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Erwin, TN 37650

December 30, 2010

RECEIVED

Cindy Bladey
Chief, Announcements and Directives Branch
Division of Administrative Services
Office of Administration, Mail Stop TWB-05-B01M
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001

SUBJECT: **Docket ID NRC-2009-0435**: Comments on Draft Environmental Assessment and Finding of No Significant Impact for Nuclear Fuel Services, Inc., Erwin, TN, Request for 40-year License Renewal

Dear Ms. Bladey:

Since the NRC extended the time period for comment on subject license renewal until December 31, 2010, the following is a **continuation** of my initial 18-page comment dated November 11, 2010, and verbal and written comments provided at the public meeting on October 26, 2010.

Page 1-4 and 1-5

1.5.2. Basis for Review. On page 1-5, it states that many aspects of the proposed action and the affected environment have been addressed in previously issued NRC environmental review documents. For this reason, the staff uses information in prior EAs (e.g., for the previous license renewal (NRC, 1999), for the BLEU project (NRC, 2002), as a basis; this draft EA focuses on new and significant information since those prior documents.

In the 1999 EA, page 4-5 and 4-6, 4.1.2.2 Non-Contact Cooling Water, it states that non-contact cooling water is taken from and returned to Banner Spring Branch through Outfall 002. Grab samples of this process water, which serves the highly-enriched uranium recovery process, are taken weekly and analyzed for gross alpha and gross beta activity. **NFS has established actions levels for gross alpha activity and gross beta activity, respectively.** If action levels are exceeded, the environmental protection function manager is notified, an investigation is undertaken, and appropriate corrective actions are initiated. Activity-release data for uranium, thorium, and plutonium isotopes are provided in semi-annual effluent monitoring reports to NRC.

In the same reference on page 4-6, 4.1.2.3 Sewer, it states that **NFS has also established action levels for gross alpha analysis and gross beta.** (For gross alpha, the action level is 3.0×10^{-7})

E-RIDS = ADM-03

add =
J. Park (JRP)

10/15/2010
15 FR 63519

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SONSI Banner Complete
Template = ADM-013

Comment: The Erwin Citizens Awareness Network, Inc. recently asked the NRC how much high enriched uranium NFS was allowed to discharge into the Nolichucky River, and how often. The answer from Steven Vias at NRC Region II was 3.0×10^{-7} and the frequency was annually. According to the 1999 EA, it appears that this action limit was established by the licensee (NFS) and not the NRC.

Additionally, the same question was posed to the NRC regarding the amount of Plutonium NFS is authorized to discharge, since there is no equation in any of the EA's or ER's regarding Plutonium discharges to the Nolichucky River – how much and how often. As of this date, no response has been received. Therefore, the Plutonium discharges into our air and water for the past 10 years is outlined as follows:

NFS Biannual Effluent Monitoring Reports

Plutonium Discharges Only – Calendar Years 2000-2010

January 1, 2010 to June 30, 2010

Plutonium Discharges in Air

| | Total Volume (m ³) | Quantity Released (Ci) | Quantity Released (g) |
|----------------------------|--------------------------------|------------------------|-----------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 74,003,292 | 6.61E-09 | 3.87E-10 |
| Pu-239 | 74,003,292 | .53E-08 | 8.88E-07 |
| Pu-240 | 74,003,292 | 1.94E-08 | 8.53E-08 |
| Pu-241 | 74,003,292 | 9.87E-07 | 9.58E-09 |

Plutonium Discharges in Water

| | | | |
|-------------------|------------|-----------|-----------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 1,625,345 | 9.01E-08 | 5.27E-09 |
| Pu-239/240 | 1,625,345 | 2.70E-08 | 4.34E-07 |
| <u>Sewer</u> | | | |
| Pu-238 | 17,469,999 | 3.44E-07 | 2.01E-08 |
| Pu-239/240 | 17,469,999 | 1.31E-07 | 2.10E-06 |
| <u>WWTF</u> | | | |
| Pu-238 | 2,435,527 | -2.57E-09 | -1.05E-10 |
| Pu-239/240 | 2,435,527 | 5.09E-09 | 8.19E-07 |
| Pu-241 | 2,435,527 | -1.57E-06 | -1.52E-08 |

July 1, 2009 to December 31, 2009

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg 234</u> | | | |
| Pu-238 | 4,241 | 1.39E-12 | 8.10E-14 |
| Pu-239 | 4,241 | 1.16E-11 | 1.86E-10 |
| Pu-240 | 4,241 | 4.07E-12 | 1.79E-11 |
| Pu-241 | 4,241 | 8.68E-11 | 8.43E-13 |

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 6,820,227 | 1.65E-07 | 9.65E-09 |
| Pu-239/240 | 6,820,227 | 1.30E-07 | 2.08E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 19,419,101 | 1.02E-06 | 5.98E-08 |
| Pu-239/240 | 19,419,101 | 6.99E-07 | 1.12E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,123,715 | 5.21E-08 | 3.04E-09 |
| Pu-239/240 | 3,123,715 | 1.73E-07 | 2.78E-06 |
| Pu-241 | 3,123,715 | 1.11E-05 | 1.07E-07 |

January 1, 2008 to June 30, 2008

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 5,958,057 | 9.38E-08 | 5.49E-09 |
| Pu-239/240 | 5,958,057 | -1.16E-07 | -1.87E-06 |

| | | | |
|--------------|------------|-----------|-----------|
| <u>Sewer</u> | | | |
| Pu-238 | 34,065,895 | 6.86E-07 | 4.01E-08 |
| Pu-239/240 | 34,065,895 | -2.57E-07 | -4.14E-06 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,683,433 | 3.59E-10 | 2.10E-09 |
| Pu-239/240 | 3,683,433 | 1.14E-07 | 1.83E-06 |
| Pu-241 | 3,683,433 | -3.37E-06 | -3.27E-08 |

July 1, 2008 to December 31, 2008

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 7,954,996 | -2.89E-07 | -1.69E-08 |
| Pu-239/240 | 7,954,996 | 2.16E-07 | 3.47E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 47,074,022 | -5.16E-07 | -3.02E-08 |
| Pu-239/240 | 47,074,022 | 1.48E-06 | 2.38E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,640,728 | -5.43E-08 | -3.17E-09 |
| Pu-239/240 | 3,640,728 | -4.41E-08 | -7.10E-07 |
| Pu-241 | 3,640,728 | 2.07E-06 | 2.00E-08 |

July 1, 2007 to December 31, 2007

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 6,674,205 | -1.23E-08 | -7.19E-10 |
| Pu-239/240 | 6,674,205 | 1.16E-07 | 1.87E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 17,543,391 | 1.51E-07 | 8.83E-09 |

| | | | |
|-------------|------------|----------|----------|
| Pu-239/240 | 17,543,391 | 3.17E-07 | 5.10E-06 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,452,942 | 1.47E-07 | 8.62E-09 |
| Pu-239/240 | 3,452,942 | 1.86E-07 | 2.99E-06 |
| Pu-241 | 3,452,942 | 1.61E-05 | 1.57E-07 |

January 1, 2007 to June 30, 2007

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 7,238,980 | -1.43E-07 | -8.37E-09 |
| Pu-239/240 | 7,238,980 | 4.47E-07 | 7.18E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 23,888,742 | -8.64E-07 | -5.05E-08 |
| Pu-239/240 | 23,888,742 | 1.51E-06 | 2.43E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,782,157 | -2.19E-08 | -1.28E-09 |
| Pu-239/240 | 3,782,157 | -1.41E-08 | -2.27E-07 |
| Pu-241 | 3,782,157 | 7.39E-06 | 7.18E-08 |

July 1, 2006 to December 31, 2006

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 7,132,705 | -7.61E-08 | -4.45E-09 |
| Pu-239/240 | 7,132,705 | -1.61E-07 | -2.59E-06 |

| | | | |
|--------------|------------|-----------|-----------|
| <u>Sewer</u> | | | |
| Pu-238 | 27,128,091 | 1.54E-07 | 9.03E-09 |
| Pu-239/240 | 27,128,091 | -1.05E-06 | -1.69E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 2,336,489 | 1.82E-08 | 1.06E-09 |
| Pu-239/240 | 2,336,489 | 6.81E-08 | 1.09E-06 |
| Pu-241 | 2,336,489 | 3.47E-06 | 3.37E-08 |

January 1, 2006 to June 30, 2006

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|-------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 4,254,634 | 8.37E-08 | 4.89E-09 |
| Pu-239/240 | 4,254,634 | -6.32E-08 | -1.02E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 29,331,985 | 4.97E-07 | 2.91E-08 |
| Pu-239/240 | 29,331,985 | 1.00E-06 | 1.61E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 4,134,273 | 2.12E-07 | 1.24E-08 |
| Pu-239/240 | 4,134,273 | -1.08E-07 | -1.73E-06 |
| Pu-241 | 4,134,273 | 3.54E-06 | 3.44E-08 |

July 1, 2005 to December 31, 2005

Plutonium Discharges in Air – None reported

Plutonium Discharges in Water

| | | | |
|-------------------|------------|-----------|-----------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 6,674,110 | -6.59E-08 | -3.85E-09 |
| Pu-239/240 | 6,674,110 | -6.56E-07 | -1.06E-05 |
| <u>Sewer</u> | | | |
| Pu-238 | 26,222,712 | 9.53E-07 | 5.58E-08 |
| Pu-239/240 | 26,222,712 | -2.32E-08 | -3.74E-07 |

| | | | |
|-------------|-----------|----------|----------|
| <u>WWTF</u> | | | |
| Pu-238 | 5,093,999 | 5.33E-08 | 3.12E-09 |
| Pu-239/240 | 5,093,999 | 3.13E-07 | 5.03E-06 |
| Pu-241 | 5,093,999 | 3.70E-06 | 3.59E-08 |

January 1, 2005 to June 30, 2005

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 501 Bldg. 510</u> | | | |
| Pu-241 | 6,983,017 | 8.65E-08 | 8.40E-10 |
| <u>Stack 502 OCB</u> | | | |
| Pu-241 | 18,514,830 | 9.17E-08 | 8.90E-10 |
| <u>Stack 503 EPB</u> | | | |
| Pu-241 | 554,598 | 4.42E-09 | 4.29E-11 |

Plutonium Discharges in Water

| | | | |
|-------------------|------------|-----------|-----------|
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 8,694,792 | 4.45E-07 | 2.66E-08 |
| Pu-239/240 | 8,694,792 | -1.60E-07 | -2.57E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 23,242,925 | -1.03E-06 | -6.00E-08 |
| Pu-239/240 | 23,242,925 | 3.20E-08 | 5.15E-07 |
| <u>WWTF</u> | | | |
| Pu-238 | 4,636,734 | 2.92E-07 | 1.71E-08 |
| Pu-239/240 | 4,636,734 | -1.48E-07 | -2.38E-06 |

July 1, 2004 to December 31, 2004

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 501 Bldg. 510</u> | | | |
| Pu-241 | 14,456,083 | 1.29E-07 | 1.26E-09 |

| | | | |
|---------------------------------------|-------------|----------|----------|
| <u>Stack 502 OCB</u> | | | |
| Pu-241 | 44,767,200 | 4.72E-07 | 4.58E-09 |
| <u>Stack 503 EPB</u> | | | |
| Pu-241 | 1,208,527 | 1.28E-08 | 1.25E-10 |
| <u>Stack 703 Exhaust Room Air</u> | | | |
| Pu-241 | 213,884,879 | 1.29E-06 | 1.26E-08 |
| <u>Stack 704 Process Exhaust (H2)</u> | | | |
| Pu-241 | 40,576,623 | 2.56E-07 | 2.49E-09 |

Plutonium Discharges in Water (Original Version)

| | | | |
|---------------------------|-------------|-----------|-----------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 282,604,780 | 5.67E-06 | 3.32E-07 |
| Pu-239/240 | 282,604,780 | 2.44E-06 | 3.92E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 144,247,475 | 3.20E-06 | 1.87E-07 |
| Pu-239/240 | 144,247,475 | 1.83E-05 | 2.93E-04 |
| <u>WWTF</u> | | | |
| Pu-238 | 6,902,977 | -2.65E-07 | -1.55E-08 |
| Pu-239/240 | 6,902,977 | 1.39E-07 | 2.24E-06 |

Plutonium Discharges in Water (Amended Version)

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 282,604,780 | 5.67E-06 | 3.32E-07 |
| Pu-239/240 | 282,604,780 | 2.44E-06 | 3.92E-06 |
| <u>BLEU Sewer</u> | | | |
| Pu-238 | 7,087,405 | 1.90E-07 | 1.11E-08 |
| Pu-239/240 | 7,087,405 | 4.05E-07 | 6.51E-06 |
| <u>Sewer</u> | | | |
| Pu-238 | 123,606,419 | 4.16E-06 | 2.43E-07 |
| Pu-239/240 | 123,606,419 | 1.64E-05 | 2.63E-04 |
| <u>WWTF</u> | | | |
| Pu-238 | 5,319,722 | -1.66E-07 | -9.74E-09 |

| | | | |
|------------|-----------|----------|----------|
| Pu-239/240 | 5,319,722 | 1.72E-07 | 2.77E-06 |
|------------|-----------|----------|----------|

January 1, 2004 to June 30, 2004

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|--|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 501 Bldg. 510</u> | | | |
| Pu-241 | 16,341,659 | 8.57E-08 | 8.32E-10 |
| <u>Stack 502 OCB</u> | | | |
| Pu-241 | 276,341 | 3.37E-09 | 3.27E-11 |
| <u>Stack 703 Exhaust Room Air</u> | | | |
| Pu-241 | 9,722,040 | 9.43E-08 | 9.16E-10 |
| <u>Stack 704, Process Exhaust (H2)</u> | | | |
| Pu-241 | 1,844,392 | 9.86E-09 | 9.58E-11 |

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 471,397,632 | 2.70E-06 | 1.58E-07 |
| Pu-239/240 | 471,397,632 | 8.56E-07 | 1.38E-05 |
| <u>Sewer</u> | | | |
| Pu-238 | 65,774,692 | 1.76E-06 | 1.03E-07 |
| Pu-239/240 | 65,774,692 | 7.13E-06 | 1.15E-04 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,677,721 | -2.38E-09 | -1.39E-10 |
| Pu-239/240 | 3,677,721 | 7.95E-08 | 1.28E-06 |

July 1, 2003 to December 31, 2003

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg 234</u> | | | |
| Pu-238 | 22,989,984 | -5.21E-10 | -3.05E-11 |
| Pu-239 | 22,989,984 | -4.35E-09 | -7.01E-08 |
| Pu-240 | 22,989,984 | -1.53E-09 | -6.73E-09 |
| Pu-241 | 22,989,984 | -2.48E-08 | -2.40E-10 |
| <u>Stack 501 Bldg. 510</u> | | | |
| Pu-241 | 14,545,872 | 8.16E-08 | 7.92E-10 |

Plutonium Discharges in Water

| | | | |
|---------------------------|-------------|-----------|-----------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 505,542,544 | 1.35E-06 | 7.90E-08 |
| Pu-239/240 | 505,542,544 | 4.38E-05 | 7.03E-04 |
| <u>Sewer</u> | | | |
| Pu-238 | 44,403,429 | -9.88E-08 | -5.78E-09 |
| Pu-239/240 | 44,403,429 | 2.26E-06 | 3.64E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,929,760 | -2.95E-08 | -1.73E-09 |
| Pu-239/240 | 3,929,760 | 5.01E-08 | 8.06E-07 |

January 1, 2003 to June 30, 2003

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 77,363,990 | -6.94E-10 | -4.06E-11 |
| Pu-239 | 77,363,990 | -5.80E-09 | -9.33E-08 |
| Pu-240 | 77,363,990 | -2.04E-09 | -8.95E-09 |
| Pu-241 | 77,363,990 | 1.73E-08 | 1.68E-10 |
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 4,624,028 | 1.74E-10 | 1.02E-11 |

| | | | |
|--------|-----------|----------|----------|
| Pu-239 | 4,624,028 | 1.45E-09 | 2.34E-08 |
| Pu-240 | 4,624,028 | 5.12E-10 | 2.24E-09 |
| Pu-241 | 4,624,028 | 3.59E-08 | 3.48E-10 |

Stack 28 Bldg. 234

| | | | |
|--------|-----------|----------|----------|
| Pu-238 | 5,974,130 | 1.44E-09 | 8.43E-11 |
| Pu-239 | 5,974,130 | 1.20E-08 | 1.94E-07 |
| Pu-240 | 5,974,130 | 4.24E-09 | 1.86E-08 |
| Pu-241 | 5,974,130 | 4.23E-08 | 4.10E-10 |

Stack 667 Bldg 410

| | | | |
|--------|-------------|----------|----------|
| Pu-238 | 264,084,538 | 2.77E-08 | 1.62E-09 |
| Pu-239 | 264,084,538 | 3.22E-07 | 5.17E-06 |
| Pu-240 | 264,084,538 | 1.08E-07 | 4.74E-07 |
| Pu-241 | 264,084,538 | 2.20E-06 | 2.13E-08 |

Plutonium Discharges in Water

Banner Spring Down

| | | | |
|------------|-------------|-----------|-----------|
| Pu-238 | 350,081,508 | -2.94E-06 | -1.72E-07 |
| Pu-239/240 | 350,081,508 | 1.58E-05 | 2.54E-04 |

Sewer

| | | | |
|------------|------------|----------|----------|
| Pu-238 | 51,870,934 | 8.11E-07 | 4.74E-08 |
| Pu-239/240 | 51,870,934 | 5.70E-06 | 9.16E-05 |

WWTF

| | | | |
|------------|-----------|-----------|-----------|
| Pu-238 | 4,104,747 | 1.63E-07 | 9.56E-09 |
| Pu-239/240 | 4,104,747 | -9.61E-08 | -1.55E-06 |

July 1, 2002 to December 31, 2002

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 69,469,705 | -2.01E-09 | -1.17E-10 |
| Pu-239 | 69,469,705 | -1.68E-08 | -2.70E-07 |
| Pu-240 | 69,469,705 | -5.91E-09 | -2.59E-08 |
| Pu-241 | 69,469,705 | -1.69E-08 | -1.64E-10 |
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 38,753,761 | 1.47E-08 | 8.61E-10 |

| | | | |
|--------|------------|----------|----------|
| Pu-239 | 38,753,761 | 1.23E-07 | 1.98E-06 |
| Pu-240 | 38,753,761 | 4.33E-08 | 1.90E-07 |
| Pu-241 | 38,753,761 | 2.21E-07 | 2.14E-09 |

Stack 28 Bldg. 234

| | | | |
|--------|------------|----------|----------|
| Pu-238 | 15,020,671 | 7.69E-10 | 4.50E-11 |
| Pu-239 | 15,020,671 | 6.43E-09 | 1.03E-07 |
| Pu-240 | 15,020,671 | 2.26E-09 | 9.92E-09 |
| Pu-241 | 15,020,671 | 3.71E-08 | 3.61E-10 |

Stack 667 Bldg. 410

| | | | |
|--------|-------------|----------|----------|
| Pu-238 | 261,031,537 | 3.76E-08 | 2.20E-09 |
| Pu-239 | 261,031,537 | 4.37E-07 | 7.03E-06 |
| Pu-240 | 261,031,537 | 1.47E-07 | 6.44E-07 |
| Pu-241 | 261,031,537 | 1.57E-06 | 1.53E-08 |

Plutonium Discharges in Water

Banner Spring Down

| | | | |
|------------|-------------|----------|----------|
| Pu-238 | 265,983,892 | 3.73E-06 | 2.18E-07 |
| Pu-239/240 | 265,983,892 | 3.60E-05 | 5.79E-04 |

Sewer

| | | | |
|------------|------------|-----------|-----------|
| Pu-238 | 55,774,938 | 3.67E-08 | 2.14E-09 |
| Pu-239/240 | 55,774,938 | -3.54E-07 | -5.70E-06 |

WWTF

| | | | |
|------------|-----------|-----------|-----------|
| Pu-238 | 3,561,682 | -1.06E-07 | -6.17E-09 |
| Pu-239/240 | 3,561,682 | -1.02E-07 | -1.64E-06 |

January 1, 2002 to June 30, 2002

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 68,264,930 | 1.06E-09 | 6.19E-11 |
| Pu-239 | 68,264,930 | 8.85E-09 | 1.42E-07 |
| Pu-240 | 68,264,930 | 3.11E-09 | 1.37E-08 |
| Pu-241 | 68,264,930 | -2.96E-08 | -2.88E-10 |

| | | | |
|---------------------------|------------|----------|----------|
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 26,303,871 | 2.59E-09 | 1.51E-10 |
| Pu-239 | 26,303,871 | 2.16E-08 | 3.48E-07 |
| Pu-240 | 26,303,871 | 7.61E-09 | 3.34E-08 |
| Pu-241 | 26,303,871 | 6.99E-08 | 6.79E-10 |

| | | | |
|---------------------------|------------|----------|----------|
| <u>Stack 28 Bldg. 234</u> | | | |
| Pu-238 | 25,278,592 | 9.33E-10 | 5.46E-11 |
| Pu-239 | 25,278,592 | 7.80E-09 | 1.25E-07 |
| Pu-240 | 25,278,592 | 2.74E-09 | 1.20E-08 |
| Pu-241 | 25,278,592 | 1.91E-08 | 1.85E-10 |

| | | | |
|----------------------------|-------------|----------|----------|
| <u>Stack 667 Bldg. 410</u> | | | |
| Pu-238 | 389,303,185 | 1.33E-07 | 7.78E-09 |
| Pu-239 | 389,303,185 | 1.52E-06 | 2.44E-05 |
| Pu-240 | 389,303,185 | 5.12E-07 | 2.25E-06 |
| Pu-241 | 389,303,185 | 5.30E-06 | 5.15E-08 |

Plutonium Discharges in Water

| | | | |
|---------------------------|-------------|----------|----------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 263,497,408 | 1.00E-05 | 5.86E-07 |
| Pu-239/240 | 263,497,408 | 1.58E-05 | 2.54E-04 |

| | | | |
|--------------|------------|----------|----------|
| <u>Sewer</u> | | | |
| Pu-238 | 40,605,836 | 5.12E-07 | 3.00E-08 |
| Pu-239/240 | 40,605,836 | 1.13E-06 | 1.81E-05 |

| | | | |
|-------------|-----------|----------|----------|
| <u>WWTF</u> | | | |
| Pu-238 | 3,864,313 | 1.04E-08 | 6.07E-10 |
| Pu-239/240 | 3,864,313 | 8.24E-09 | 1.33E-07 |

January 1, 2001 to June 30, 2001

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 76,056,173 | -1.76E-09 | -1.03E-10 |
| Pu-239 | 76,056,173 | -1.71E-08 | -2.75E-07 |
| Pu-240 | 76,056,173 | -5.87E-09 | -2.57E-08 |
| Pu-241 | 76,056,173 | -2.81E-08 | -2.73E-10 |

Stack 27 Bldg. 234

| | | | |
|--------|------------|----------|----------|
| Pu-238 | 26,202,746 | 1.76E-09 | 1.03E-10 |
| Pu-239 | 26,202,746 | 1.54E-08 | 2.45E-07 |
| Pu-240 | 26,202,746 | 5.34E-09 | 2.34E-08 |
| Pu-241 | 26,202,746 | 4.36E-08 | 4.23E-10 |

Stack 28 Bldg. 234

| | | | |
|--------|-----------|----------|----------|
| Pu-238 | 9,284,021 | 4.63E-10 | 2.71E-11 |
| Pu-239 | 9,284,021 | 4.21E-09 | 6.77E-08 |
| Pu-240 | 9,284,021 | 1.46E-09 | 6.42E-09 |
| Pu-241 | 9,284,021 | 1.88E-08 | 1.82E-10 |

Stack 667 Bldg. 410

| | | | |
|--------|-------------|----------|----------|
| Pu-238 | 396,838,393 | 8.43E-08 | 4.93E-09 |
| Pu-239 | 396,838,393 | 9.54E-07 | 1.53E-05 |
| Pu-240 | 396,838,393 | 3.21E-07 | 1.41E-06 |
| Pu-241 | 396,838,393 | 9.05E-06 | 8.78E-08 |

(NOTE: This report states "Average radionuclide concentrations in air effluents from stacks 416, 421, and 667 (as measured at the point of release) exceeded concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1 during the release period.")

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 247,043,068 | 7.76E-05 | 4.54E-06 |
| Pu-239/240 | 347,043,068 | 2.58E-05 | 4.14E-04 |
| <u>Sewer</u> | | | |
| Pu-238 | 31,217,770 | 6.83E-07 | 3.99E-08 |
| Pu-239/240 | 31,217,770 | 1.04E-06 | 1.66E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 4,452,928 | 6.35E-08 | 3.71E-09 |
| Pu-239/240 | 4,452,928 | 2.86E-07 | 4.59E-06 |

July 1, 2001 to December 31, 2001

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 65,014,695 | 8.66E-10 | 5.06E-11 |
| Pu-239 | 65,014,695 | 7.24E-09 | 1.16E-07 |
| Pu-240 | 65,014,695 | 2.55E-09 | 1.12E-08 |
| Pu-241 | 65,014,695 | 6.93E-08 | 6.73E-10 |
| | | | |
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 23,592,535 | 1.03E-09 | 6.04E-11 |
| Pu-239 | 23,592,535 | 8.63E-09 | 1.39E-07 |
| Pu-240 | 23,592,535 | 3.04E-09 | 1.33E-08 |
| Pu-241 | 23,592,535 | 8.30E-08 | 8.06E-10 |
| | | | |
| <u>Stack 28 Bldg. 234</u> | | | |
| Pu-238 | 22,530,721 | 4.73E-10 | 2.77E-11 |
| Pu-239 | 22,530,721 | 3.95E-09 | 6.36E-08 |
| Pu-240 | 22,530,721 | 1.39E-09 | 6.10E-09 |
| Pu-241 | 22,530,721 | 3.69E-08 | 3.58E-10 |
| | | | |
| <u>Stack 667 Bldg. 410</u> | | | |
| Pu-238 | 372,476,859 | 4.29E-08 | 2.51E-09 |
| Pu-239 | 372,476,859 | 4.82E-07 | 7.74E-06 |
| Pu-240 | 372,476,859 | 1.61E-07 | 7.08E-07 |
| Pu-241 | 372,476,859 | 1.94E-06 | 1.88E-08 |

(NOTE: This report states "The average radionuclide concentrations in gaseous effluents routinely exceed the concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1.")

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 329,710,340 | -5.81E-06 | -3.40E-07 |
| Pu-239/240 | 329,710,340 | 1.99E-05 | 3.19E-04 |
| | | | |
| <u>Sewer</u> | | | |
| Pu-238 | 48,876,475 | 1.51E-06 | 8.81E-08 |
| Pu-239/240 | 48,876,475 | 2.14E-06 | 3.44E-05 |

| | | | |
|-------------|-----------|----------|----------|
| <u>WWTF</u> | | | |
| Pu-238 | 3,526,983 | 1.20E-07 | 7.01E-09 |
| Pu-239/240 | 3,526,983 | 5.49E-08 | 8.82E-07 |

July 1, 2000 to December 31, 2000

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 84,612,257 | 1.49E-10 | 3.42E-11 |
| Pu-239 | 84,612,257 | 1.64E-09 | 2.64E-08 |
| Pu-240 | 84,612,257 | 5.53E-10 | 2.43E-09 |
| Pu-241 | 84,612,257 | -5.28E-08 | -5.13E-10 |
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 13,601,575 | 5.85E-10 | 3.42E-11 |
| Pu-239 | 13,601,575 | 5.84E-09 | 9.38E-08 |
| Pu-240 | 13,601,575 | 2.00E-09 | 8.79E-09 |
| Pu-241 | 13,601,575 | 2.08E-08 | 2.02E-10 |
| <u>Stack 28 Bldg.234</u> | | | |
| Pu-238 | 17,648,946 | 1.71E-09 | 9.98E-11 |
| Pu-239 | 17,648,946 | 1.70E-08 | 2.74E-07 |
| Pu-240 | 17,648,946 | 5.85E-09 | 2.56E-08 |
| Pu-241 | 17,648,946 | 4.72E-08 | 4.58E-10 |
| <u>Stack 583 Bldg.234</u> | | | |
| Pu-238 | 2,235,029 | 3.37E-10 | 1.97E-11 |
| Pu-239 | 2,235,029 | 3.37E-09 | 5.41E-08 |
| Pu-240 | 2,235,029 | 1.16E-09 | 5.07E-09 |
| Pu-241 | 2,235,029 | 4.52E-08 | 4.39E-10 |
| <u>Stack 667 Bldg. 410</u> | | | |
| Pu-238 | 405,450,463 | 1.19E-07 | 6.96E-09 |
| Pu-239 | 405,450,463 | 1.35E-06 | 2.17E-05 |
| Pu-240 | 405,450,463 | 4.55E-07 | 2.00E-06 |
| Pu-241 | 405,450,463 | 3.82E-05 | 3.71E-07 |

(NOTE: This report states "Average radionuclide concentrations in air effluents from stacks 416, 421, and 667 (as measured at the point of release) exceeded concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1 during the release period.")

Plutonium Discharges in Water (Original Report)

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 252,068,838 | 7.94E-06 | 4.65E-07 |
| Pu-239/240 | 252,068,838 | 4.75E-05 | 7.64E-04 |
| <u>Sewer</u> | | | |
| Pu-238 | 19,610,980 | 3.65E-07 | 2.13E-08 |
| Pu-239/240 | 19,610,980 | 7.77E-07 | 1.25E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 4,741,217 | 3.96E-09 | 2.32E-10 |
| Pu-239/240 | 4,741,217 | 1.29E-07 | 2.07E-06 |

Plutonium Discharges in Water (Revised Report)

| | | | |
|---------------------------|-------------|----------|----------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 252,068,838 | 7.94E-06 | 4.65E-07 |
| Pu-239/240 | 252,068,838 | 4.75E-05 | 7.64E-04 |
| <u>Sewer</u> | | | |
| Pu-238 | 19,773,794 | 3.64E-07 | 2.13E-08 |
| Pu-239/240 | 19,773,794 | 7.77E-07 | 1.25E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 4,741,217 | 3.96E-09 | 2.32E-10 |
| Pu-239/240 | 4,741,217 | 1.29E-07 | 2.07E-06 |

(NOTE: Nuclear Fuel Services Amendment 12 (TAC No. L31387) Adjust Liquid Effluent Discharge Limits, October 27, 2000, and Safety Evaluation Report, Amendment to Adjust Liquid Effluent Discharge Action Levels.)

January 1, 2000 to June 30, 2000

Plutonium Discharges in Air

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|----------------------------|-------------------------------------|-------------------------------|------------------------------|
| <u>Stack 234 Bldg. 234</u> | | | |
| Pu-238 | 12,181,746 | 3.69E-10 | 2.16E-11 |
| Pu-239 | 12,181,746 | 4.06E-09 | 6.53E-08 |
| Pu-240 | 12,181,746 | 1.37E-09 | 6.00E-09 |
| Pu-241 | 12,181,746 | -2.83E-09 | -2.74E-11 |
| <u>Stack 27 Bldg. 234</u> | | | |
| Pu-238 | 23,726,403 | 1.28E-08 | 7.48E-10 |
| Pu-239 | 23,726,403 | 1.28E-07 | 2.05E-06 |
| Pu-240 | 23,726,403 | 4.38E-08 | 1.92E-07 |
| Pu-241 | 23,726,403 | 6.80E-07 | 6.61E-09 |
| <u>Stack 28 Bldg. 234</u> | | | |
| Pu-238 | 39,209,477 | 1.28E-08 | 7.46E-10 |
| Pu-239 | 39,209,477 | 1.27E-07 | 2.05E-06 |
| Pu-240 | 39,209,477 | 4.37E-08 | 1.92E-07 |
| Pu-241 | 39,209,477 | 7.88E-07 | 7.65E-09 |
| <u>Stack 583 Bldg. 234</u> | | | |
| Pu-238 | 2,879,457 | 1.49E-09 | 8.73E-11 |
| Pu-239 | 2,879,457 | 1.49E-08 | 2.39E-07 |
| Pu-240 | 2,879,457 | 5.11E-09 | 2.24E-08 |
| Pu-241 | 2,879,457 | 1.49E-09 | 1.44E-09 |
| <u>Stack 667 Bldg. 410</u> | | | |
| Pu-238 | 424,817,557 | 1.43E-07 | 8.38E-09 |
| Pu-239 | 424,817,557 | 1.64E-06 | 2.64E-05 |
| Pu-240 | 424,817,557 | 5.53E-07 | 2.42E-06 |
| Pu-241 | 424,817,557 | 7.13E-05 | 6.92E-07 |

(NOTE: This report states "Average radionuclide concentrations in air effluents from stacks 416, 421, 600, and 667 (as measured at the point of release) exceeded concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1 during the release period.")

Plutonium Discharges in Water

| | <u>Total Volume (m³)</u> | <u>Quantity Released (Ci)</u> | <u>Quantity Released (g)</u> |
|---------------------------|-------------------------------------|-----------------------------------|----------------------------------|
| <u>Banner Spring Down</u> | | | |
| Pu-238 | 296,617,513 | 4.19E-06 | 2.45E-07 |
| Pu-239/240 | 296,617,513 | 2.52E-05 | 4.06E-04 |
| <u>Sewer</u> | | | |
| Pu-238 | 24,119,391 | 1.54E-06 | 9.03E-08 |
| Pu-239/240 | 24,119,391 | 7.43E-07 | 1.19E-05 |
| <u>WWTF</u> | | | |
| Pu-238 | 3,359,353 | 1.07E-07 | 6.26E-09 |
| Pu-239/240 | 3,359,353 | 5.77E-08 | 9.27E-07 |

Disclaimer: This information was extracted from the NFS Biannual Effluent Monitoring Reports which are publicly available on the NRC ADAMS website. Writer does not know whether or not they represent an accurate report or picture of actual Plutonium discharges to the air and water, given the past incidents of falsification of documents, providing inaccurate information to the NRC, and questionable credentials of those verifying the reports.

These numbers reflect only the NFS Plutonium discharges and do not include the discharges of Uranium 234, 235, 236, and 238, Thorium 228,230, 231, 232, and 234, Technitium-99, Cesium (Cs-137), Sodium (Na-22), Radium (Ra-224 and 228), Neptunium (Np-237), Protactinium (Pa-231 and 234m), Lead (Pb-212), Actinium (Ac-227), Americium (Am-241) from the 22 air effluent stacks and three (and at times four) water effluent outfalls.

Negative activity concentrations and negative quantities released measured in curies and grams. NRC was queried as to the meaning of negative values and their response was as follows: "A negative value means no radiation above background was detected. The measurement of effluents include natural background radiation. To determine whether any radiation above background was detected, an average background value must be subtracted from the measured value. This can result in some negative values because the measurements fluctuate up and down." (Email response from Kevin Ramsey, Dec. 22, 2010)

4.11 Public and Occupational Health

The draft EA states that “Public health impacts could occur if sufficient quantities of hazardous or radioactive materials are transported from the NFS site and enter the environment through air, surface water, groundwater, and solid wastes. Public health impacts through air include direct radiation from sources on the site and release of radioactive materials from stacks. Routine air monitoring is not currently performed for non-radiological criteria and hazardous air pollutants. Table 2-1 indicates that **NFS estimates** of pollutants to the ambient air are in compliance with applicable guidelines and regulations. **HOWEVER**, estimated emissions for several of the compounds **ARE AT** or marginally below the allowable limits.”

COMMENT: One of the important points to be made by the Biannual Effluent Monitoring Reports is that **discharge limits are routinely exceeded**. Therefore, I strongly disagree with the draft EA Conclusion on Page 6-1 that “Gaseous emissions and liquid effluents are controlled and monitored by permit and are within regulatory limits for non-radiological and radiological components.” (See **Enclosure 1**, Timeline - Exceeded Limits/Mass Limits and Related Issues, 1980-2009, 18 pages).

A prime example is the April 2, 1996 NFS Incinerator Fire – a loss of containment of licensed material. The incinerator was burning radioactive material at the time, so the potential existed for a radiological release, according to the Special Inspection Team Report. The licensee determined that a maximum of 800 grams of high-enriched uranium was available for release.

“There was no formal, periodic inspection of the Fiberglass Reinforced Plastic (FRP) duct to look for damage or coating of the duct. There was no periodic inspection of the inside of the ducting for buildup of material. The ducting was opened and cleaned out only after Non-destructive Assay (NDA) measurements (scanning) showed the buildup of uranium above the licensee’s action point. The ducting had not been cleaned out, based on NDA requirements, for several years.” Also, there were no air samples taken for chemicals during the fire.

A security guard in the Secondary Alarm Station (SAS) was not able to make an announcement concerning the fire over the public address system because the PA system was out of service for repair. The Emergency Control Director determined that the fire should be classified as a Site Area Emergency (SAE) since it lasted more than 15 minutes and breached containment for radioactive materials. The winds were to the South. (NRC Inspection Report No. 70-143/96-05, May 21, 1996).

Previously, another fire had occurred on June 13, 1983 in the incinerator exhaust ventilation duct downstream of the exhaust blower. The licensee “planned” to install a new incinerator in 1985, but the new incinerator was never installed. (NRC Inspection Report 70-143/83-26).

Additionally, according to a listing of radionuclides, chemicals, and other heavy metals in an NFS 1998 Emergency Plan, Revision 2, dated June 2, 1998, it appears that many of these are not reported on the Biannual Effluent Monitoring Report, or anywhere else that can be found. They include: Cerium (Ce-137 and 139), Cesium (Cs-134), Cobalt (Co-57, 58 and 60), Europium (Eu-152, 154 and 155), Iodine (I-129), Nickel (Ni-63), Praseodymium (Pr-147), Radium (Ra-226), Hydrogen (H-3), Yttrium (Y-88 and 169), Strontium/Yttrium (Sr/Y-90), Mercury (Hg-203), Californium (Cf-252), Gadolinium (Gd-148), Curium (Cm-244), Cadmium (Cd-109), and Tin (Sn-113). (Table 1-1, Page 1-2, Summary of Major NFS Radioactive Material Licenses).

The NRC was asked if they ever independently verified that the NFS Biannual Effluent Monitoring Reports accurately accounted for the actual volume and activity concentration of each radionuclide discharged to water by NFS? The response was that “NRC has not independently verified effluent monitoring results since the last license renewal in 1999.” Further, “We are not aware of any TDEC independent verification of the limits in 10 CFR Part 20.”

Page 4-15

4.11 Public and Occupational Health

The draft EA states “As shown in Figure 3-9 for calendar years 2004 through 2009, the largest monthly average concentration of radioactivity in groundwater was 63.2 percent of the liquid effluent concentrations limits in 10 CFR Part 20, Appendix B.”

COMMENT: It appears that the environmental impact of NFS discharges through multiple sources – directly into the Nolichucky River, Banner Spring Branch, Martin Creek, the BLEU Sewer, City Sewer, and Wastewater Treatment Facility – all eventually going to the Nolichucky River -- is never taken into consideration. And added to that is the runoff of contaminated groundwater into the River – a source of drinking water for the downstream communities of Jonesborough and Greeneville. If this is not a significant impact to the human environment, then I cannot imagine what could be. The Nolichucky River is being bombarded with a mixture of radioactive materials mixed with chemicals, and has been for 53 years. It is no wonder that high-enriched uranium is found in the River 40 plus miles downstream.

Page 4-18

4.12 Waste Management

The draft EA states that “Mixed waste that consists of PCB remediation waste or mercury laboratory wastes that are contaminated with radioactive materials are stored for an indeterminate period until a permitted disposal facility becomes available. Regarding the generation of **mixed (radioactive and hazardous) waste**, the volume of waste generated

is equal to about twenty-four (24) 55-gallon drums per year or 980 drums for the 40-year license renewal.”

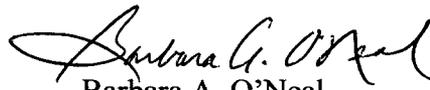
COMMENT: This mixed radioactive and hazardous waste has been accumulating at NFS for 53 years; however, the draft EA does not tell us how many 55-gallon drums are already being stored there. To add 980 more to what is already there is a significant impact in my opinion, especially since NFS is located within the City Limits of Erwin, is in a 100-year flood plain and sits on top of two fault zones with five fractures and is a stone’s throw from a major Interstate Highway 26 connecting Tennessee and North Carolina.

Appendix (Flora and Fauna in the Region Around Nuclear “Field” Services).

COMMENT: Believe this should read “Fuel.” Tables 1, 2, 3 and 4 also contain the same error. Table 5 does not delineate between the Erwin 7.5-minute quadrangle and the Chestoa 7.5-minute quadrangle. However, the draft EA makes quite a distinction between the two on pages 3-22 and 3-23. Additionally, many animals and one fish are not included, i.e. muskrats, skunks, otters, minks, red foxes, coyotes, black bears and spotted bass.

Based on the NFS 53-year history of discharging radioactive materials and chemicals into our air and water, I strongly disagree with the NRC draft EA that there would be no significant impact to the environment for another 40 years, 10 years, 5 years or even 2 years. This license renewal request should not be approved.

I also have great concern for the knowledge and credentials of those who manage NFS, and even more so for the knowledge and credentials of those in the NRC and the State of Tennessee who supposedly provide oversight. After attending every NRC public meeting here in Erwin since September 2007, two meetings in Atlanta at NRC Region II, and one at NRC HQ in Rockville, my observation is that the NRC representatives responsible for the oversight of NFS are either unwilling or unable to answer the simplest of questions posed to them by members of the public. This does not provide the public with confidence in the government regulators whose mission is to protect them and their environment. And from the State regulators who are never present at any public meetings, their comments on more than one occasion have been: “sue us.”


Barbara A. O’Neal

1 Enclosure

Timeline – (NFS) Exceeded Limits/Mass Limits and Related Issues

EXCEEDED LIMITS/MASS LIMITS & RELATED ISSUES

(Note: (R) Means Word Or Text Has Been Redacted. IR Means Inspection Report)

- 12/04/80 NFS has had three significant (greater than 100 grams) releases of uranium hexafluoride since 1957. The NRC has determined that accidents at NFS could involve: *criticality, release of material (i.e., uranium hexafluoride fire)*. U.S. NRC Report, Public Meeting at Erwin, TN, 12/04/80, p. 22 (Note: 08/07/79—NRC: Too Much Erwin Plant Radioactivity. 7 lbs. (3,000 grams) uranium accidentally vented into atmosphere. The Tennessean, 01/26/81 10/29/80—NRC states that 48 lbs. of uranium reported missing from NFS earlier this year was primarily lost through larger than reported releases of gas and liquid waste and slow buildup of uranium in equipment. According to the NRC report, radioactive dust released from NFS smokestacks, in some cases due to improper operation of equipment was understated by the company. Al Gibson, chief of the radiation support section of the NRC office in Atlanta said "release of radiation from NFS was in one sense more hazardous than the accident at Three Mile Island (TMI)." Gibson said radiation released at TMI radiates a person's entire body, while "NFS radiation exposure was a different type—to an individual organ, the bone. The inhalation of radioactive dust particles are absorbed in the blood and deposited in bone tissue. The dose to the bone near NFS was, in fact, probably higher than TMI. The report states "It can be said that inadequate measurements of stack effluents (gaseous waste) contributed to at least 766 grams (1 lb.11 ounces) to the uranium inventory differences." Inadequacies were identified in both the design and operation of the waste measurement system. Missing Uranium Uranium Explained By NRC, Johnson City Press Chronicle, 10/29/80 (This is only 2 of many such releases that exceeded NFS' Limits. See Known Safety Issues At NFS From 1962 to January 12, 2010 under Tab K)
- 01/26/81 NRC: Too Much Erwin Plant Radioactivity. NRC report states that residents in the area have routinely been exposed to at least 4 to 5 times more radiation than had been predicted in the 1978 Environmental Impact Appraisal (EIA) when NFS was relicensed. NRC officials said the Erwin plant has routinely released twice as much radioactive uranium into the atmosphere as its seven day standard allows and plans to lower the standard limits for NFS. The NRC does not take corrective action against NFS for its accidental releases or for exceeding its seven day standard for releases. "The condition of their license is that they must report to the NRC if they exceed the standard. That is so we know the trend (of radioactivity) in the atmosphere. "Right now their average release is running twice the amount of their standard", NRC spokesman Joe Gilliland stated. For the physical condition of the plant, they're doing about as well as they can". The Tennessean, 1/26/81 (Note: "One company document supplied to the NRC in 1976, indicates the nearest residents, who live about 350 yards from the stacks, receive annual doses of lung radiation of up to 35 millirems, the then existing NRC radiation standards. In 1977, the EPA issued more restrictive radiation guidelines, which said no one living near uranium plants or elsewhere should absorb doses of more than 25 millirems. The NRC, it was learned, then discarded the plants own radiation estimates and issued its own environmental impact assessment (EIA) on the Erwin plant. The new NRC report estimates that Erwin residents would receive no more than 3.4 millirems per year. The NRC assessment, sent to the EPA for routine clearance three months ago, did not mention the plant had submitted an estimate that is 10 millirems higher than the current EPA standard". The Atlanta Journal and Constitution, Sunday, 4/30/78, p.20A

- 04/10/81 Management meeting to discuss the analysis and evaluation of an apparent internal exposure to a quantity of material in excess of regulatory limits. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86
- 11/29/81 *Little Progress Made at Nuclear Plant*. A Sept. 29, 1981 NRC report indicated a number of possible health and environmental impacts *continue to exist at the plant* and has ordered the plant to install new waste treatment facilities in hopes of reducing radioactive discharges, but they won't be in place until Dec., 1982. The report, containing observations by NRC officials, covered the following problems:
- Outside contaminated control areas "the surfaces (asphalt, soil, etc.) in these areas have been permitted to become contaminated to the **limits** specified in the license. *The contamination is re-suspended into the atmosphere and also discharged from plant environs through surface water runoff. Licensee has no control over the quantity discharged nor is licensee able to satisfactorily measure the quantify of material released.*" *In addition to the potential migration of radioactive waste from the treatment ponds to the groundwater, NFS has buried waste lines which could leak and a solid waste burial ground on site from which contamination could be released to the groundwater.*
- Devices measuring release of radioactive particles: "A comparison of the results shows *very poor correlation between the primary and redundant stack samples,*" *the officials wrote of devices which measure the amount of uranium particles often vented up smokestacks, during the chemical process which converts the uranium into nuclear fuel.* Atlanta Journal and Constitution, 11/29/81
- 02/08/82 Notice of Violation for overexposure of an individual to a quantity of material in excess of 10 CFR limits. Severity Level III—No civil penalty. Hearing Before the Subcommittee on Energy Conservation and Power, p.72, 9/18/86
- 03/09/82 A lunchroom vending machine *had surface radioactivity beyond present allowable levels for uncontrolled areas*. The machine had surface radioactivity on a portion of the top outer surfaces (the associated initial total alpha radiation surveys read 6,700 dpm/100 cm²). Hearing Before the Subcommittee on Energy Conservation and Power, p.280, 9/18/86 (Maximum allowable removable contamination in the lunchroom is 500 dpm/square foot of area or approximately 54 dpm/100 cm²). Hearing Before the Subcommittee on Energy Conservation and Power, p.63, 9/18/86
- 1983 Exceeded Limits. A review of the stream sediment data indicates the downstream sediments in Banner Spring Branch and Martin Creek contain more radioactive contamination than the upstream sediments. If the alpha activity is assumed to be enriched uranium, **several** annual average values are in excess of the limit of 30 pCi of enriched uranium per gram of soil allowed for disposal with *no restriction on the method of burial* (NRC 1981). p.4-21, 1991 NRC Environmental Impact Appraisal, 8/13/91, ML050210220
- 01/84 Between January-March 1984, nine examples of failure to follow operating procedures or posted nuclear safety limits were identified. A CAL dated 2/8/84 was issued. These examples were

collectively treated as a Severity Level III violation. Hearing Before the Subcommittee on Energy Conservation and Power, p.32,9/18/86

- 07/84 The Region noted the well samples indicated migration of radioactivity from the ponds, with one month's results showing approximately 14% of unrestricted area MPC, above the license reporting level of 10%. NFS had not reported this result. The licensee made subsequent reports in 1984 and 1985 when samples exceeded reporting criteria. Analyses of well water samples from the three wells closest to the ponds, (especially well #14, which is located between the ponds and a natural spring, Banner Spring), indicate that migration of the radioactive material in the ponds is taking place. Well #14 shows the highest levels of radioactive material of all the wells. NFS currently views the migration as a problem that does not require immediate remedial action. Hearing Before the Subcommittee on Energy and Power, pp.38-39, 9/18/86 "Wells at NFS have detected contaminations leaking in Banner Hill Spring, a primary source of drinking water for area residents". Hearing Before the Subcommittee on Energy Conservation and Power,9/18/86, pp. 190-191
- 10/29/84 Enforcement Conference to discuss NRC concerns regarding a buildup of uranium-235 in the ventilation systems and licensee's remedial action program. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86 "In October 1984 it was determined that during the period of July-September 1984, accumulation of uranium bearing solids greater than action limits were found in the HEU Scrap Recovery Building ventilation system tanks. Consequently, materials accumulated in the ventilation system which exceeded the criticality safety action limits. Hearing Before the Subcommittee on Energy and Power, p.32,9/18/86 (11/85—NFS fined \$15,000 for the accumulation in a ventilation duct of enough uranium for a theoretical critical mass. Fortunately, the uranium was sufficiently spread out that a critical chain reaction did not occur. "This record of fines and other NRC "enforcement actions" at NFS Erwin is much worse than for any other uranium fuel production plants". (NRC Prehearing Answers, pp. 23-28), Hearing Before the Subcommittee on Energy and Power, p.17, 9/18/86
- 02/21/85 Order Modifying License and Notice of Violation—Severity Level II regarding build-up of uranium-235 in ventilation systems. Civil Penalty \$20,000 proposed but reduced to \$15,000. Hearing Before the Subcommittee on Energy and Power, p.73, 9/18/86 "This action was based on a violation involving the accumulation of uranium-bearing solids in process equipment above specified limits, where the licensee failed to make appropriate investigations and take appropriate corrective action". Office of Inspection and Enforcement, Notification of Significant Enforcement Action, EN-85-014A, 11/27/85
- 05/85 NFS stated that two smears taken since May 1985 exceeded the plant's action level. Hearing Before the Subcommittee on Energy and Power, p.269, 9/18/86
- 11/85 NFS fined \$15,000 for the accumulation in a ventilation duct of enough uranium for a theoretical critical mass. (Fortunately, the uranium was sufficiently spread out that a critical chain reaction did not occur.) Hearing Before the Subcommittee on Energy and Power, p.17, 9/18/86

- 1986 "Many highly contaminated areas have been observed. One spill reported by myself continuously leaked for over two months before the three leaks in the area were fixed. Contamination levels in this area were as high as sixteen times contamination limits. Gross levels of *contamination of 1 million durations per minute have been hidden under coats of paint*". Hearing Before the Subcommittee on Energy Conservation and Power, p.190, 9/18/86
- 08/01/86 Fifteen (15) air samples were above action limits in the 303 building. Hearing Before the Subcommittee on Energy and Power, p.190, 9/18/86
- 08/13/86 Sixteen (16) air samples were above action limits in the 302 building. Hearing Before the Subcommittee on Energy and Power, p.190, 9/18/86
- 09/18/86 *Erwin N-Fuel plant called nightmare*. The Nuclear Fuel Services plant in Erwin is the most dangerous of five fuel production plants because of inadequate controls over radioactive materials, a House subcommittee has found. Rep. Edward Markey, D-Mass., the chairman of the House energy conservation and power subcommittee is scheduled to hold a hearing *today to find out why the NRC has not done more to require safety at the plant*. "The NFS plant is a toxic nightmare," Markey said "oozing radioactive contamination into work areas, lunchrooms and vending machines, onto the soil outside work buildings, into groundwater and on railroad land off site." The plant has been fined by the NRC much more (\$102,000 since May 1984) than four other uranium processing plants in the United States, Markey said, and many problems remain unresolved.
- In today's hearing, NRC's five-member commission will be asked why they have not taken action to require cleaning up three inactive ponds on NFS grounds after a 1984 test showed some radioactivity in the ponds had migrated into groundwater. Markey is interested in when and how 30 pits of buried radioactive waste at the plant will be decontaminated. NRC documents show that an NRC inspector investigating complaints of radioactive contamination in plant lunchrooms found **6,000** disintegrations per minute (dpm), a measure of radioactivity, outside a milk machine in April 1985. The plant's maximum allowable level is 5,000 dpm, the NRC said. Markey's subcommittee also plans to ask the NRC why they allow the 5,000 dpm level at the Erwin plant when most other uranium processing plants have maximum allowable limits of 100 to 200 dpm. The Knoxville News Sentinel, 9/18/86 (Question: *Is NFS still allowed to have maximum allowable limits **above** other uranium processing plants? If so, why?*)
- 10/24/86 *The sludge samples collected from the Erwin municipal sewage treatment facility have been analyzed by Oak Ridge Associated Universities (ORAU). Preliminary results indicate the U-234 concentrations range from 168 to 390 pCi/g and U-238 concentrations range from 1.5 to 4.1 pCi/g with uranium enrichment from 24 to 43 percent. Other isotopes such as Ra-226 and Thorium-230 will also be analyzed to determine background levels. The analysis from NFS also confirmed enriched uranium in the sludge. Office of Nuclear Material Safety and Safeguards (NMSS) to Nuclear Fuel Services, Inc., 10/24/86 (See 01/26/91 news article and NFS charts)*
- 05/26/89 *Some Contaminated Soil Exceeded NRC's Guidelines*. Since 1980, NRC has been releasing land at the NFS site for unrestricted use. NRC released the land, although contamination in some soil ranged from 1.5 to 4.4 higher than its guidelines allowed. In 1980, NFS asked NRC to release

some of the land for unrestricted use. The land included the stream bed of the Banner Spring before NFS diverted its flow. Despite this finding, in a September 1980 letter, NRC released about 36,250 square feet of land adjacent to Clinchfield Railroad's property for unrestricted use. NRC concluded that (1) its guidelines merely set a "target" value rather than an absolute value that must be achieved, (2) the contaminated soil would be covered with approximately 7 feet of dirt, essentially eliminating the exposure pathway, and (3) the average concentration of the contaminated soil was within NRC's guidelines. (pp. 19, 20)

In 1984, NFS asked NRC to release additional land from its license. Again the land was on the Clinchfield property and the site of the old Banner Spring stream bed. NFS surveyed the property; NRC made a confirmatory survey. On July 24, 1987, NRC released the land even though some soil contamination was almost 3 times higher than NRC's guidelines. NRC did not require the cleanup of all the contaminated soil because the staff concluded the contamination level was low and would not adversely affect public health and safety because the land was only used by the railroad. (p.20)

In 1986 NRC contracted with ORAU to characterize the substances in NFS' buried waste sites, determine the possibility for waste migration, and assess the environmental impacts that could occur from such migration. In its September 1987 report ORAU pointed out that buried waste had resulted in significant soil and some groundwater contamination. Although the buried waste did not pose any danger, *ORAU said that contamination could migrate off-site through storm runoff and other activities that disturb the surface soil.* (p.33)

Sample results in 1987 showed radioactive contamination in six wells that was higher than EPA's drinking water standards allowed. In one well, the contamination was 730 times higher. NFS could not determine if the contamination was from the buried waste sites or other plant operations. (p.33)

NFS also has three solid waste burial sites—two on its property and one on property owned by the Clinchfield Railroad and leased to NFS. The main burial site, located in the northeast corner of NFS' property, contains about 26 trenches; 21 were used to dispose of radioactive waste. At the second site, NFS has found radioactive contamination that company officials believe is natural uranium or thorium. NFS does not have information showing the type of waste buried at the site. The third burial site, located on Clinchfield's property, contains two trenches that NFS used in 1969 to dispose of contaminated metal. The company later removed the metal, decontaminated it, and sold it as scrap. In September 1987, ORAU found uranium **contamination** and some contaminated debris at the site that exceeded NRC guidelines. (p. 47) United States General Accounting Office (GAO), Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives, 'NRC's Decommissioning Procedures and Criteria Need to Be Strengthened, 5/26/89, ML070800431

01/1990

During the period from January 1990 to July 1996, a single chemical oxygen demand (COD), cadmium, lead, and copper concentration measurement has exceeded the NPDES permit limits p.4-5 1999 Environmental Assessment (Hereafter 1999 NRC EA) for Renewal of SNM-124 for NFS, U.S. NRC, Division of Fuel Cycle Safety and Safeguards, NMSS, ML050600258 (6 years!)

- 03/29/90 *Uranium Concentration Greater than Limit/Loss of Criticality Safety Controls.* Uranium concentration in a solution was greater than the **(R)** limit; reported on 7/11/90. FC900218
- 08/06/90 *NFS Identified As Source of Elevated Concentration In Sludge Sent to Erwin's Sewage Treatment Plant.* On August 6, 1990, NFS and state officials collected split samples of sludge. Sample 1 (dry), detected Uranium-234 at 1,310 picocuries per gram; U-235 at 28.8 and U-238 at 24.8. Sample 2 (dry) results showed U-234 at 1,350; U-235 at 29.3 and U-238 at 18.9. Kingsport Times News, 1/26/91
- 11/11/90 *Contamination of City Waste Treatment Plant.* Contaminated sludge in old digester at City Waste Treatment Plant. Analysis yielded in the **(R)** with a dry weight of **(R)**. FC900662
- 11/28/90 *Proposed Civil Penalty of \$10,000.* Failure to provide a siphon break or other means of preventing the transfer of HEU solution to an unsafe geometry tank and exceeding the station procedural concentration limits for uranium in two tanks on 11/28/90. The violation was aggregated as a Severity Level II problem because sufficient material was available and there was an existing pathway which, in combination, could have resulted in a criticality. Office of Enforcement, Notification of Significant Enforcement Action, EN 91-019, EAs 90-124 and 94-004, March 15, 1991
- 11/30/90 *Criticality Control Limit Violated.* Criticality control limit was violated when a solution of Uranium with a concentration over the administrative limit was transferred to a waste tank. Highly concentrated uranium solutions in an adjoining part of the process were available in quantities that were more than sufficient to *have caused a criticality accident* in the unfavorable geometry tank. Operators had no knowledge of the potential for crossover of highly concentrated uranium solutions into unfavorable tanks as a result of open valves or other *anomalies* in the piping systems. FC900707
- 11/30/90 On Nov. 30, they notified us they had discovered some uranium in a batch of waste that had been processed through their wastewater treatment system and the amount of uranium exceeded their administrative criticality limit. They determined there were 395 grams of Uranium-235 in a waste batch, which exceeded the licensee's administrative criticality safety limit of 350 grams. Resident Inspector To Be Posted at NFS, Kingsport Times News, 1/26/91
- 01/26/91 *NFS Identified As Source Of Elevated Concentration In Sludge Sent To Erwin's Sewage Treatment Plant.* NFS was identified as the source of an elevated uranium concentration in sludge sent to Erwin's sewage treatment plant. The plant is equipped with two digesters to process sanitary sewage. The NRC inspector reviewed monthly data from 1987 to May 1990. A new digester was constructed in December 1988 to replace the old digester, which was used intermittently as a holding tank to store processed sludge from the new digester prior to transfer to drying beds. On August 6, 1990, NFS and state officials collected split samples of sludge from the old digester. Sample 1 (dry), detected Uranium-234 at 1,310 picocuries per gram, U-235 at 28.8, and U-238 at 24.8. Sample 2 (dry) results showed U-234 at 1,350, U-235 at 29.3 and U-238 at 18.9. Ken Clark of NRC Region II in Atlanta said, "They never did discharge anything that was above discharge limits but apparently there was some re-concentration" at the sewage treatment plant. Tony Treadway, communications specialist for NFS, said "most of the material that had gotten (to the

sewage treatment plant), got there 20 years ago. NFS now uses only U-235, adding NFS hasn't used U-234 and U-238, which had concentrations of 15 to 20 percent uranium, since the late 1960's. He also stated sludge was spread on a farmer's field and had no greater an impact than phosphate fertilizer. The worst case scenario is one-tenth of a millirem over 50 years, and that's negligible". Kingsport Times News, 1/26/91 (Note: See 10/24/86 letter from NMSS; 08/06/90 and NFS charts below).

Table 5.14A Annual Radioactivity Level Discharged To Municipal Sewer (Units in pCi/L)

| <u>YEAR</u> | ALPHA | BETA | <u>U-234</u> | U-235 | <u>U-238</u> | TOTAL PU | TOTAL THORIUM |
|-------------|--------|-------|--------------|-------|--------------|----------|---------------|
| 1990 | 156.98 | 32.60 | 146.51 | 2.42 | 4.89 | 1.87 | 1.15 |
| 1991 | 136.22 | 39.09 | 117.87 | 2.56 | 8.00 | 2.70 | 7.40 |
| 1992 | 172.18 | 24.78 | 183.18 | 4.60 | 12.85 | 1.90 | 0.98 |
| 1993 | 130.23 | 59.15 | 107.13 | 3.14 | 12.27 | 0.97 | 1.72 |
| 1994 | 153.86 | 24.82 | 105.20 | 3.71 | 17.25 | 1.43 | 0.92 |
| 1995 | 54.18 | 11.85 | 44.38 | 1.69 | 6.86 | 0.47 | 1.55 |

Table 5.15B Process Water Effluent Average Radioactivity Levels-Waste Water Treatment Facility (Units in pCi/L)

| <u>YEAR</u> | ALPHA | BETA | <u>U-234</u> | U-235 | <u>U-238</u> | THORIUM 234 | TC-99 |
|-------------|---------|---------|--------------|-------|--------------|-------------|---------|
| 1990 | 821.58 | 143.41 | 1243.58 | 15.82 | 27.46 | 324.76 | 52.63 |
| 1991 | 1459.58 | 506.23 | 2501.92 | 24.59 | 10.64 | 4190.60 | 169.79 |
| 1992 | 440.17 | 285.92 | 471.87 | 6.14 | 3.47 | 5482.40 | 88.24 |
| 1993 | 660.00 | 1185.72 | 587.50 | 15.73 | 30.30 | 60.53 | 3156.83 |
| 1994 | 167.68 | 78.15 | 164.38 | 6.84 | 39.72 | 190.49 | 74.90 |
| 1995 | 145.46 | 93.45 | 122.92 | 3.43 | 16.81 | 142.28 | 59.11 |

Letter from Andrew M. Maxin, Vice President, Safety and Regulatory Management, NFS; Table 5.14A—Annual Radioactivity Level Discharged to Municipal Sewer; Table 5.15B—Process Water Effluent Average Radioactivity Levels-Waste Water Treatment Facility, Supplement to the 1984 NFS Environmental Report for 1990 through 1995 to Robert C. Pierson, Chief, Licensing Branch, NMSS, NRC, Washington, D.C., 5/31/96

- 03/20/91 Failure to evaluate a piping system for the siphoning or overflow of fissile solutions into an unsafe geometry tank and the failure to provide a means of preventing transfer of a highly concentrated solution to a non-favorable geometry containment. Failure to adhere to procedural limits for uranium contained in a waste receiving tank. A Severity Level III violation was issued for multiple examples of failure to follow operating procedures. A proposed Imposition of Civil Penalty in the amount of \$10,000 was issued to NFS based on a Severity Level II problem associated with the two violations described above. EA-90-124; EA-91-004, Notice of Violation and Civil Penalty, Severity Level II, NRC: Escalated Enforcement Actions Issued to Materials Licensees, 3/20/91
- 02/24/92 Shipping Error – Exceeded A2 Limits. Licensee reported a shipping error that caused 250 shipments to (R) exceed A-2 limits. Containers used were not approved for the quantities shipped. Due to failure of the computer software, not all (R) was accounted for. The total amount shipped was (R) not (R) as planned. Source/Material—Fuel Fabrication Material (PU-241). FC920181
- 04/07/93 Exceeded Mass Limits. A slurry tank in the (R) building was inadvertently filled with (R). Licensee limit is (R) of (R). This mass is approximately 45% of one critical mass and is contained in

an unfavorable geometry. Waste recovery process was shutdown and the slurry tank was isolated. U-235 slurry will be removed in (R) portions until Inventory decreases below the licensee limit. FC940843

- 05/10/93 *Soil in Drums Potentially Exceed Safety Control/Management Deficiency. Soil in two 55 gallon drums potentially exceeded nuclear safety control for drums. Soil samples were taken from two of the six 55 gallon drums and one measured (R) and the other measured (R) of (R). Licensee plans to transfer some of the soil from these two drums to the other drums. (R). FC940842*
- 05/20/93 *Criticality Safety Limits Exceeded. Criticality safety limits exceeded for the quantity of (R) in a (R) tank analysis of the recovered waste revealed the total content of the tank had been between (R) of highly enriched (97%) uranium in the form of (R). FC940841*
- 01/20/94 *Surface Contamination in Excess of Acceptance Criteria. Inspection Report identified non-cited violation concerning the following event: No further shipments of contact handled transuranic (CH-TRU) waste drums would be received by (R) pending resolution of problems that had been noted with some of the shipments. The problems were identified by (R) in non-conformance reports (NCRS). The NCRS outlined problems which involved (1) a solid waste drum which had been received without an inner liner lid, (2) a previously rejected drum that was returned to (R) but still contained free liquid, (3) a 500 ML bottle was noted to be located within a 2 liter bottle inside a waste drum and the 500 ML bottle contained free liquid, and (4) two 55 gallon drums were received at (R) and upon surveying the drums were found to have surface contamination in excess of the acceptance criteria. FC941518*
- 1996 *NFS exceeded the liquid discharge permit to Erwin Utilities POTW for 1996 and 1997 for mercury. p. 4-6, NRC 1999 EA, ML050600258 (Two years!)*
- 1997 *Surface Water Contamination: Chemical constituents were detected in surface water samples above the TN Water Quality Criteria, above site specific action levels as defined by NFS, or EPA drinking water maximum contaminate levels. In downstream locations on Banner Spring Branch, total cyanide, nitrate /nitrite, copper, and zinc were detected at elevated concentrations. In Martin Creek surface water, Mercury was detected above the TN Water Quality Criteria in up-gradient samples. p. 3-26, 1999 NRC EA, ML050600258*
- 02/25/98 *Criticality Control Parameter Exceeded. Licensee reported that plant personnel discovered that portions of the diked area around two waste water storage tanks in (R) was between (R) deep. This condition exceeds the Criticality Control Parameter (geometry) of (R) maximum dike depth and a level floor within the diked area specified in Plant Criticality Safety Analysis #54T-97-014. Plant personnel plan to fill in the portions of the dike that are greater than (R) and then resurface the dike area. FC980288*
- 09/04/98 *Sewer discharge to Erwin Publicly Owned Treatment Works, (POTW) exceeded Gross Beta Limits of 300 pCi/l. A sanitary sewer manhole near a building being decommissioned was determined to be the cause. Erwin Utilities and NRC notified. 2001 NFS ER, p. 2-7*

- 05/12/99 Sewer discharge to Erwin Publicly Owned Treatment Works (POTW) exceeded 25 pCi/l for Uranium 238. Erwin Utilities and NRC notified. NFS 2001 ER, p. 2-7, ML050130093
- 08/24/99 *NRC Bulletin 91-01—24 Hour Report*. Operator was loading trays in ENCLOS-0602. There were two 2-liter bottles each in ENCLOS-0601 and -0602, which is the limit for each enclosure. After emptying one of the bottles in ENCLOS-0602, operator needed to switch the remaining full bottle with one in ENCLOS-0601. He did this by putting the full bottle from ENCLOS-0602 on the ledge between the enclosures, moving to ENCLOS-0601, brought the bottle into ENCLOS-0601 and set it on the floor. The limit for two 2-liter bottles in ENCLOS-0601 was violated. Next, the operator took the bottle he wanted from EN-CLOS-0601 out of its rack position, and moved it to the ledge between enclosures. In doing so he violated the limit that states only one bottle can be out of its rack at a time. He then moved back to ENCLOS-0602 and brought the bottle in. Licensee informed the NRC Resident Inspector. Event #36071, FC990587
- 2000 The 2000 data from the Kingsport monitoring station indicated *Two 1-hour and Nine 8 hour ozone exceedances*. As stated in the NFS ER, December 1996, and it is still relevant, the Great Smoky Mountains National Park is a Prevention of Significant Deterioration (PSD) Class 1 area. Since the promulgation of the PSD regulations (40 CFR Part 52.21) in 1977, *no PSD permits have been required for any emission source at NFS* (DOE 1996). NFS 2001 ER, p.3-1 ("Releases to the atmosphere from NFS were not reported in any documentation supplied to ATSDR from the state or EPA. The Toxic Release Inventory (TRI) data reported for 2004 indicates NFS released 103 pounds of nitrates and nitrogen compounds to the air and 25,620 lbs. to surface waters. *NFS does not perform environmental air sampling for non-radiological materials as this is not required by the EPA for their operations.*" (p. 16) "In the past as in the present, NFS was not and is not required to monitor for chemical releases into the atmosphere. ATSDR has seen statements that the TN Department of Environment and Conservation does not have any air monitoring stations in Unicoi County. NFS is required, however, to report releases for the EPA Toxic Release Inventory. The lack of air data is considered a data gap (missing data".) (p.57) Agency For Toxic Substances and Disease Registry (ATSDR), Public Health Assessment for NFS, 5/18/07 "Air pollution permits issued by TDEC does not require off-site chemical air quality monitoring by NFS. p. 4-6 & 4-7, 2001 NFS ER, ML050130093)
- 01/00 Average radionuclide concentrations in air effluents from stacks 416, 421, 600, and 667 (as measured at the point of release) exceeded concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1, during the release period. The source term for this evaluation was *gaseous effluents released by NFS stacks and vents from January 1, 2000 through June 30, 2000*. NFS Biannual Effluent Monitoring Reports, 8/28/00, Letter from NFS to Luis A. Reyes, NRC, ML003746676 (6 Months!)
- 03/16/00 *Radioactive Material in Waste Shipments Exceeded Limits*. Licensee reported that two waste shipments (**R**) and (**R**) to Envirocare, Inc., contained concentrations of radioactive material above that authorized by the Envirocare license. *The waste consisted of approximately 480 cubic feet of soil contaminated with plutonium and americium. A total of 16 containers exceeded the limit by up to 37%*. These waste shipments were buried by Envirocare prior to discovering this error. The licensee was notified by Envirocare on 5/10/00 that an over-check sample taken on waste shipment (**R**) indicated Am-241 activity higher than the licensee's reported value. The licensee's investigation determined that the calibration of the system they used to measure Am-241 in soil

was inaccurate. The inaccuracy was a *result* of a failure to account for an increase in Am-241 over time as Pu-241 in the source decayed to Am-241. Reported 7/07/00. FC000497 NFS shipped Class C waste to Envirocare labeled as Class A waste. Significant Am-241 in-growth occurred in the calibration system resulting in decline of the efficiency of the system. The State of Utah will allow the waste to remain buried. Enforcement Action Tracking System, p.80, License History Report, NFS, 10/19/00, ML020420107 (Note: Reported almost 2 months later!)

- 07/01/00 Average radionuclide concentrations in air effluents from stacks 416, 421, and 667 (as measured at the point of release) exceeded concentration values listed in CFR Part 20, Appendix B, Table 2, Column 1 during the release period. The source term for this evaluation was gaseous effluents released by NFS stacks and vents from July 1, 2000 through Dec. 31, 2000. An evaluation was performed to estimate the potential dose to the maximally exposed off-site individual (MEI) and the maximum off-site activity concentrations in air. NFS Biannual Effluent Monitoring Reports, 3/01/01 Letter from NFS to Luis Reyes, NRC, ML010650462 (6 months!)
- 08/03/00 The May 2000 monthly isotopic composite sample result for Wastewater Treatment Facility discharge was elevated. NRC notified. 2001 NFS ER, p. 2-7, ML050130093
- 2001 *NFS Issued Violations By NRC.* During review of selected environmental monitoring and sampling results for the year 2001, the NRC observed that radioactivity levels in Banner Spring Branch downstream sediment samples continued to be elevated, or greater than the action limit of 25 picocuries per gram, ranging from 36 to 73 pCi/gram for gross alpha activity. The elevated radioactivity levels were due to past processing and present onsite decommissioning activities, according to the NRC. In addition, the inspector noted that gross alpha activity levels were elevated in Martin Creek downstream sediment samples during the first quarter of 2001. *Cause of the elevated results is still under investigation. The NRC noted that gross beta radioactivity levels from vegetation sample locations in the Nolichucky river during the second quarter of 2001 were all elevated.* Sampling results for offsite groundwater monitoring wells have shown low levels of technetium-99, which the NRC says has been attributed to past operations, "probably uranium hexafluoride cylinder cleaning activities." Trace amounts of plutonium also have been found in selected offsite wells. *NFS was unable to reach a definite conclusion on the origin of the reported plutonium, according to NRC.* Elizabethton Star, 7/07/02
- 01/01 Average radionuclide concentrations in air effluents from stacks 416, 421, and 667 exceeded concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1 during the release period. The source term was gaseous effluents. Bi-Annual Effluent Monitoring Report for January 1, 2001 through June 30, 2001 from NFS to Mr. Luis A. Reyes, Regional Administrator, NRC, 8/28/01, ML012490200 (6 Months!)
- 01/31/01 NFS Storm Water Monitoring Report. Storm Water Monitoring Report and analytical results for the monitoring year *January 2000 to December 31, 2000 identifies the nitrate cut off concentration was exceeded in each of the four (4) quarters and thus in the quarterly average.* The Johnson City Field Office (Mr. Joseph S. Lane) was notified and an investigation was conducted. The investigation could not identify any nitrate contributors; however, it did identify that surface water and the background monitoring well on the NFS site are *2.5 times higher in nitrate than the permit cut off*

concentration of 0.68 mg/l. B. Marie Moore, vice President, Safety and Regulatory, NFS, to Sims Crownover, Compliance and Enforcement Section, TDEC, Division of Water Pollution Control, Nashville, TN, 1/31/01, NPDES Permit No. TNR050873

- 07/01-
—12/01 "The average radionuclide concentration in gaseous effluents routinely exceed the concentration values listed in 10 CFR Part 20, Appendix B, Table 2, Column 1". NFS Biannual Effluent Monitoring Reports, Letter from NFS to Luis Reyes, NRC, 2/26/02, ML0200710079 (Note: 6 months!)
- 08/29/01 RCRA Facility Investigation (RFI) and Interim Measures (IM) Progress Reports. PCE was detected in 7 of 9 offsite wells at concentrations greater than the MCL. TCE was detected in seven of nine offsite wells at concentrations greater than the MCL. One offsite well (116B) contained concentrations greater than the MCL for Cis-1,2 DCE and Vinyl Chloride was detected in two of the nine offsite wells at concentrations above the MCL for the second quarter of 2001. B. Marie Moore, Vice President, Safety & Regulatory, NFS, Quarterly RCRA Facility Investigation (RFI) and Interim Measures (IM) Progress Reports, HSWA Permit for 1984 RCRA Amendments, EPA ID: TND 003 095 635 to Richard D.Green, Director, Waste Management Division, EPA, Region IV, Atlanta, GA and Mike Apple, Director, Division of Solid Waste Management, TDEC, Nashville, TN, 8/29/01
- 02/11/02 *Subject: Addendum 1 To The Corrective Measures Study Work Plan: NFS' Responses To Notice of Technical Inadequacy For Groundwater Source Control At The NFS Maintenance Shop Area; Interim Measure (IM) Progress Report. PCE was detected in seven of nine offsite wells at concentrations greater than the MCL. TCE was detected in seven of nine offsite wells at concentrations greater than the MCL. One well (116B) contained detected concentrations of Cis-1,2 DCE greater than the MCL. Detected concentrations of vinyl chloride in Well 116A and Well 116B are above the MCL during fourth quarter 2001.*
- Gross Beta activity in the offsite well 117B contained detected concentrations above the NFS internal action level of 50pCi/L for fourth quarter 2001. Gross beta activity in Well 117B collected during third quarter 2001 was above the NFS internal action level of 50 pCi/L.
- Letter from B. Marie Moore, Vice President, Safety & Regulatory, NFS, to G.A. Farmer, Chief, RCRA Branch, Waste Management Division, U. S. EPA, Region IV, Atlanta, GA, and Mike Apple, Director, Division of Solid Waste Management, TN Department of Environment & Conservation, Nashville, TN, EPA ID. No. TND 00 309 5635, 2/11/02
- 04/03/02 *Plutonium, Other Contaminants found Offsite Near NFS. A 13-acre plume of chemical and radioactive contamination, including plutonium, identified in groundwater located offsite from NFS in Erwin. NFS sampling results from monitoring wells located along property boundary line—Plutonium 234, 238, 239/240 and 241, were detected in groundwater samples as early as Sept. 1993. In Nov. 2001, radioactive plutonium, thorium and uranium were observed in monitoring wells located in county Industrial Park, which parallels NFS on the northwest side. Technetium 99, which does not exist in nature and is radioactive, also was detected in two of nine offsite wells. All were within levels considered safe. Total uranium present in on-site groundwater was above EPA's safe drinking water standard. Offsite chemical contaminants leaving NFS property have*

federal officials concerned. PCE, TCE, cis-1,2-DCE and vinyl chloride all were detected beyond acceptable limits. PCE was found in seven of nine offsite wells during fourth quarter 2001. Highest level charted was 1,403 mg/L (milligrams per liter); 0.005 mg/L is considered safe, says EPA. PCE concentrations are expected to decline by 2003 and should be limited to onsite locations by 2011 with concentrations falling below the MCL by 2018.

Groundwater in the area generally flows in a northwest direction toward the Nolichucky. Groundwater flow patterns in the bedrock aquifer beneath the site extend to a depth of about 350 feet. According to future projections, the uranium plume will be almost identical in 2003 to what it is now with concentrations dipping below MCL by year 3850. Elizabethton Star, 4/03/02

(Note: Monitoring data for the groundwater plume in 2002 indicated the maximum concentration of PCE in the alluvial aquifer exceeded 13,000 micrograms per liter and extended beyond the west boundary of the facility toward the industrial park. According to the EPA, the apparent source of the PCE plume is one of the maintenance shop areas within the NFS fence line. Environmental sampling and analyses of groundwater collected during RCRA activities indicated the presence of uranium, PCE and its degradation products in the groundwater beneath the NFS facility. The uranium plume was about 0.7 acre (250' by 120') and exceeded the EPA Maximum Contaminant Level (MCL; 30 micrograms per liter.) Uranium concentration in the groundwater plume ranged from approximately 30 to 1,100 pCi/L. The area of the PCE groundwater plume exceeding National Drinking Water Maximum Contaminant Level (MCL=0.005 mg/L) was approximately 19 acres (1200 feet by 700 feet). PCE concentrations in this plume ranged from approximately 0.005 milligrams per liter (mg/L) to 14 mg/L. Associated PCE degradation product concentrations are also present in portions of the PCE groundwater plume. The EPA also has a Maximum Contaminant Level Goal (MCLG) that is not enforceable and the MCLG for the contaminants is zero. ATSDR received data from the TN Department of Environment and Conservation (TDEC) on annual sampling of the Erwin Utilities Railroad Well located north of the site. The well was sampled for both regulated and unregulated volatile organic compounds. For regulated contaminants, Tetrachloroethylene (PCE) was detected at 0.000856 mg/L and 0.00158 mg/L in 2006 and 2007 respectively. The established MCL for this contaminant is 0.005 mg/L. Agency For Toxic Substances And Disease Registry (ATSDR), Public Health Assessment for Nuclear Fuel Services, Inc., p.12,13, & 16, May 18, 2007)

05/21/02

RCRA Facility Investigation (RFI) and Interim Measures (IM) Progress Reports. PCE was detected in seven of nine offsite wells at concentrations greater than the MCL, TCE was detected in two of nine offsite wells at concentrations greater than the MCL; however, the detection limit for Wells 116A, 116B, 120A, and 120B is above the MCL. One offsite well (116B) detected concentrations greater than the MCL for Cis- 1,2 DCE during the first quarter of 2002. All detection limits for vinyl chloride are above the MCL.

Offsite wells 116B and 117B contained detected concentrations of gross beta activity above the NFS internal action level of 50 pCi/L. During the first quarter 2002, dissolved TC-99 was detected above the method detection limit in Wells 116B, 120A, and 120B ranging from 86.0 pCi/L to 100 pCi/L. Total TC-99 was detected above the method detection limit in Wells 116 B, 119A, 120A and 120B. Pond 4 Downgradient Wells 101A and 102A are located along the western perimeter of the NFS site. Vinyl chloride was detected in Well 101A during first quarter 2002. In March, a concentration was detected which is above the MCL. B. Marie Moore, Vice President, Safety & Regulatory, NFS, HSWA Permit for 1984 RCRA Amendments, EPA ID: TND 003 095 635, to Richard D.

Green, Director, Waste Management Division, EPA, Region IV, Atlanta, GA and Mike Apple, Director, Division of Solid Waste Management, TDEC, Nashville, TN, 05/21/02

- 01/12/03 Transfer of LEU material by an employee who failed to follow procedure and failed to notify the nuclear criticality engineer the sample results were above the limits. This is a Severity Level III Violation. Letter to NFS employee, Notice of Violation, Office of Investigations, Report No. 2-2003-024 and IR 70-143/2002-11, Report dated 3/29/04, ML081500239
- 08/03 *From August 2003 to April 2004, stack (R) had frequently exceeded licensee established action points. Upon review of the action levels for ALARA, NFS indicated a re-evaluation of the technical basis for action levels be completed to determine if action levels should be increased. Inspection Report (Hereafter (IR) 70-143/2004-08, Inspection dates 7/11/-8/21/04, 9/20/04, ML081440246 (Nine Months!) See 5/02/05*
- 10/17/03 *24 Hour Bulletin 91-01 Report From NFS. It was suspected that NFS storage area H/X limits were potentially exceeded for materials received from an off-site facility. A subsequent review of stored materials identified the H/X values for two containers exceeded the H/X limits for a storage area. Source Material—U-235. Event # 40257, FC030834*
- 11/26/03 Two recent Nuclear Criticality Safety (NCS) operating limit violation events. Two cans of fissile material stored in a designated storage area were stored in contravention of the mass limit of kilograms for material authorized to be stored in that area. (Non-Cited (NCV) Violation. IR 70-143/2003-205, Inspection dates 11/03-07/03
- 03/12/04 Detailed criticality safety analysis not performed when changes to existing equipment and procedure changes were made in order to process licensed material where more than a safe mass existed and double batching was possible (IR 2004-001). Mass (R) limits for (R) containers of (R) were exceeded when material was moved from one (R) to another by operators who did not know NCS requirements for the (R). (R) containers of (R) exceeded the (R) H/X ratio of the material prior to placing the material (R) had been established. Solution transferred from a favorable to an unfavorable geometry vessel that was over the allowed procedural concentration limits. Did not meet NCS limits for uranium concentration. LPR, 3/12/04, Inspection dates 1/20/03-1/24/04, ML081440081
- 05/17/04 *From September 9, 2002 through January 12, 2003, operations which involved more than a safe mass of licensed material, where double batching was possible, were performed without a detailed criticality safety analysis. IR 70-143/2004-003, Inspection dates 3/07-4/17/04, ML081440458 The NCS controls in place to prevent double batching to produce more than a safe mass were not sufficient to adequately prevent credible changes in process conditions that could lead to a criticality accident. The main concern for criticality safety for this operation was preventing more than a safe mass from getting in (R). Solutions pumped (R) had a concentration limit that was not to be exceeded but administrative controls on concentration of solutions did not work and solutions above the limit was (R) on at least one occasion. Response to Disputed Notice of Violation, IR 70-143/2004-03, EA-04-207, ML081360341 (Note: 5 Months!)*

- 06/24/04 *Removable Surface Contamination Greater Than Limits. NFS Event Report 40840, FC070001*
- 06/28/04 As of April 2004 NFS exceeded the ALARA goal of 80 mrem/yr. NFS attributed this change to the storage of natural uranium oxide in drums in building 310. A poor ALARA evaluation which involved the handling of material in and out of a dry glove box enclosure. The evaluation made incorrect assumptions concerning contamination in a dry glove box, the location of material inside the dry glove box, the position of stationary air samplers around the dry glove boxes, and the height of the individual performing the operation, led to an individual exceeding the derived air concentration action levels in the area and unexpected contamination inside the dry glove box. Unusually high contamination ranging from 100,000 dpm to 300,000 dpm were documented inside the dry box enclosure. IR 70-143/2004-04, Inspection dates 4/18-5/29/04, ML081440457
- 09/20/04 From August 2003 to April 2004, stack (R) had frequently exceeded licensee established action points. ML081440457 (Note: *Nine Months!*)
- 10/06/04 A violation involved NFS's identification of a previously unidentified failure mode for a piece of safety related equipment (SRE) during an ISA review. The amount of material available was sufficient to form a critical mass and the inability of the instrument to perform its specified criticality safety function under certain conditions constitutes a violation of Section 4.1.1.1 of NFS' License Application. It was determined the merits of this case warrant the exercise of discretion. ML081500427
- 10/26/04 *Failure of Safety System Causing Unfavorable Geometry.* A transfer of low concentration HEU solution from favorable to unfavorable geometry initiated upon sampling data that was not representative of the solution. The solution was determined to be above the transfer concentration limit. NFS Event Report 41149, FC050002
- 12/13/04 NFS Inspection Report. *Failure to meet nuclear criticality safety limits for a transfer of liquid process waste.* Failure to follow criticality safety requirements for discard of waste containing (R) material. IR 70-143/2004-10, Inspection dates 10/03/04-11/13/04, ML081440453
- 12/17/04 *Criticality Control Event.* Materials were transferred to a storage area without being transferred through a particular device as required by Standard Operating Procedure (SOP) which prevents a more reactive/incorrect material type from being transferred. NFS Event Report 41274 The material involved was approximately 9,940 grams of uranium enriched to 95.13 weight percent U-235. FC050003
- 01/07/05 *Faulty Programmable Logic Controller (PLC) for Oxide Dissolution Operation.* (Loss or Degraded Safety Items). NFS Event Report 41316 The material involved was approximately 9,900 grams of Uranium enriched to about 65 weight percent U-235. FC050004
- 02/05 Sewer discharge to the Erwin Publicly Owned Treatment Works (EPOTW) exceeded the Technical Review Criteria and the monthly Average permit limit for U-238. p. 2-17, Environmental Report (ER) for Renewal of SNM-124, Prepared by NFS, May 2009, ML091900072

- 02/10/05 *NFS Inspection Report. March 9, 2004, Scenario 4.1.7 failed to ensure the introduction of the more reactive materials (R) would not result in a k-effective exceeding 0.95. Specifically, Scenario 4.2.7's analysis did not consider optimal placement of the more reactive material. IR 07000143-2004-207, Inspection dates 11/01/04-11/05/04, ML081440507.*
- 03/05 Sewer discharge to the Erwin Publicly Owned Treatment Works (EPOTW) exceeded the Technical Review Criteria and the monthly Average permit limit for U-238. p. 2-17, Environmental Report (ER) for Renewal of SNM-124, Prepared by NFS, May 2009, ML091900072
- 05/02/05 During a routine stack sample collection on May 2, 2005, NFS determined the sample from the (R) dissolution stack (R) BPF Process Exhaust (R) indicated an initial *elevated reading of 53,961.90 disintegrations per minute (dpm) for alphas, and 192,528.74 dpm for betas.* The samples were held for 7 days and recounted by NFS to allow radon and its associated daughters to decay. After the 7-day recount, the alpha reading indicated 3,381.48 dpm and the beta reading indicated 1,267.10 dpm. NFS's action limit for alpha is 130 dpm and 5,000 dpm for betas. As of May 19, 2005, the alpha reading on the stack air filter was still above licensee's action limit of 130 dpm. IR 70-143/2005-03, Inspection dates 4/17-5/28/05, 6/27/05, EA-04-199, ML081440517 Elevated isotopic analysis on a stack sample above licensee's action limit concerned an elevated result on a stack sample above licensee's action limit. The elevated stack sample result (R). An investigation was unable to state how much material might have been vented out the stack on May 2, 2005. *The system normally operated continuously and no system isolation or lockout was utilized. The inspector questioned how NFS maintained control over the system. Poor maintenance practice resulted in increased exposure. IR 70-143/2005-04, Inspection dates 5/29-7/9/05, 8/5/05, ML081480303 (Note: Over limits on Alpha's 415.1 times the action limits; Over limits on Beta's 38.5 times the action limits for three weeks or longer!)*
- 08/03/05 Inspectors observed open piping flanges and visible residue on pipes and on the floor (R). Surface contamination levels on the floor, piping, and inside the flanges ranged from 12,488 dpm/100 cm² to 99,112 dpm/ 100 cm². Surveys found transferable alpha contamination levels above established action limits of 5,000 dpm 100 cm². IR dated 9/19/05, 70-143/2005-007, ML081480306
- 09/09/05 *NFS Inspection Report. There were a number of inconsistencies and deficiencies in the facility validation reports, involving treatment of experimental uncertainties, verification of the normality of the benchmarks, definition of the area of applicability (AOA), and calculation of upper safety limits (USLs). The most significant was the violation regarding use of positive bias in calculating USLs applicable to highly enriched uranium (HEU) systems. Licensee established upper safety limits (USLs) using the 95/99.9 single-sided tolerance limit approach, but took credit for positive bias in several sub-groupings of the data. This resulted in an over estimation of the USL for two of the HEU sub-groupings and, in one instance, for the entire set of experiments analyzed. Use of positive bias resulted in a USL greater than the maximum allowed k_{eff} limit of 0.95 for abnormal conditions. Failure to prohibit use of positive bias in calculating USL values for HEU operations. IR 70-143/2005-205, Inspection dates 08/08-08/12/05, ML081490101*
- 10/31/05 Areas noted as "above administrative control limits" were in generally accessible areas. One situation involved a spread of contamination outside a maintenance area involving equipment

replacement. The other area was the (R) in the natural and LEU handling area, and no obvious cause was evident. Specific examples of poor contamination control within radiologically controlled areas. An upset condition/overflow from the (R) system which identified a violation of NFS design procedures associated with the documentation for (R) system modifications performed by subcontractors. IR 70-143/2005-08, 10/31/05, Inspection dates 8/21-10/01/05, Events 41197 & 41839, ML081480305

- 11/08/05 Exceeded Mass Limit Requirements (Unanalyzed Condition). Failure of IROFS for Environmental Safety Program. Released (R) of liquid waste effluent from (R) to unfavorable geometry tanks without confirmation of the U235 concentration. NFS Event Report 42131 (Note: A total of 2,920 grams of uranium with enrichment of 65 weight percent were transferred. The administrative environmental IROF limit for this tank was 2,400 grams of Uranium.) Discovery Date 11/08/05, Reported 11/09/05, FCFC050013
- 12/11/05 Less than a safe mass of enriched uranium was involved in the transfer from the caustic Discard (R) without the demonstration the U235 concentration was less than (R). Failure to comply with the unfavorable geometry bag handling requirements. Failure to get NCS approval prior to storing (R) containers. IR 70-143/2004-207, Inspection dates 12/13-12/17/04, ML081440512 and ML081440511
- 12/16/05 A container was stored in an area which exceeded the posted mass limit. IR 70-143/2006-001, Inspection dates 12/25/05-02/04/06, ML081490104
- 02/03/06 Licensee relied on a safety limit of (R), a calculated single parameter limit from Table 1 of the consensus standard ANSI/ANS-8-1, for the concentration of (R) material in a non-uniform aqueous solution stored in unsafe geometry WWTF tanks without discussing or justifying the limit in criticality analysis for the tanks to demonstrate sub-criticality for normal and credible abnormal conditions. ML081490103
- 03/06/06 *NFS Inspection Report*. Based on the results of this inspection, the NRC has determined three (3) Violations of NRC requirements occurred. Two violations are being treated as Non Cited Violations (NCV). On December 16, 2005, licensee identified a container was stored in the area which exceeded the posted mass limit. Standard Operating Procedure (SOP) 409, Section 22, *requires two operators verify the container meets the posted limits prior to storage*. Failure to comply with storage area mass limits was a violation of NRC requirement (NCV) 70-143/2006-001-01. IR 70-143/2006-001, Inspection dates 12/25/05-02/04/06, Events 42226 & 42244, ML081490104
- 03/07/06 *Unanalyzed Condition of Criticality Controls*. NFS Event Report 42393 A spill of HEUN material consisted of approximately 35 liters of solution with 266 grams of uranium per liter, and an enrichment of approximately 63 weight percent U-235 during construction of a new process. On several occasions before the spill, workers had reported signs of a yellowish liquid in the filter glove box. Supervisors had failed to fully investigate the reports because they assumed the yellowish liquid was natural uranium solution used to initially test the new process system. *Criticality was possible in the filter glove box due to the size and shape of the glove box, and because no controls were present in the filter glove box to prevent accumulation of solution. The solution leaked out of the glove box through uncontrolled drains to the floor of the new process area. Investigation of the*

event revealed the floor contained an uncontrolled accumulation point, an elevator pit, where criticality was also possible. The total volume of the transfer was more than enough solution for criticality to be possible in the glove box or the elevator pit. If a criticality accident had occurred in the glove box or elevator pit, it is likely that at least one worker would have received an exposure high enough to cause acute health effects or death. Source material: Unsealed source SNM. Cause: Management deficiency. Event date—3/06/06, Discovery date—3/07/06, Report date—3/07/06. Last updated—5/16/08, Item FC060004, p.302 of 348

- 05/23/06 *NFS Inspection Report. Event 42089-Failure of an Administrative IROFS in the Environmental Safety Program (WWTF). In the Wastewater Treatment Facility (WWTF) a caustic solution transfer was made and the mass limit was exceeded for uranium. Approximately 270 liters of un-sampled caustic discard solution was transferred. NFS cited for two violations. IR 70-143/2006-003, Inspection dates 3/19-4/29/06, NFS Event Report 42131, ML073060269 11/07/06—Notice of Violation issued because NFS' Criticality Accident Alarm System (CAAS) for (R) which covers (R) of the WWTF, had only one operable detector in service from May 31, 2006 to July 15, 2006 and does not meet the intent of the regulation to ensure that reliable detector coverage for that area is maintained. It neither met the requirement of 10 CFR 70.24(a) (1) nor NFS' commitment to the ANSI/ANS standard. ML081490354 (Three Months!)*
- 03/01/07 *Potential Degradation of Safety Systems (Loss or Degraded Safety Items). Accumulation of fissile materials exceeding the controlled limit found in an enclosure. Failure of IROFS. NFS Event 43204, 03/02/07 (Retracted 03/02/07)*
- 03/16/07 *A caustic transfer was made from HEU to LEU side of BPF facility with elevated uranium content. Testing of Nitrogen trickle flow system for U-AL in BPF operations not on calibration frequency. IR dated 04/23/07, 70-143/2007-002, Inspection dates 02/11-03/24/07, ML073060098*
- 12/28/07 *NFS Inspection Report. A spill occurred in BPF operating area; Clog within the U/AL system; SNM sprayed into cup operator was holding and splattered back up into the operator's face and body who had to be decontaminated and taken to the hospital emergency room. No specifics on how to locate an obstruction. Pressure gage would have aided operator in locating the obstruction but the needle for the gage had broken and fallen to bottom of face plate. Additional smears not taken to define extent of contamination outward that exceeded licensee applicable limits. IR 70-143/2007-008, Inspection dates 10/21-12/01/07, ML073620551 and corrected report dated 1/4/08, ML080080165*
- 01/30/08 *NFS Storm Water Runoff. Annual storm water sampling was conducted on March 20, 2006 for Outfall A and Outfall B. On both outfalls NPDES Permit limits were exceeded for Nitrate/Nitrite as Nitrogen, Recoverable Magnesium, and Total Recoverable Aluminum. The nitrate/nitrite as nitrogen and magnesium attributes have exceeded the permit limits since 1998. These exceedances have been identified to the State of Tennessee Division of Water Pollution Control. Research has demonstrated that the nitrate/nitrite as nitrogen and the magnesium are due to naturally occurring background levels in surface water and groundwater in the vicinity of the NFS site. This was identified to the State of Tennessee in 2003 and a request was made by NFS to modify the permit limits. The State of Tennessee agreed with the research, but has not modified*

the permit limits. The origin of the aluminum attribute still remains unidentified as it has since 2003.

BLEU Complex Storm Water Runoff: Annual storm water sampling was conducted on April 17, 2006. All attributes were within NPDES Permit limits with the exception of Total Recoverable Magnesium, Total Recoverable Aluminum, and Nitrate/Nitrite as Nitrogen. This was identified to the State of Tennessee with the same explanation as in 13A.3.1 Redacted Version of Annual Update to Part II of SNM-124 Reflecting Changes Made during Calendar Year 2007, Letter from NFS to NMSS, Director, Appendix A, Chapter 13, p.3-4, January 30, 2008, ML082660148 by Cover letter 9/12/08 (Note: Exceeded NPDES limits for nitrate/nitrite as nitrogen and magnesium for 10 years and exceeded limits for aluminum for Six Years! These effluent reports are for 2006—reported two years later!)

- 03/28/08 *Filters Not Scanned Properly For Activity Prior to Packing.* Some contaminated cartridge filters were placed/packaged in two (2) 55-gallon drums based on nominal values of U-235 content as opposed to measured values (i.e., some filters were not measured by the segmented scanning system.) NFS Event Report 44104 "Based on NFS' review of the actual material readings they determined that the actual values of the material in the drum as approximately 40% above the operational limit and 70% of the safety limits." IR 70-143/2008-001 dated 5/05/08, Inspection dates 1/01-04/05/08, ML081270020
- 04/03/09 Mass Limit of Container Exceeded. IR 70-143/2009-202, 5/01/09, ML091110102
- 04/15/09 *Elevated Storm Water Sampling Results.* Storm water samples for AREVA NP/NFS were collected on March 25, 2009. *The magnesium and nitrate/nitrite concentrations have exceeded the permit cut-off concentration at the NFS site since February 1998. The issue of storm water cut-off concentrations for magnesium and nitrate being greater than background has been identified to TDEC and a request was made by NFS to TDEC for a modification of the cut-off concentration limits. No modification to the cut-off concentration was issued.* Letter from B. Marie Moore, Director, Safety & Regulatory, NFS, to Jeff Horton, Environmental Field Office Manager, Johnson City, TN, NFS NPDES TMSP No. TNR056583, 04/15/09 (Note: NPDES Permit exceeded limits for 11 years—See 01/30/08)
- 04/28/09 *Elevated Storm Water Sampling Results.* Total recoverable magnesium, total recoverable aluminum and nitrate/nitrite as nitrogen are above the cut-off concentrations. The results of the annual storm water sampling event conducted on March 25, 2009 were received by NFS on April 9, 2009. Investigation into the nitrate /nitrite as nitrogen contributor could not identify a source; however, *this sample is significantly elevated above normal levels established during previous sampling.* Further investigation and sampling has been initiated to determine the extent and duration of this elevated sample. *The aluminum contributor still remains unidentified as it did in the 2008 Storm Water Report.* Letter from B. Marie Moore, Director, Safety and Regulatory, NFS, to Jeff Horton, Environmental Field Office Manager, Johnson City, TN, NFS NPDES TMSP No. TNR056583, 04/28/09 (Note: NPDES Permit exceeded for aluminum for seven years. See 01/30/08)

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