorobenzidine	< 50 ug/l
4-Bromophenyl phenyl ether	< 10 ug/l
4-Chloro-3-methylphenol	< 10 ug/l
4-Chlorophenyl phenyl ether	< 10 ug/l
4-Nitrophenol	< 50 ug/l
Acenaphthene	< 10 ug/l
Acenaphthylene	< 10 ug/l
acrolein	< 50 ug/l
acrylonitrile	< 50 ug/l
Alkalinity	34 mg/l
Alkalinity	35 mg/l
Ammonia	< 0.2 mg/l
Ammonia	< 0.2 mg/l
Anthracene	< 10 ug/l
Arsenic	< 0.01 mg/l
Barium	0.05 mg/l
Benzene	< 5 ug/l
benzidine	< 50 ug/l
Benzo(a)anthracene	< 10 ug/l
Benzo(a)pyrene	< 10 ug/l
Benzo(b)fluoranthene	< 10 ug/l
Benzo(g,h,i)perylene	< 10 ug/l
Benzo(k)fluoranthene	< 10 ug/l
benzyl butyl phthalate	< 10 ug/l
Beryllium	< 0.01 mg/l
Bicarbonate	42 mg/l
Bicarbonate	42 mg/l
Bis(2-chloroethoxy)methane	< 10 ug/l
Bis(2-chloroethyl)ether	< 10 ug/l
Bis(2-chloroisopropyl)ether	< 10 ug/l
Bis(2-ethylhexyl)phthalate	< 10 ug/l
Bromodichloromethane	< 5 ug/l
Bromoform	< 5 ug/l

Table 2

Groundwater Well 82	
Samples Collected/Analyzed in 1988	
Parameter	Result
Bromomethane	< 10 ug/l
Cadmium	< 0.01 mg/l
Calcium	4.3 mg/l
Calcium	3.1 mg/l
Carbon tetrachloride	< 5 ug/l
Carbonate	< 5 mg/l
Carbonate	< 5 mg/l
Chloride	< 3 mg/l
Chloride	< 3 mg/l
Chlorobenzene	< 5 ug/l
Chloroethane	< 10 ug/l
Chloroform	< 5 ug/l
Chloromethane	< 10 ug/l
Chromium	< 0.01 mg/l
Chrysene	< 10 ug/l
cis-1,3-Dichloropropylene	< 5 ug/l
Cobalt	< 0.01 mg/l
Copper	< 0.01 mg/l
Cyanide, Total	< 0.01 mg/l
Cyanide, Total	< 0.01 mg/l
Dibenz(a,h)anthracene	< 10 ug/l
Dibromochloromethane	< 5 ug/l
Diethylphthalate	< 10 ug/l
Dimethylphthalate	< 10 ug/l
Di-n-butylphthalate	< 10 ug/l
Di-n-octylphthalate	< 10 ug/l
Diphenylamine	< 10 ug/l
Ethylbenzene	< 5 ug/l
Fluoranthene	< 10 ug/l
Fluorene	< 10 ug/l
Fluoride	< 0.5 mg/l
Fluoride	< 0.5 mg/l
Hexachlorobenzene	< 10 ug/l
Hexachlorobutadiene	< 10 ug/l
Hexachlorocyclopentadiene	< 10 ug/l
Hexachloroethane	< 10 ug/l
Indeno(1,2,3-cd)pyrene	< 10 ug/l
Iron	< 0.01 mg/l
Iron	2.2 mg/l
Isophorone	< 10 ug/l
Lead	< 0.01 mg/l
Magnesium	4.7 mg/l
Magnesium	4.3 mg/l
Manganese	< 0.01 mg/l
Manganese	0.13 mg/l
Mercury	< 0 mg/l
Mercury	< 0 mg/l
Methylene chloride	< 5 ug/l
Molybdenum	< 0.01 mg/l

Table 2

Groundwater Well 82	
Samples Collected/Analyzed in 1988	
Parameter	Result
Naphthalene	< 10 ug/l
Nickel	< 0.01 mg/l
Nitrate	1 mg/l
Nitrate	0.96 mg/l
Nitrobenzene	< 10 ug/l
N-nitrosodimethylamine	< 10 ug/l
N-nitrosodipropylamine	< 10 ug/l
Pentachlorophenol	< 50 ug/l
pH	6.9 pH
pH	8.2 pH
Phenanthrene	< 10 ug/l
Phenol	< 10 ug/l
Phosphorus	0.07 mg/l
Phosphorus	0.04 mg/l
Potassium	1.4 mg/l
Potassium	1.6 mg/l
pyrene	< 10 ug/l
Selenium	< 0.01 mg/l
Silver	< 0.01 mg/l
Sodium	1.1 mg/l
Sodium	1.6 mg/l
Sulfate	< 5 mg/l
Sulfate	< 5 mg/l
Tetrachloroethylene	< 5 ug/l
Thallium	< 0.01 mg/l
Toluene	< 5 ug/l
Total Dissolved Solids	62 mg/l
Total Dissolved Solids	56 mg/l
Total Kjeldahl Nitrogen	< 1 mg/l
Total Kjeldahl Nitrogen	< 1 mg/l
Total Organic Carbon	2 mg/l
Total Organic Carbon	2 mg/l
Total Organic Halogens	< 3 ug/l
Total Organic Halogens	< 3 ug/l
Total Uranium	< 0 pCi/L
trans-1,3-Dichloropropylene	< 5 ug/l
Trichloroethylene	< 5 ug/l
Trichlorofluoromethane	< 5 ug/l
Vanadium	< 0.01 mg/l
Vinyl chloride	< 10 ug/l
Zinc	0.01 mg/l

Source: NFS Environmental Database Management System

Table 3

Soil Samples from Well 82 Area		
Samples Collected/Analyzed in 1988		
Parameter	Result	
Arsenic	6.6	ug/g
Arsenic	6.8	ug/g
Arsenic	3.9	ug/g
Arsenic	6.5	ug/g
Barium	120	ug/g
Barium	78	ug/g
Barium	150	ug/g
Barium	120	ug/g
Beryllium	0.7	ug/g
Beryllium	< 0.5	ug/g
Beryllium	< 0.5	ug/g
Beryllium	0.7	ug/g
Cadmium	< 0.5	ug/g
Cadmium	< 0.5	ug/g
Cadmium	< 0.5	ug/g
Cadmium	< 0.5	ug/g
Cation Exchange Capacity	24	meq/100g
Cation Exchange Capacity	29	meq/100g
Cation Exchange Capacity	33	meq/100g
Cation Exchange Capacity	30	meq/100g
Chromium	34	ug/g
Chromium	34	ug/g
Chromium	50	ug/g
Chromium	36	ug/g
Cobalt	11	ug/g
Cobalt	3.1	ug/g
Cobalt	11	ug/g
Cobalt	6.1	ug/g
Copper	7.4	ug/g
Copper	10	ug/g
Copper	18	ug/g
Copper	12	ug/g
Fluoride	< 0.5	ug/g
Fluoride	< 0.5	ug/g
Fluoride	< 0.5	ug/g
Fluoride	< 0.5	ug/g
Lead	14	ug/g
Lead	8.2	ug/g
Lead	14	ug/g
Lead	12	ug/g
Mercury	0.28	ug/g
Mercury	0.16	ug/g
Mercury	0.15	ug/g
Mercury	0.09	ug/g
Molybdenum	2.3	ug/g
Molybdenum	0.9	ug/g
Molybdenum	0.6	ug/g
Molybdenum	1.6	ug/g



Table 3

Soil Samples from Well 82 Area		
Samples Collected/Analyzed in 1988		
Parameter	Result	
Nickel	5.8	ug/g
Nickel	5.4	ug/g
Nickel	22	ug/g
Nickel	10	ug/g
pH	6.9	pH
pH	6.1	pH
pH	4.5	pH
pH	3.1	pH
Selenium	< 0.5	ug/g
Selenium	< 0.5	ug/g
Selenium	< 0.5	ug/g
Selenium	< 0.5	ug/g
Silver	< 1	ug/g
Silver	1.3	ug/g
Silver	1.6	ug/g
Silver	1.1	ug/g
Thallium	< 0.5	ug/g
Thallium	< 0.5	ug/g
Thallium	< 0.5	ug/g
Thallium	< 0.5	ug/g
Vanadium	31	ug/g
Vanadium	35	ug/g
Vanadium	90	ug/g
Vanadium	40	ug/g
Zinc	31	ug/g
Zinc	32	ug/g
Zinc	61	ug/g
Zinc	39	ug/g

Source: NFS Environmental Database Management System

**Attachment 13**  
**Additional Information to update Table 3.13 of the NRC EA January 1999**  
**Summary of U.S. Environmental Protection Agency AOC's and SWMU's**

AOC No.	SWMU No.	Location	Potentially Affected Media
1		Plant scrubbers	b
2		Building 111 boiler blowdown and backwash water	Soil
3		Building 130 cooling tower	Soil, surface water
4		Plant Drainage System	Soil, groundwater, surface water
5		Banner Spring Branch present channel <sup>a</sup>	b
6		Mercury Contaminated Area NW of Building 220	Soil, groundwater
	1	Ponds 1,2, and 3 <sup>a</sup>	Air, soil, groundwater, surface water
	2	Pond 4 <sup>a</sup>	Soil, groundwater, surface water
	3	Building 110 underground storage tank <sup>a</sup>	Soil, groundwater
	4	Yard incinerator	Air, soil, surface water
	5	Deleted before WPA permit issued	
	6	Abandoned Banner Spring Branch Channel <sup>a</sup>	Soil, groundwater
	7	CSX soil stockpile <sup>a</sup>	Soil, surface water
	8	Soil excavation site on CSX property	Groundwater
	9	Radiological Burial Ground	Soil, groundwater
	10	Demolition Landfill	Soil, groundwater
	11	Burial trenches on CSX property	Soil
	12	Building 310 warehouse	c
	13	Building 111 bulk chemical storage area	Soil, groundwater, surface water
	14	Well 72 (LNAPL Plume)	Groundwater
	15	Wastewater treatment facility	Soil, groundwater
	16	Radioactive waste incinerator	Air, soil
	17	Scrap recovery calcine furnace	b
	18	Building 105 underground storage tank	Soil, groundwater
	19	Building 100 underground storage tank	b
	20	Building 130 Scale Pit	Soil, groundwater
	21	No. 2 fuel oil above ground storage tank, western portion of the NFS site	Soil, groundwater —
	Unnumbered HW Unit	Building 304 West End Storage Area	b

a. The facility or area is part of the North Site decommissioning.

b. The AOC or SWMU has no known unregulated releases.

c. The facility is regulated by the State RCRA permit.

**Attachment 14**  
**Additional Information to update Table 4.1 of the NRC EA – 1999**  
**Specifically Addressing the BLEU Complex**

Effluent	Sample Type/Collection Frequency	Radionuclide Minimum Detectable Concentration	Proposed Radionuclide Action Level	Required Action
Gaseous Effluent:				
Uranyl Nitrate Building	Continuous/Weekly <sup>a</sup>	Gross alpha 8.0 x 10 <sup>-14</sup> uCi/ml	Monthly Average: 2.0 x 10 <sup>-11</sup>	Notification of environmental protection function manager, Investigation; Initiation of corrective actions
		Gross beta 1.0 x 10 <sup>-13</sup> uCi/ml	Monthly Average: 2.9 x 10 <sup>-10</sup>	
Oxide Conversion Building	Continuous/Weekly <sup>a</sup>	Gross alpha 8.0 x 10 <sup>-14</sup> uCi/ml	Monthly Average: 2.0 x 10 <sup>-11</sup>	Notification of environmental protection function manager, Investigation; Initiation of corrective actions
		Gross beta 1.0 x 10 <sup>-13</sup> uCi/ml	Monthly Average: 2.9 x 10 <sup>-10</sup>	
Effluent Processing Building	Continuous/Weekly <sup>a</sup>	Gross alpha 8.0 x 10 <sup>-14</sup> uCi/ml	Monthly Average: 2.0 x 10 <sup>-11</sup>	Notification of environmental protection function manager, Investigation; Initiation of corrective actions
		Gross beta 1.0 x 10 <sup>-13</sup> uCi/ml	Monthly Average: 2.9 x 10 <sup>-10</sup>	
Liquid Effluent:				
Sanitary Sewer Discharge (Combined)	Proportional/ Daily <sup>b</sup>	Gross alpha 1.5 x 10 <sup>-8</sup> uCi/ml	3.0 x 10 <sup>-7</sup> uCi/ml	Notification of environmental protection function manager, Investigation; Initiation of corrective actions
		Gross beta 3.0 x 10 <sup>-8</sup> uCi/ml	6.0 x 10 <sup>-6</sup> uCi/ml	
	Composite/ Monthly	Isotopic U, Th, Pu, and Tc-99	Sum of Fraction > 0.5	

a. Sample exchange frequencies will be established by NFS and Framatome ANP to ensure that the measurement sensitivity criteria are met.

b. Daily means normal 5-day work week. On holidays and weekends, samplers will continue to accumulate samples; however, the sample will not be collected until the next normal operating day.

**Additional Information to update Table 4.1 of the NRC EA-1999**  
**Specifically addressing current NFS operations**

All information currently in Table 4.1 of the NRC EA-1999 is correct with the exception of Liquid Effluent: Non-Contact Cooling Water. The Non-Contact Cooling Water system used in the 200 Complex and discharging to Banner Spring Branch was removed as part of the 200 Complex decommissioning effort. Table 5.1 of the SNM-124 license will be amended to incorporate the above information for the BLEU Project.

**Attachment 15**  
**Additional Information to update Table 4.2 of the NRC EA - January 1999**  
**NPDES \* permit limits of outfall 001 effluent**

Parameter	NPDES Limit (Daily Maximum)
pH	Range 6.0 – 9.0
Flow	Report
Chemical Oxygen Demand	370 mg/l
Total Suspended Solids	40 mg/l
Settleable Solids	0.5 ml/l
Chlorine, Total Residual (TRC) <sup>b</sup>	2.0 mg/l
Fluoride, Soluble	20 mg/l
Ammonia (as Nitrogen)	30 mg/l
Nitrite plus Nitrate Nitrogen	558 lbs/day
Uranium, Natural, Total	4.0 mg/l
Arsenic, Total	Report
Cadmium, Total	0.01 mg/l
Chromium, Total	Report
Copper, Total	1.0 mg/l
Lead, Total	0.1 mg/l
Mercury, Total <sup>c</sup>	0.05 mg/l
Nickel, Total	Report
Silver, Total	0.05 mg/l
Zinc, Total	Report
Tetrachloroethylene	Report

a. NPDES – National Pollutant Discharge Elimination System.

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

c. 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.

Source: State of Tennessee NPDES Permit No. TN0002038 issued to Nuclear Fuel Services, Inc. effective on October 1, 2000 and Expiring August 31, 2005.

**Attachment 16**  
**Additional Information to update Table 4.3 of the NRC EA January 1999**

**Table 1: NFS Monitoring data for radiological constituents (pCi/l)  
in liquid effluent discharged to the sewer**

Yearly Average	Gross alpha	Gross beta	U-234	U-235	U-238
1998	9.78E+1	1.01E+2	8.24E+1	3.21E+0	1.21E+1
1999	1.78E+2	5.89E+1	9.97E+1	4.81E+0	2.35E+1
2000	3.26E+1	3.53E+1	1.68E+1	5.92E-1	1.90E+0

Source: Safety Department Semi-annual Reports and Environmental Database Management System (EDMS).

**Table 2: Estimated Radiological Constituents (Ci/y) for the  
BLEU Complex Sewer Discharge**

Constituent	Estimated Annual Release (Ci/y)
Uranium isotopes	2.0 E-04
Thorium isotopes	1.3 E-08
Plutonium isotopes	4.3 E-09
Technetium-99	1.1 E-03

Source: Framatome ANP, Inc. 2001.

Note: The BLEU Preparation Facility (BPF) will not discharge process material into the sanitary sewer.

**Table 3: Estimated Non-radiological Constituents for the  
BLEU Complex Sewer Discharge**

Constituent	*Estimated Value
Discharge Volume	6300 gpd
Ammonia (as Nitrogen)	<0.029 kg/day
Nitrate (as Nitrogen)	<0.28 kg/day
Fluoride	<0.0038 mg/l
Chloride	<0.0075 mg/l
Arsenic	<0.002 mg/l
Barium	<0.01 mg/l
Cadmium	<0.0001 mg/l
Chromium	<0.0006 mg/l
Lead	<0.0004 mg/l
Mercury	<0.0001 mg/l
Selenium	<0.0004 mg/l
Silver	<0.001 mg/l
PH	<9

Source: Framatome ANP, Inc. 2001.

\* Estimates do not include domestic wastewater volume, which is estimated to be a combined total of < 10,000 gpd.

Note: The BPF will not discharge process material into the sanitary sewer.

**Attachment 17**  
**Additional Information to update Table 4.4 of the NRC EA - January 1999**  
**POTW<sup>a</sup> permit limits for nonradiological constituents (mg/l)<sup>b</sup>**  
**in liquid effluent discharged to the sewer**

Parameter	Daily Max (mg/l)	Average Discharge Limits (mg/l)
Cadmium	0.024	0.012
Total Chromium	0.564	0.423
Copper	0.768	0.384
Lead	0.593	0.445
Nickel	0.490	0.245
Silver	0.076	0.038
Zinc	0.493	0.369
Cyanide	0.170	0.114
Phenol	0.457	0.228
pH	Range 5.0 – 9.0	
Oil & Grease		100
Toluene	0.193	0.145
Benzene	0.114	0.057
1,1,1, Trichloroethane	0.193	0.096
Ethylbenzene	0.304	0.152
Carbon Tetrachloride	0.150	0.032
Chloroform	0.017	0.0084
Tetrachloroethylene	0.380	0.190
Trichloroethylene	0.030	0.015
1,2, Trans-Dichloroethylene	0.380	0.190
Methylene Chloride	0.170	0.011
Napthalene	0.076	0.038
Total Phthalates	0.935	0.468
Mercury	0.0048	0.0024
Temperature	Max 40 °C (104 °F)	

Source: Town of Erwin Wastewater Discharge Permit Number 013 issued to Nuclear Fuel Services, Inc., effective July 1, 1998, expiration date June 30, 2003.

a. POTW: Publicly Owned Treatment Works

b. All values in mg/l except for pH and temperature

Note: The BLEU Preparation Facility will not have an impact on the current POTW permit. A separate Erwin POTW Wastewater Discharge Permit for the BLEU Complex has not been issued at this time.

**Attachment 18**  
**Additional Information to update Table 3.17 of the NRC EA – 1999**  
**Site area groundwater monitoring**

Site Area Monitored <sup>a</sup>	Groundwater Monitoring Wells <sup>a,b</sup>	Radiological Constituents Monitored	Non-radiological Constituents Monitored
Maintenance Shop Area	Model Layer 1: 93  Model Layer 2: 97A, 108A, IW-1, OW-1, 111A	U-233, U-234, U-235, U-238	Conductivity, pH, temperature, oxidation-reduction potential, ferrous iron, alkalinity, VOCs, total organic carbon, dissolved nitrogen, nitrite nitrogen, ammonium, manganese, sulfate, phosphate, chloride, ethene, ethane, biochemical oxygen demand
Building 234	Model Layer 1: 234-2, 234-3	gross alpha, gross beta, (U-233, U-234, U-235, U-238, Pu-238, Pu-239, Pu-242, Th-228, Th-230, Th-232, Tc-99) <sup>c</sup>	Conductivity, pH, temperature, oxidation-reduction potential, chloride, TBP
Burial Ground	Model Layer 1: 52, 55, 57, 63, 63A, 95A Model Layer 2: 63B Model Layer 3: 60B, 67, 67B Model Layer 2 & 3: 60	gross alpha, gross beta, (U-233, U-234, U-235, U-238, Pu-238, Pu-239, Pu-242, Th-228, Th-230, Th-232, Tc-99) <sup>c</sup>	Conductivity, pH, temperature, oxidation-reduction potential, chloride, TBP
Site Boundary	Model Layer 1: 98A, 99A, 101A, 103A, 104A, 105A, 106A Model Layer 2: 100A, 102A Model Layer 3: 100B	gross alpha, gross beta, (U-233, U-234, U-235, U-238, Pu-238, Pu-239, Pu-242, Th-228, Th-230, Th-232, Tc-99) <sup>c</sup>	Conductivity, pH, temperature, oxidation-reduction potential, chloride, TBP
Ponds Area	Model Layer 1: 64, P-1, P-2, P-3 Model Layer 2: 38	gross alpha, gross beta, U-233, U-234, U-235, U-238, Pu-238, Pu-239, Pu-242, Th-228, Th-230, Th-232, Tc-99	PCE, TCE, 1,2-DEC, vinyl chloride
Off Site	Model Layer 2: 116A, 116B, 117A, 117B, 118A, 119A, 120A Model Layer 3: 118B, 120B	gross alpha, gross beta, (U-233, U-234, U-235, U-238, Pu-238, Pu-239, Pu-242, Th-228, Th-230, Th-232, Tc-99) <sup>c</sup>	Conductivity, pH, temperature, oxidation-reduction potential, chloride, TBP

a. Refer to Figure 4.3 update in Attachment 20 for locations of the groundwater monitoring wells.

b. Refer to Attachment 9 for a description of Model layers 1, 2, and 3.

c. Constituents monitored only if triggered by gross alpha > 15 pCi/l or gross beta > 50 pCi/l.

PCE = tetrachloroethylene TCE = trichloroethylene DCE = dichloroethylene TBP = tributyl phosphate

**Attachment 19****Additional Information to update Table 3.18 of the NRC EA – 1999  
Contaminants of potential concern in groundwater and preliminary guideline values**

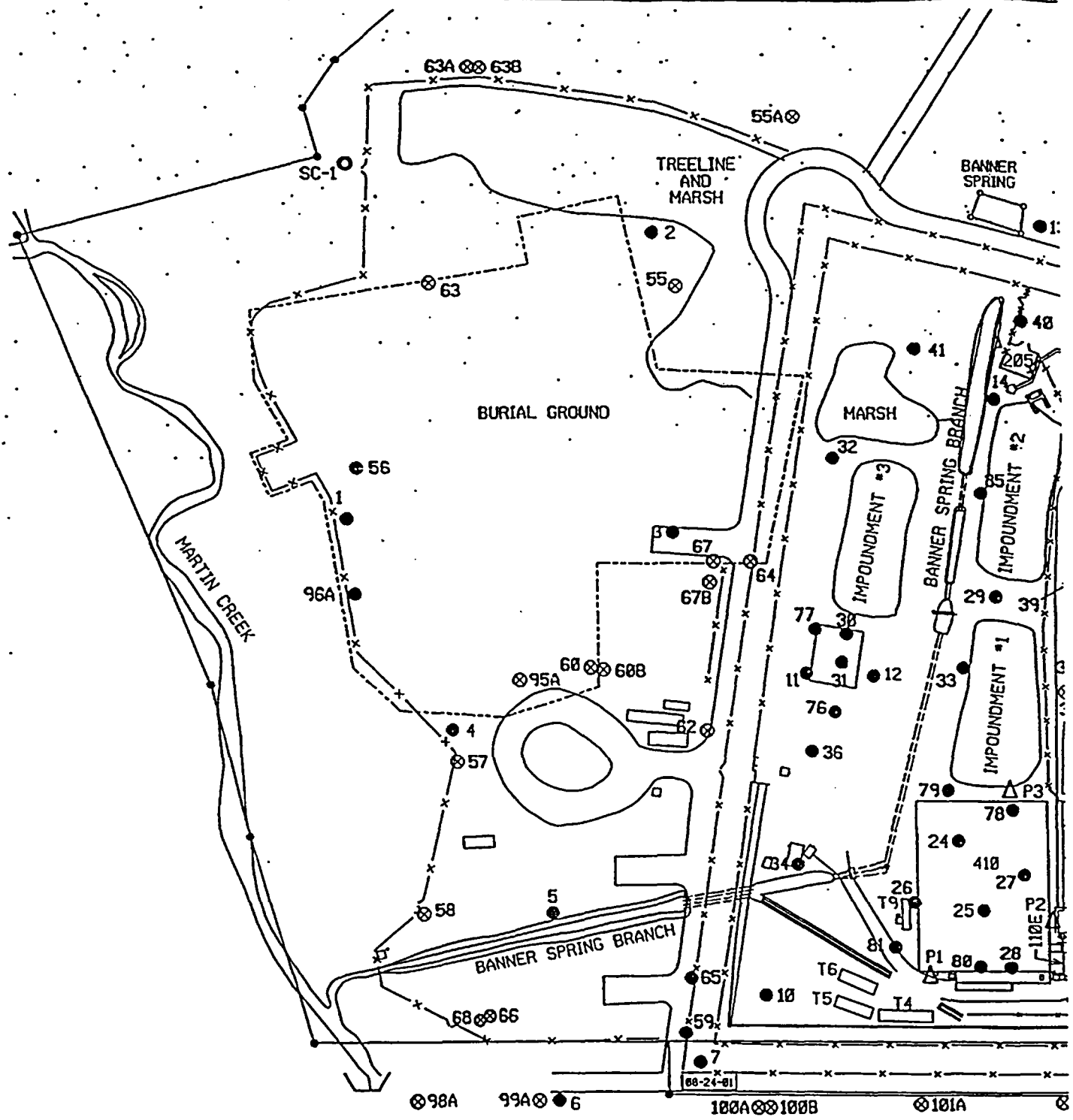
The preliminary guideline values in Table 3.18 are no longer applicable. Installation of a drinking water well on the north site is not likely. The groundwater underlying the north site is not used as a source of drinking water and is not a likely exposure pathway for future site occupants<sup>a</sup>. The approved North Site Decommissioning Plan also addresses this issue<sup>b</sup>.

- a. Nuclear Fuel Services, Inc. Potential Dose Due to Radiological Contaminants in North Site Soil and Groundwater, Revision 1, February 1999.
- b. Nuclear Fuel Services, Inc. North Site Decommissioning Plan, Revision 1, July 1999.



**Attachment 20**  
**Additional Information to update Figure 4.3 of the NRC EA – 1999**  
**Monitoring Well Locations**

NFS area drawing number 000-C0243-B (attached) updates figure 4.3 of the NRC EA-1999 to current conditions.



**LEGEND**

- ⊗ - MONITORING WELL LOCATION
- - ABANDONED (CLOSED) WELL
- △ - POND 4 PIEZOMETER LOCATION
- ⊙ - PIEZOMETER LOCATION
- ⊙ - ABANDONED (CLOSED) PIEZOMETER

THIS DRAWING RELEASED FOR:  
SIGNATURE/DATE

☐ CONSTRUCTION

☒ INFORMATION ONLY *Academy*

☐ BID

☐ PURCHASE/FAB

68-24-01

MOK	CSH	12-21-88
MOK	LHN	84-12-96
BY	DATE	

THIS DRAWING AND THE PROPERTY ON IT NOT BE USED OR THAT FOR WHICH EXPRESS WRITTEN

**Attachment 21**  
**Additional Information to update Table 4.13 of the NRC EA – 1999**  
**Groundwater monitoring for gross alpha and gross beta in the alluvial aquifer**  
**(zone 1) leak-detection wells in the vicinity of the burial trenches**  
**on CSX railroad property.**

Year	Gross alpha (pCi/l)				Gross beta (pCi/l)			
	107A <sup>a</sup>	104A	105A	106	107A <sup>a</sup>	104A	105A	106A
1998		0.76	0.68	0.87		6.36	6.49	2.88
1999	0.98	0.97	0.45	0.41	3.49	7.91	5.12	3.76
2000	0.42	1.00	0.33	1.08	1.42	5.25	2.08	2.25

a. Well 107A is not routinely monitored, but is used for available information.

**Attachment 22**  
**Additional Information to update Table 2.3 of the NRC EA – 1999**  
**Estimated annual releases of radiological constituents from process stacks**

**Table 1:**  
**Radioactive Gaseous Effluents - Radioactivity Released**

Element	Current Averages <sup>1</sup>		Estimated BLEU Project Effluents			Effluent Totals	
	Main Stack (Ci/yr)	Remaining Stacks (Ci/yr)	BPF <sup>2</sup> (Ci/yr)	BLEU Complex (Ci/yr)	NFS WWTF (Ci/yr)	(Ci/yr)	(uCi/yr)
Uranium	2.8E-04	3.1E-05	1.1E-03	2.3E-05	4.7E-05	1.5E-03	1,492.23
Thorium	5.7E-07	7.2E-06	1.7E-05	3.4E-07	2.0E-05	4.5E-05	44.55
Plutonium	0.0E+00	4.7E-05	1.4E-07	2.8E-09	1.6E-07	4.7E-05	47.13
Americium	0.0E+00	9.4E-07	2.5E-09	5.0E-11	2.9E-09	9.4E-07	0.94

**Notes:**

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports.
- 2 - The BPF's gaseous effluents will be released through the Main Stack.

**Additional Information to update Table 5.2 of the NRC EA – 1999**  
**Radiological impacts to the maximally exposed individual**  
**from releases to the atmosphere**

**Table 2:**  
**Radioactive Gaseous Effluents –TEDE**

Current Averages <sup>1</sup>		Estimated BLEU Project Effluents			Totals <sup>3</sup> (mrem/yr)
Main Stack (mrem/yr)	Remaining Stacks (mrem/yr)	BPF <sup>2</sup> (mrem/yr)	BLEU Complex (mrem/yr)	NFS WWTF (mrem/yr)	
0.0260	0.0150	0.0737	0.0080	0.0790	0.2016

**Notes:**

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports. The portion attributable to the Main Stack was determined from the ECV – fractions in the EDMS' Radioactivity in Effluent Air" report for the period of 1996 through 2000.
- 2 - The BPF's gaseous effluents will be released through the Main Stack.
- 3 - The DOE/EIS-0240 estimates the dose to the maximally exposed individual from the atmospheric pathway at 0.17 mrem/yr. The 0.03 mrem/yr difference between the estimates is negligible relative to the ALARA constraint of 10 mrem/yr.

**Attachment 23**  
**Additional Information to update Table 5.4 of the NRC EA – 1999**  
**Radiological impacts to the maximally exposed individual from liquid releases**

**Table 1: Radioactive Liquid Effluents - Radioactivity Released<sup>1</sup>**

Effluent Stream	Element	Current Averages (Ci/yr)	Estimated BLEU Project Effluents		Effluent Totals (Ci/yr)
			BPF <sup>2</sup> (Ci/yr)	BLEU Complex <sup>3</sup> (Ci/yr)	
WWTF	Uranium	6.3E-04	1.1E-04		7.3E-04
	Radium	1.3E-04	3.7E-01		3.7E-01
	Thorium	4.4E-06	9.1E-03		9.1E-03
	Plutonium	5.3E-07	3.1E-02		3.1E-02
	Technetium	1.6E-02	1.8E-04		1.6E-02
Banner Spring Branch	Uranium	1.4E-02			1.4E-02
	Radium	NM			NM
	Thorium	3.4E-04			3.4E-04
	Plutonium	1.7E-04			1.7E-04
	Technetium	2.6E-03			2.6E-03
Sanitary Sewer	Uranium	2.8E-03		2.0E-04	3.0E-03
	Radium	NM			NM
	Thorium	1.4E-05		1.3E-08	1.4E-05
	Plutonium	1.3E-06		4.3E-09	1.3E-06
	Technetium	2.5E-03		1.1E-03	3.6E-03

**Notes:**

- 1 - Current averages are based on release data from 1996 through 2000, which were obtained from the Safety Department's Semiannual Reports. "NM" - not measured.
- 2 - BPF liquid effluents are only discharged through the WWTF.
- 3 - BLEU Complex effluents are only discharged to the sanitary sewer.

Table 2: Summary of Estimated BPF Liquid Effluents

Constituent	WWTF's Minimum Removal Factor	NCRP-123 Unit Dose Factors (mrem/Ci)	Summary of Estimated BPF Liquid Effluents				
			Untreated Effluents (Ci/yr)	Treated Effluents (Ci/yr)	(%)	Estimated TEDE (mrem/yr)	(%)
U-232	0.0024	58	1.85E-04	4.44E-07	0.0000%	2.58E-05	0.0012%
U-233	0.0024	2.1	1.76E-04	4.22E-07	0.0000%	8.86E-07	0.0000%
U-234	0.0024	2	3.50E-02	8.41E-05	0.0032%	1.68E-04	0.0081%
U-235	0.0024	9.5	5.28E-04	1.27E-06	0.0000%	1.20E-05	0.0006%
U-236	0.0024	1.9	7.95E-03	1.91E-05	0.0007%	3.62E-05	0.0018%
U-238	0.0024	4.4	2.37E-05	5.69E-08	0.0000%	2.50E-07	0.0000%
U Subtotal			4.39E-02	1.05E-04	0.0040%	2.43E-04	0.0118%
Th-228	0.0024	14	9.34E-01	2.24E-03	0.0850%	3.14E-02	1.5202%
Th-230	0.0024	9	2.19E-02	5.26E-05	0.0020%	4.74E-04	0.0230%
Th-231	0.0024	1.0E-02	2.79E+00	6.70E-03	0.2542%	6.70E-05	0.0032%
Th-232	0.0024	220	9.20E-04	2.21E-06	0.0001%	4.86E-04	0.0235%
Th-234	0.0024	3.2E-01	4.53E-02	1.09E-04	0.0041%	3.48E-05	0.0017%
Th Subtotal			3.79E+00	9.10E-03	0.3454%	3.24E-02	1.5716%
Pu-238	1.0000	36	1.08E-02	1.08E-02	0.4102%	3.89E-01	18.8657%
Pu-239/240	1.0000	41	6.94E-04	6.94E-04	0.0263%	2.85E-02	1.3796%
Pu-241	1.0000	0.92	1.94E-02	1.94E-02	0.7368%	1.79E-02	0.8659%
Pu Subtotal			3.09E-02	3.09E-02	1.1734%	4.36E-01	21.1112%
Am-241	1.0000	49	5.56E-04	5.56E-04	0.0211%	2.72E-02	1.3201%
Np-237	1.0000	58	7.67E-03	7.67E-03	0.2910%	4.45E-01	21.5598%
<b>Thorium Series</b>							
Ra-228	0.4000	95	7.27E-04	2.91E-04	0.0110%	2.76E-02	1.3391%
Ac-228	1.0000	2.2E-02	7.27E-04	7.27E-04	0.0276%	1.60E-05	0.0008%
Ra-224	0.4000	2.1	9.34E-01	3.73E-01	14.1670%	7.84E-01	38.0042%
Pb-212	1.0000	1.8E-01	9.24E-01	9.24E-01	35.0615%	1.66E-01	8.0619%
Bi-212	1.0000	7.1E-03	5.26E-01	5.26E-01	19.9334%	3.73E-03	0.1808%
Po-212	1.0000	0	3.38E-01	3.38E-01	12.8144%	0.00E+00	0.0000%
Tl-208	1.0000	3.4E-05	2.98E-01	2.98E-01	11.3016%	1.01E-05	0.0005%
<b>Uranium Series</b>							
Pa-234	1.0000	1.8E-02	3.31E-04	3.31E-04	0.0125%	5.95E-06	0.0003%
Pa-234m	1.0000	1.0E-07	1.25E-01	1.25E-01	4.7520%	1.25E-08	0.0000%
Ra-226	0.4000	110	6.10E-05	2.44E-05	0.0009%	2.68E-03	0.1300%
<b>Actinium Series</b>							
Pa-231	1.0000	120	7.70E-04	7.70E-04	0.0292%	9.23E-02	4.4743%
Ac-227	1.0000	170	1.39E-04	1.39E-04	0.0053%	2.37E-02	1.1479%
Th-227	0.0024	2	1.36E-04	3.27E-07	0.0000%	6.53E-07	0.0000%
Ra-223	0.4000	5.4	1.37E-04	5.48E-05	0.0021%	2.96E-04	0.0143%
<b>Fission Products</b>							
Sr/Y-90	1.0000	10	3.45E-04	3.45E-04	0.0131%	3.45E-03	0.1671%
Tc-99	1.0000	1.7	1.75E-04	1.75E-04	0.0066%	2.98E-04	0.0144%
Cs-134	1.0000	27	1.89E-04	1.89E-04	0.0072%	5.10E-03	0.2471%
Cs-137	1.0000	27	4.86E-04	4.86E-04	0.0184%	1.31E-02	0.6353%
Pm-147	1.0000	2.4E-02	2.01E-05	2.01E-05	0.0008%	4.81E-07	0.0000%
Eu-154	1.0000	10	1.53E-05	1.53E-05	0.0006%	1.53E-04	0.0074%
Grand Totals				2.64E+00	100.0000%	2.06E+00	100.0000%

Note: The DOE/EIS-0240 reports the estimated dose from liquid effluents resulting from the BLEU Project to be zero. The estimated dose of 2.06 mrem/yr is conservative because removal factors of many of the isotopes were considered to be zero (1.0000 in column 2). The 2.06 mrem/yr is less than the ALARA constraint of 10 mrem/yr.

**Attachment 24**  
**Additional Information updating Table 5.6 of the NRC EA – 1999**

Impact Category	Current Operations	Down Blending (BPF)	BLEU Complex	DOE/EIS-0240
Air Quality	Air pollutant concentrations are less than applicable standards.	Air pollutant concentrations will be less than applicable standards.	Air pollutant concentrations will be less than applicable standards.	Air pollutant concentration will be less than applicable standards (Table 4.6.2.2-4 p. 4-130)..
Surface Water	Concentrations Below NPDES limits.	No Impact on NPDES limits.	No Impact on NPDES limits.	Required to meet NPDES limits. Emergency Action Plans and Flood warnings systems adequately protect Public Water supply from potential contamination.
Groundwater	Localized contamination, monitoring program in place.	Localized contamination, monitoring program in place.	Groundwater would not be affected by the operation.	No direct discharge of process wastewater to groundwater. No groundwater used. Groundwater would not be affected by the operation.
Land Use	73% of 69.9 Acres developed	No Impact	Developed area increases to 80% of 69.9 Acres.	
Biotic Resources	All activities in previously disturbed area.	All activities in previously disturbed area.	5-acre vacant field. No critical habitat disrupted	No significant adverse impact (p.4-30).
Socioeconomic	652 employees	No additional employment for operations.	No additional employment for operations.	126 employees for operations and 295 indirect jobs were estimated. No project related in-migration. Therefore, impact on housing and related services are the same as for the No Action Alternative.
		Temporary indirect impact for construction is estimated at 109 jobs.		
Cultural Resources	No known impact	No known impact	No known impact	None identified, but possible with low probability.
Radiological				Incremental / site total
Maximally exposed individual, Air Releases	0.041 mrem/yr	0.153 mrem/yr	0.008 mrem/yr	0.14 / 0.17 mrem/yr
Maximally exposed individual, Liquid Releases	Not Estimated	2.06 mrem/yr	Not applicable for sewer releases	0 / 9x10 <sup>-4</sup> mrem/yr
Population Air Releases	N/A	N/A	N/A	1.2 / 1.5 person-rem/yr
Population, Liquid Releases	N/A	N/A	N/A	0-1.9x10 <sup>-3</sup> person rem/year
Population Transportation	*2.32E <sup>-2</sup> per-rem	Transportation Evaluated in DOE/EIS-0240 and TVA ROD <sup>b</sup>	Transportation Evaluated in DOE/EIS-0240 and TVA ROD <sup>b</sup>	
Accidents	Criticality / Nearest Property Boundary / Nearest Resident	Criticality / Nearest Property Boundary / Nearest Resident	Criticality / Nearest Property Boundary / Nearest Resident	Earthquake Criticality Scenario
Radiological	Not Estimated / 9.4 rem	33 rem / 9.4 rem	61 rem / 9.2 rem	67 rem (non involved worker)
Transportation Vehicular	*0.717 fatality	Transportation Evaluated in DOE/EIS-0240 and TVA ROD <sup>b</sup>	Transportation Evaluated in DOE/EIS-0240 and TVA ROD <sup>b</sup>	

a. Sum of reported values in NRC EA 1999.

b. Tennessee Valley Authority (TVA) Record of Decision (ROD). Blending of Surplus Highly Enriched Uranium From the Department of Energy, to Low Enriched Uranium for Subsequent use as Reactor Fuel at the Tennessee Valley Authority's Browns Ferry Nuclear Plant. Federal Register / Vol. 66, No. 223 / Monday, November 19, 2001.

N/A: Not Available, necessary incremental population data to estimate per-rem exposure was not available.

**Attachment 25**  
**Additional information to update model data in the NRC EA-1999**

Design based accidents will be documented and evaluated through the Integrated Safety Analysis (ISA) process. The data used for pathway analysis has not changed since the NFS Environmental Report – 1996. NFS still uses the same meteorological data set, which contains 5-year average data. Attached is a copy of the data set.

**Additional information addressing Solid Waste Monitoring**

The radioactive waste generated from the BLEU Project will be dispositioned at the Nevada Test Site (NTS) in compliance with the NTS waste acceptance criteria and the Department of Transportation shipping requirements.



CAP88-PC

Version 2.00

Clean Air Act Assessment Package - 1988

## WEATHER DATA

Non-Radon Individual Assessment

Nov 26, 2001 11:07 am

Facility: Nuclear Fuel Services  
Address: 1205 Banner Hill Road  
City: Erwin  
State: TN Zip: 37650-9301

Source Category: NRC License SNM-124  
Source Type: Stack  
Emission Year: 2000

Comments: Quarterly Dose Assessment: 3rd Qtr 2001  
(Using Annualized Data)

Dataset Name: 3Q01Dose  
Dataset Date: Nov 26, 2001 11:07 am  
Wind File: C:\CAP88PC2\WINDFILES\NFS5Y.WND

## HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

## Pasquill Stability Class

Dir	A	B	C	D	E	F	G	Wind Freq
N	0.000	0.000	0.000	3.510	0.000	0.000	0.000	0.114
NNW	0.000	0.000	0.000	3.510	0.000	0.000	0.000	0.066
NW	0.000	0.000	0.000	2.790	0.000	0.000	0.000	0.034
WNW	0.000	0.000	0.000	1.980	0.000	0.000	0.000	0.019
W	0.000	0.000	0.000	1.620	0.000	0.000	0.000	0.017
WSW	0.000	0.000	0.000	1.755	0.000	0.000	0.000	0.022
SW	0.000	0.000	0.000	1.935	0.000	0.000	0.000	0.030
SSW	0.000	0.000	0.000	2.205	0.000	0.000	0.000	0.042
S	0.000	0.000	0.000	2.700	0.000	0.000	0.000	0.070
SSE	0.000	0.000	0.000	3.510	0.000	0.000	0.000	0.123
SE	0.000	0.000	0.000	2.970	0.000	0.000	0.000	0.047
ESE	0.000	0.000	0.000	2.385	0.000	0.000	0.000	0.025
E	0.000	0.000	0.000	2.565	0.000	0.000	0.000	0.025
ENE	0.000	0.000	0.000	3.285	0.000	0.000	0.000	0.055
NE	0.000	0.000	0.000	3.735	0.000	0.000	0.000	0.131
NNE	0.000	0.000	0.000	3.375	0.000	0.000	0.000	0.181

## ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

## Pasquill Stability Class

Dir	A	B	C	D	E	F	G
N	0.000	0.000	0.000	3.510	0.000	0.000	0.000
NNW	0.000	0.000	0.000	3.510	0.000	0.000	0.000
NW	0.000	0.000	0.000	2.790	0.000	0.000	0.000
WNW	0.000	0.000	0.000	1.980	0.000	0.000	0.000
W	0.000	0.000	0.000	1.620	0.000	0.000	0.000
WSW	0.000	0.000	0.000	1.755	0.000	0.000	0.000
SW	0.000	0.000	0.000	1.935	0.000	0.000	0.000
SSW	0.000	0.000	0.000	2.205	0.000	0.000	0.000
S	0.000	0.000	0.000	2.700	0.000	0.000	0.000
SSE	0.000	0.000	0.000	3.510	0.000	0.000	0.000
SE	0.000	0.000	0.000	2.970	0.000	0.000	0.000
ESE	0.000	0.000	0.000	2.385	0.000	0.000	0.000
E	0.000	0.000	0.000	2.565	0.000	0.000	0.000
ENE	0.000	0.000	0.000	3.285	0.000	0.000	0.000
NE	0.000	0.000	0.000	3.735	0.000	0.000	0.000
NNE	0.000	0.000	0.000	3.375	0.000	0.000	0.000

## FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

Pasquill Stability Class							
Dir	A	B	C	D	E	F	G
N	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
NNW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
NW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
WNW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
W	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
WSW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
SW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
SSW	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
S	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
SSE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
SE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
ESE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
E	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
ENE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
NE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
NNE	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000
TOTAL	0.0000	0.0000	0.0000	1.0002	0.0000	0.0000	0.0000

## ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 13.0 degrees C  
 286.16 K  
 Precipitation: 103.4 cm/y  
 Lid Height: 800 meters  
 Surface Roughness Length: 0.010 meters  
 Height Of Wind Measurements: 10.0 meters  
 Average Wind Speed: 3.143 m/s

## Vertical Temperature Gradients:

STABILITY E 0.073 k/m  
 STABILITY F 0.109 k/m  
 STABILITY G 0.146 k/m

**Attachment 26**  
**Additional Information to update Table 4.13 of the NRC EA – 1999**  
**Groundwater monitoring for gross alpha and gross beta in the alluvial aquifer**  
**(zone 1) leak-detection wells in the vicinity of the two 23,000 liter (6000-gallon)**  
**underground storage tanks.**

Year – Quarter	Gross alpha (pCi/l)				Gross beta (pCi/l)			
	70A	LD-2A	LD-1A	97A	70A	LD-2A	LD-1A	97A
1997-3	0.2	51.9	1.0	5.4	12.0	78.7	10.3	19.4
1997-4	1.5	51.4	1.0	2.2	11.3	28.1	3.2	6.8
1998-1	3.0	71.1	0.7	34.7	4.0	50.0	1.8	28.3
1998-2	4.2	61.5	0.8	22.5	8.7	46.6	4.8	25.8
1998-3	2.7	46.6	1.0	14.5	10.5	54.2	16.9	16.0
1998-4	10.5	35.1	0.6	4.3	13.5	24.9	2.8	10.9
1999-1	3.7	19.2	18.8	3.2	9.5	21.7	15.5	11.0
1999-2	5.0	35.1	9.0	7.0	24.0	42.1	84.6	87.0
1999-3	3.0	43.0	8.7	10.0	36.0	44.3	78.0	80.0
1999-4	5.0	32	9.0	10.0	32.0	46.0	62	109.0
2000-1	13.0			14.0	31.0			108.0
2000-2	19.0			30.0	39.0			60.0
2000-3	4.0			20.0	22.0			93.0
2000-4	11.0			14.0	38.0			90.0
2001-1	17.0			25.0	30.0			94.0
2001-2	9.0			14.0	33.3			86.3
2001-3	13.3			16.0	24.7			74.7

Note: Monitoring of wells LD-1A and LD-2A ceased during the first quarter of 2000 because use of the 6,000-gallon tanks was discontinued.

**Cross Walk between NRC EA, NFS ER, NFS Supplemental ER and Additional Information (AI) provided to the NRC to update specific tables in the NRC EA**

<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
<b>1. PURPOSE AND NEED FOR ACTION</b>				
1.1 Introduction	1.1	1.1	Supplemental ER	Update as appropriate.
1.2 Site History	1.1	1.1	Supplemental ER	Update as appropriate.
1.3 Description of the Proposed Action	1.2	1.2	Supplemental ER	Provide OCF specific information.
1.4 Need for Action	1.3	1.3	Supplemental ER	Provide OCF specific information.
1.5 References for Section 1				Update as appropriate.
<b>2. THE PROPOSED ACTION AND ALTERNATIVES</b>				
2.1 The Proposed Alternative	1.2 1.3	1.2 1.3	Supplemental ER Supplemental ER	Discuss proposed action to amend : quantities of low-enriched liquid U operation of an OCF.
2.1.1 Description of the Proposed Processing Operations	2.2.1 2.2.1.1	2.2.1 2.2.1.1 2.2.1.2 2.2.1.2.1 2.2.1.2.2 2.2.1.2.3 2.2.1.2.4	Supplemental ER Supplemental ER	A complete description of the cons: necessary for complete review. A d process should be expanded to prov review.
2.1.1.1 Highly Enriched Uranium Production				N/A to OCF.
2.1.1.2 Highly Enriched Uranium Scrap Recovery				N/A to OCF.
2.1.1.3 Blending Operations				N/A to OCF.
2.1.2 Description of the Proposed Decommissioning		2.2.1.7	Supplemental ER	Provide brief statement regarding c
2.1.2.1 Decommissioning of Burial Areas				N/A to OCF
2.1.2.2 Building Decontamination		2.2.1.6 2.2.1.7	Supplemental ER	Update as appropriate.
2.1.2.3 Proposed Decommissioning Activities in the North Site Area				N/A to OCF.
2.1.3 Utilities or Support Operations			AI-Attachment 1	The DOE/EIS-0240 referenced sec NFS site. Update as appropriate.
2.1.3.1 Water Use		2.2.2.2 2.2.2.3	Supplemental ER AI- Attachment 2	Provide information to update Tab Environmental Assessment; includ OCF.
2.1.3.2 Incinerator				N/A to OCF.
2.1.3.3 Heating Plant			AI- Attachment 1	Provide information such as additi presented elsewhere; include basel

**Cross Walk between NRC EA, NFS ER, NFS Supplemental ER and Additional Information (AI) provided to the NRC to update specific tables in the NRC EA**

<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
2.1.3.4 Waste Water Treatment Facility			Figure 2.2 of EA updated in AI - Attachment 2	Provide information to update Figure 2.2 of Environmental Assessment, include OCF.
2.1.3.5 Groundwater Treatment Facility				N/A to OCF.
2.1.3.6 Mixed Waste Treatment		2.2.2.5	Supplemental ER	Provide information to update the 1999 Environmental Assessment as information as appropriate.
2.1.3.7 Chemical Usage			Table 1-3 of 1997 Emergency Plan updated in AI- Attachment 3	Provide information necessary to update Emergency Plan. Also, provide OCF as appropriate.
2.1.4 Gaseous and Liquid Effluents and Solid Waste		2.2.2	Supplemental ER	The DOE/EIS-0240 referenced section of NFS site. Update as appropriate.
2.1.4.1 Gaseous Effluent Management			Supplemental ER and	Discuss gaseous effluent treatment; provide information to update Table 2.2 of 1999 EA.
Radiological Constituent Discharges	2.2.2.1	2.2.2.1	Table 2.2 of EA updated in AI- Attachment 4	
Non-radiological Constituent Discharges in Stack Emissions			Fugitive dust control measures discussed in AI- Attachment 5	Discuss fugitive dust control measures in construction of the OCF.
Fugitive Dust Emissions				
2.1.4.2 Liquid Waste Management	2.2.2.3	2.2.2.3	Supplemental ER	Discuss liquid effluent treatment system; provide information to update Figure 2.2 of 1999 EA.
Radiological Effluents		2.2.2.3.1 2.2.2.3.2	Figure 2.2 of EA updated in AI- Attachment 2	
Non-radiological Effluents				
2.1.4.3 Solid Waste Management	2.2.2.4 2.2.2.5 2.2.2.6 2.2.2.7	2.2.2.4 2.2.2.5 2.2.2.6 2.2.2.7	Supplemental ER	Provide information to update the 1999 Environmental Assessment as appropriate. Discuss waste management for the OCF, including estimated volume, storage and ultimate disposal.
2.2 The No-Action Alternative	2.1	2.1	Supplemental ER	Discuss the no-action alternative to operation of OCF.
2.3 References for Section 2				Update as appropriate.
3. AFFECTED ENVIRONMENT				This section should describe baseline conditions.
3.1 Site Description	3.1	3.1	Supplemental ER	Update as appropriate.

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<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
3.2 Climatology and Meteorology	3.2	3.2	Supplemental ER  Tables 3.1 - 3.4 are addressed in AI- Attachment 6  Table 3.5 of EA updated in AI- Attachment 7	Provide information to update Table appropriate.
3.2.1 Climatology	3.2.1	3.2.1	Supplemental ER	Update as appropriate.
3.2.2 Winds, Tornadoes, Storms	3.2.2	3.2.2	Supplemental ER	Update as appropriate.
3.2.3 Meteorology	3.2.3	3.2.3	Supplemental ER	Update as appropriate.
3.2.4 Air Quality	3.2.4	3.2.4	Supplemental ER	Update as appropriate.
3.3 Demography and Socioeconomics	3.3	3.3	Supplemental ER	Provide information to update Table necessary.
3.4 Land	3.4.1	3.4.1	Supplemental ER	Provide information to update Table necessary.
3.4.1 Adjacent Area	3.4.2	3.4.2	Supplemental ER	Update as appropriate.
3.4.2 Historic Significance	3.4.3	3.4.3	Supplemental ER  Table 3.9 of EA updated in AI- Attachment 8	Provide information to update Table necessary.
3.4.3 Floodplains and Wetlands	3.4.4	3.4.4	Supplemental ER	Update as appropriate.
3.5 Geology, Mineral Resources, and Seismicity	3.6	3.6	Supplemental ER	Update as appropriate.
3.5.1 Geology and Soils	3.6.1, 3.6.2	3.6.1, 3.6.2	Supplemental ER	Update as appropriate.
3.5.2 Mineral Resources	3.6.3	3.6.3	Supplemental ER	Update as appropriate.
3.5.3 Seismicity	3.6.4	3.6.4	Supplemental ER	Update as appropriate.
3.6 Hydrology	3.5	3.5	Supplemental ER	Update as appropriate.
3.6.1 Surface Water	3.5.1	3.5.1	Supplemental ER	Update as appropriate.
3.6.2 Groundwater	3.5.2	3.5.2	Supplemental ER  Table 3.11 of EA updated in AI- Attachment 9  Table 3.19 of EA	Provide information to update Table EA as necessary.

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<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
			updated in AI- Attachment 10	
3.7 Biota	3.7	3.7	Supplemental ER  Table 3.12 of EA updated in AI- Attachment 11	Provide information to update Table necessary.
3.7.1 Terrestrial	3.7.1	3.7.1	Supplemental ER	Update as appropriate.
3.7.2 Aquatic	3.7.2	3.7.2	Supplemental ER	Update as appropriate.
3.7.3 Threatened and Endangered Species	3.7.3	3.7.3	Supplemental ER	Update as appropriate.
3.8 Background Radiological Characteristics	3.8	3.8	Supplemental ER	Update as appropriate.



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<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
Public and Occupational Health				Non-radiological health impacts from The referenced information provide
3.9 Nature and Extent of Contamination		4.1.2	Supplemental ER  Discussion of Site Characterization updated in AI- Attachment 12	Discuss radiological and non-radiol relative to the OCF and provide info Section 3.9 of the January 1999 EA
3.9.1 Soil Contamination		4.1.2	Supplemental ER  Table 3.13 of EA updated in AI- Attachment 13	Discuss soil contamination at the N update Table 3.13 of the January 19
3.9.2 Surface Water Contamination		4.1.2	Supplemental ER	Discuss surface water contaminatio
3.9.3 Groundwater Contamination		4.1.2	Supplemental ER  Table 3.19 of EA updated in AI- Attachment 10	Discuss groundwater contamination information to update Table 3.19 of findings such as Tc-99 groundwater
3.10 References for Section 3				Update as appropriate.
<b>4. EFFLUENT AND ENVIRONMENTAL MONITORING PROGRAM</b>				This section may discuss either bas with the OCF facility as appropriate situation information is being provi
4.1 Effluent Monitoring	4.1.1	4.1.1	Supplemental ER  Table 4.1 of EA updated in AI- Attachment 14	Provide information to update Tabl necessary. Section 9.3.1 of the Safe

**Cross Walk between NRC EA, NFS ER, NFS Supplemental ER and Additional Information (AI) provided to the NRC to update specific tables in the NRC EA**

NRC Environmental Assessment Section (January 1999)	NFS ER (December 1996)	Supplemental ER Reference	Additional Information (AI) Reference	Discussion
4.1.1 Gaseous Effluent Monitoring	4.1.1.1.1, 4.1.1.2.1, Table 18 Table 20	4.1.1.1.1 4.1.1.2.1 Table 17 & 18 Table 22	Supplemental ER  Table 2.2 of EA updated in AI-Attachment 4  Table 2.3 of EA updated in AI-Attachment 22  Table 2.4 of EA updated in AI-Attachment 5  Table 2.5 BLEU Complex information provided in Supp. ER.	Provide information to update Figure January 1999 EA. Describe the OC
4.1.2 Liquid Effluent Monitoring	4.1.1.1.2 4.1.1.2.2 Table 19 Table 21	4.1.1.1.2 4.1.1.2.2 Table 19 Table 21	Supplemental ER	Provide information to update Table 1999 EA. Describe the OCF liquid action limits.
4.1.2.1 Wastewater Treatment Facility		2.2.2.3 4.1.1.2.2 Table 19	Supplemental ER  Table 4.2 of EA updated in AI-Attachment 15	Provide information to update Table EA as appropriate.
4.1.2.2 Non-contact Cooling Water				Update as appropriate.
4.1.2.3 Sewer			Table 4.3 of EA updated in AI-Attachment 16  Table 4.4 of EA updated in AI-Attachment 17	Provide information to update Table EA.
4.1.3 Solid Waste Monitoring		2.2.2	Supplemental ER	Discuss solid waste monitoring re: packaging, storage, shipment, and

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<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
4.2 Environmental Monitoring Program	4.1.2	4.1.2	Supplemental ER  Table 4.5 of EA updated in AI- Attachment 14	Discuss any additional environmen Provide information to update Tabl necessary. Section 9.3.2 of the Saf
4.2.1 Ambient Air Monitoring	4.1.2.1.1 4.1.2.2.1 Table 17 Table 23	4.1.2.1.1 4.1.2.2.1 Table 15 Table 24	Supplemental ER	Provide information to update Tabl appropriate.
4.2.2 Soil and Vegetation Sampling	4.1.2.1.1 4.1.2.2.3 Table 17 Table 23	4.1.2.1.1 4.1.2.2.3 Table 15 Table 24	Supplemental ER  Table 3.15 of EA updated in AI- Attachment 12 specific for BLEU Complex	Provide information to update Tab. EA as appropriate.
4.2.3 Surface Water and Sediment Monitoring	4.1.2.1.1 4.1.2.2.2 Table 8 Table 17 Table 22 Table 23	4.1.2.1.1 4.1.2.2.2 Table 10 Table 15 Table 23 Table 24	Supplemental ER	Provide information to update Tab appropriate.
4.2.4 Groundwater Monitoring	4.1.2.1.2 4.1.2.2.4 Figure 13 Table 17	4.1.2.1.2 4.1.2.2.4 Figure 13 deleted Table 15	Supplemental ER  Tables 3.17 of EA updated in AI- Attachment 18  Table 3.18 of EA updated in AI- Attachment 19  Figure 4.3 of EA updated in AI Attachment 20	Discuss groundwater monitoring a monitoring related to construction information to update Tables 3.17- 1999 EA as appropriate.
4.2.4.1 Groundwater Monitoring in the Vicinity of the North Site (Main) Burial Ground		4.1.2	Supplemental ER	Update as appropriate.

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<b>NRC Environmental Assessment Section (January 1999)</b>	<b>NFS ER (December 1996)</b>	<b>Supplemental ER Reference</b>	<b>Additional Information (AI) Reference</b>	<b>Discussion</b>
4.2.4.2 Groundwater Monitoring in the Vicinity of the Surface Impoundments in the North Site Area		4.1.2	Supplemental ER	Update as appropriate.
4.2.4.3 Groundwater Monitoring for Leak Detection near the Two 6000-Gallon Underground Storage Tanks in the Protected Area.			AI-Attachment 26	Update as appropriate.
4.2.4.4 Groundwater Monitoring near the Burial Trenches on CSX Railroad Property			Table 4.13 of EA updated in AI-Attachment 21	Provide information to update Table appropriate.
4.2.4.5 Groundwater Monitoring for Non-radiological Constituents	4.1.2.2.4 4.2.2 Figure 13 - 14	4.1.2.2.4 4.2.2 Figure 8 - 9	Supplemental ER	Update as appropriate.
4.2.5 Proposed Environmental Monitoring for the North Site Decommissioning		2.2.1.7	Supplemental ER	Update as appropriate.
4.3 References for Section 4				Update as appropriate.
<b>5. ENVIRONMENTAL CONSEQUENCES</b>				
5.1 Environmental Consequences				
5.1.1 Normal Operations		4.1 4.2	Supplemental ER	Update as appropriate.
5.1.1.1 Non-radiological		4.1 4.2	Supplemental ER	Update as appropriate.
Air Quality			Supplemental ER AI-Attachment 5	Discuss air quality impacts resulting from and operation (use of off-spec feed process, final oxide reduction step,
Surface Water		2.2.1.1 2.2.1.2.4 2.2.2.3.2	Supplemental ER	Discuss surface water impacts resulting from erosion) and operation (e.g. utilization treatment) of the OCF.
Groundwater			Supplemental ER AI-Attachment 24	Discuss groundwater impacts resulting from operation of the OCF.
Land Use		3.4.1 Table 10	Supplemental ER	Discuss land use impacts resulting from the OCF.
Biotic Resources		3.7	Supplemental ER	Appendix D applies in the baseline to the proposed action should be in impacts resulting from construction
Cultural Resources		4.3.4	Supplemental ER	Discuss cultural resource impacts resulting from operation of the OCF as appropriate

**Cross Walk between NRC EA, NFS ER, NFS Supplemental ER and Additional Information (AI) provided to the NRC to update specific tables in the NRC EA**

NRC Environmental Assessment Section (January 1999)	NFS ER (December 1996)	Supplemental ER Reference	Additional Information (AI) Reference	Discussion
Socioeconomics		4.3.1	Supplemental ER	Discuss socioeconomic impacts res additional workforce) and operation
Transportation			AI-Attachment 24	Section 4.4 provides an analysis of nitrate. This was a generic calculat reflect actual conditions. Discuss : analyzed in the DOE/EIS-0240 res additional traffic) and operation of
5.1.1.2 Radiological			AI-Attachments 23 and 24	Radiological impacts not analyzed emissions from the ADU process, 1 material) need to be presented. Th the ADU process is not analyzed.
Atmospheric Pathway Impacts			Table 5.1 Dispersion Factors – No Change  Table 5.2 of EA updated in AI- Attachment 22  Table 5.3 NA	Provide information to update Tab as necessary.
Liquid Pathway Impacts			Table 5.4 of EA updated in AI- Attachment 23  Table 5.5 NA	Provide information to update Tab as necessary.
Transportation Impacts			AI-Attachment 24	Section 4.4 provides an analysis of nitrate. This was a generic calcula reflect actual conditions. Discuss : transportation impacts not analyze appropriate.
Total Radiological Impact of the Proposed Action			Table 5.6 updated in AI- Attachment 24	Provide information to update Tab necessary.

**Cross Walk between NRC EA, NFS ER, NFS Supplemental ER and Additional Information (AI) provided to the NRC to update specific tables in the NRC EA**

NRC Environmental Assessment Section (January 1999)	NFS ER (December 1996)	Supplemental ER Reference	Additional Information (AI) Reference	Discussion
Public and Occupational Health		2.2.1.1 4.2.1	Supplemental ER AI-Attachment 5 AI-Attachment 22 AI-Attachment 23	Discuss any additional public health construction and operation (use of the ADU process, final oxide reduction the OCF as appropriate.
Waste Management		2.2.2	Supplemental ER	Discuss any additional waste impact operation (treatment of liquid and solid and disposal plans) of the OCF as a
5.1.2 Evaluation of Potential Accidents	4.3.2	4.3.2	Supplemental ER AI-Attachment 25	Confirm that OCF design basis accidents already evaluated for the NFS site. Appendix A of the January 1999 EA
5.1.2.1 Accident Analysis Methods	4.3.2	4.3.2	Supplemental ER	Update as appropriate.
5.1.2.2. Accident Evaluations		2.2.3	Supplemental ER	Update as appropriate.
Drop of Contaminated Soil				N/A to OCF
Filter Failure Due to Facility Fire		2.2.3	Accident scenarios presented in Supplemental ER	Similar to accident scenario analysis. Reconcile the two scenarios for appropriate
Release of UF <sub>6</sub>				N/A to OCF.
Inadvertent Nuclear Criticality		2.2.3 4.3.2	Accident scenarios presented in Supplemental ER	Similar to accident scenario analysis. Reconcile the two scenarios for appropriate
Update Accident Scenario's		2.2.3 4.3.2	Supplemental ER	Provide OCF design basis accident: ammonia, tank rupture containing liquid nuclear criticality, etc.
5.1.3 Cumulative Impacts			Update Table 5.6 updated in AI Attachment 24	Provide information to update Table necessary.
5.2 Impacts of the No-Action Alternative	ALL	2.1 5.1	Supplemental ER	Update as appropriate.
5.3 References for Section 5				Update as appropriate.
6.0 Regulatory Consultations		7.0 References		Update as appropriate.
Appendix A: Methods to Assess Radiological Impacts			AI-Attachment 25	Provide information to update model