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Radiation Committee

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DOE Report Finds that HEU Downblending by NFS Increases Cancer Deaths by One Latent Cancer Fatality for Every 71 Erwin Residents

The Department of Energy (DOE) National Nuclear Security Administration's (NNSA) October 2007 Supplement Analysis (DOE/EIS-0240-SA1) of the program for downblending surplus weapons-grade uranium to low-enriched uranium for commercial reactor fuel estimates that **one in seventy-one (1/71) residents of Erwin, Tennessee will fall victim to a latent cancer & die as a result of Nuclear Fuel Services' (NFS) downblending operations.**

With a population of approximately 5700, NNSA's analysis implies that NFS's Blended Low-Enriched Uranium (BLEU) facility will cause 80 latent cancer fatalities per year in Erwin -- 80 more cancer deaths per year than would have otherwise occurred.

Of the downblending sites examined, **NFS's had the greatest impact by far** on the offsite population. Because of its proximity to homes, churches, schools, nursing homes, other businesses and hospitals, as well as town and county offices, in terms of latent cancer fatalities expected by the NNSA, NFS's downblending operations are

- × **5** times more deadly to its neighbors than the Y-12 plant,
- × **6** times more deadly than Savannah River Site (SRS), and
- × **64** times more deadly than BWXT's downblending operations in Lynchburg, Virginia.

Since the inception of the downblending programs at NFS, Y-12, SRS & BWXT, **HEU feedstock enrichment has risen from 50% U-235 to 80%**. As a result of the substantial increase in HEU enrichment as well as higher radiation-dose-to-cancer-risk factors, the NNSA needed to conduct a Supplement Analysis of the June 1996 Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement (DOE/EIS-0240).

Using a decade of operational data to back up its new LCF estimates, the NNSA also found that, when compared to the 1996 EIS, latent cancer fatality risk is

- ↑ up **51%** for NFS workers in the BLEU operations,
- ↑ up **32%** for maximally-exposed offsite individuals (MEOI), and
- ↑ up **36%** for the offsite population within a 50-mile radius. (Table 4.2-2, p.11).

The 50-mile radius around Erwin, Tennessee includes a small portion of southeast Kentucky, southwest Virginia (including Abingdon), western North Carolina (including Asheville), and northeast Tennessee cities from Newport & Morristown to Bristol & Mountain City.

Linda Cataldo Modica
February 28, 2008



SUPPLEMENT ANALYSIS

DISPOSITION OF SURPLUS
HIGHLY ENRICHED URANIUM*Disposition of Surplus Highly Enriched Uranium*

Table 4.2-2. Comparison of HEU EIS and Supplement Analysis Normal Operations Radiological Doses and Risks

Impact Parameter	Involved Workforce		MEOI		Offsite Population	
	HEU EIS	SA	HEU EIS ^a	SA	HEU EIS ^a	SA
Y-12						
Annual Dose (person-rem)	11.3	11.3	7.0×10^{-4} (rem) ^b	7.8×10^{-4} (rem) ^b	2.9	4.7
Risk (LCF per year)	4.5×10^{-3}	6.8×10^{-3}	3.5×10^{-7}	4.7×10^{-7}	1.5×10^{-3}	2.9×10^{-3} ^c
BWXT						
Annual Dose (person-rem)	11.3	11.3	3.4×10^{-5} (rem) ^b	3.8×10^{-5} (rem) ^b	0.30	0.37
Risk (LCF per year)	4.5×10^{-3}	6.8×10^{-3}	1.7×10^{-8}	2.3×10^{-8}	1.5×10^{-4}	2.3×10^{-4} ^c
NFS						
Annual Dose (person-rem)	11.3	11.3	2.5×10^{-3} (rem) ^b	2.8×10^{-3} (rem) ^b	21	25
Risk (LCF per year)	4.5×10^{-3}	6.8×10^{-3}	1.3×10^{-6}	1.7×10^{-6}	1.1×10^{-2}	1.5×10^{-2} ^c
SRS						
Annual Dose (person-rem)	11.3	11.3	4.5×10^{-5} (rem) ^b	5.0×10^{-5} (rem) ^b	2.9	4.0
Risk (LCF per year)	4.5×10^{-3}	6.8×10^{-3}	2.3×10^{-8}	3.0×10^{-8}	1.5×10^{-3}	2.4×10^{-3} ^c

^a Adjusted to include uranium-232, uranium-234, and uranium-236.

^b Unit for MEOI dose is rem because the receptor is a single individual.

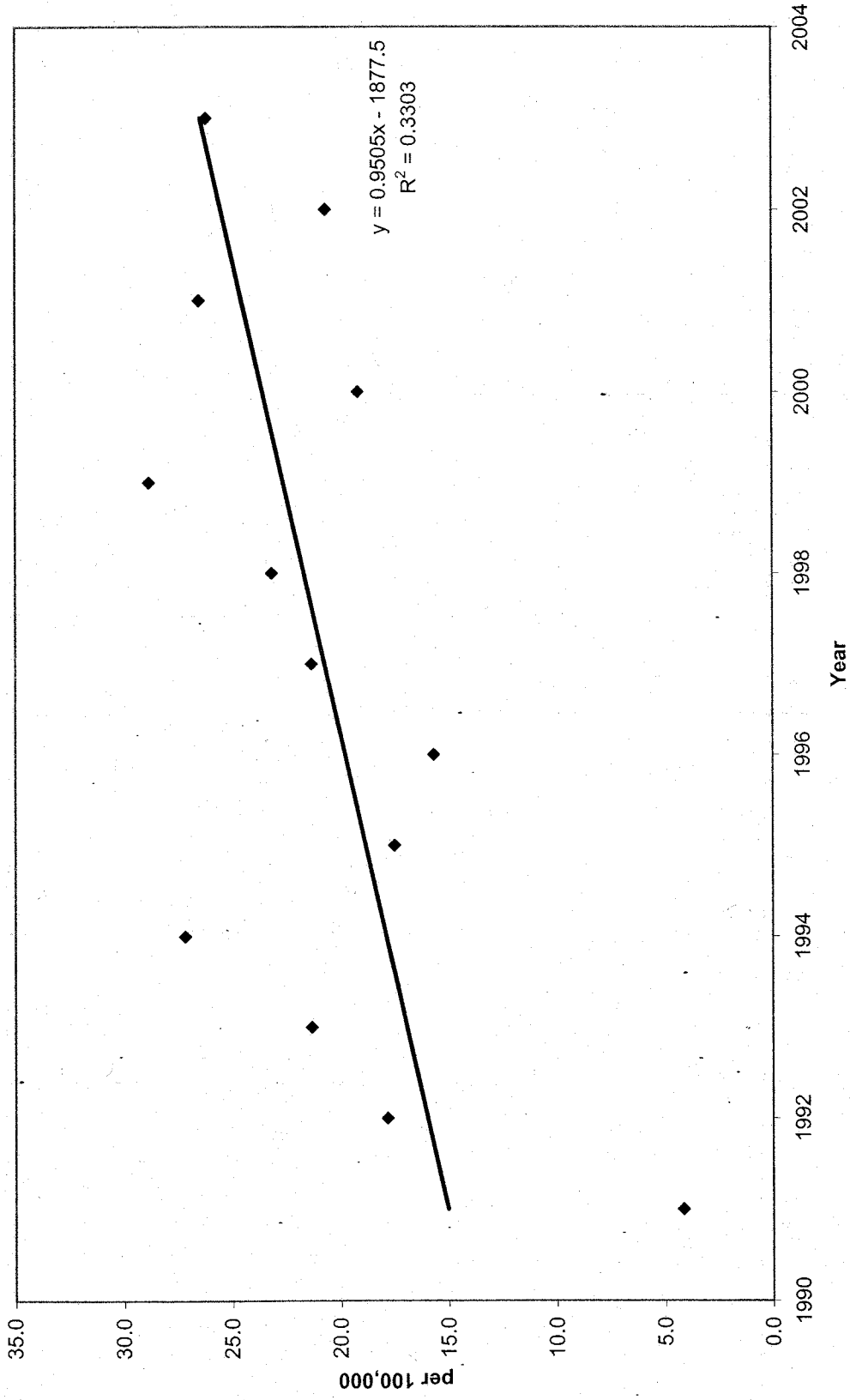
^c This SA's calculated offsite population risk is equivalent to the following increased annual risk of an LCF occurring in the total offsite population: 1 chance in 357 for Y-12; 1 chance in 4,545 for BWXT; 1 chance in 71 for NFS; and 1 chance in 416 for SRS.

Key: BWXT=BWXT Nuclear Operations Division; DOE=U.S. Department of Energy; HEU EIS=*Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement*; LCF=latent cancer fatalities; MEOI=maximally exposed offsite individual; NFS=Nuclear Fuel Services, Inc; SA=supplement analysis; SRS=Savannah River Site; and Y-12=Y-12 National Security Complex.

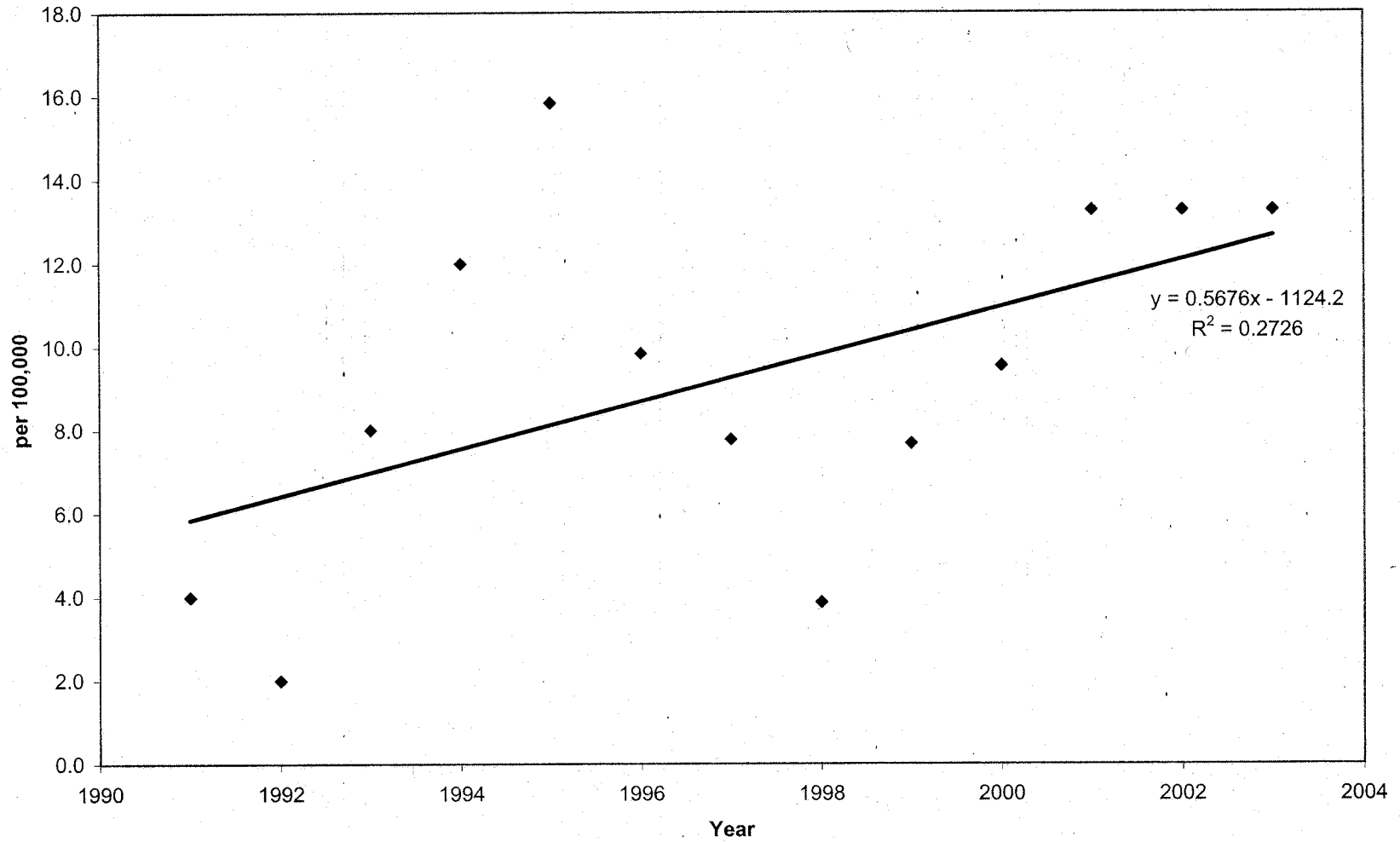
Source: Derived from DOE 1996a.

Breast Cancer Deaths, Unicoi County, 1990-2004

(3-year Moving Average Trend Line)



Non-Hodgkin's Lymphoma Deaths, Unicoi County, 1990-2004 (3-year Moving Average Trend Line)



Environmental Assessment for Renewal of Special Nuclear Material License No. SNM-124

Nuclear Fuel Services, Inc.
Erwin, Tennessee

Docket 70-143

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle Safety and Safeguards, NMSS

January 1999

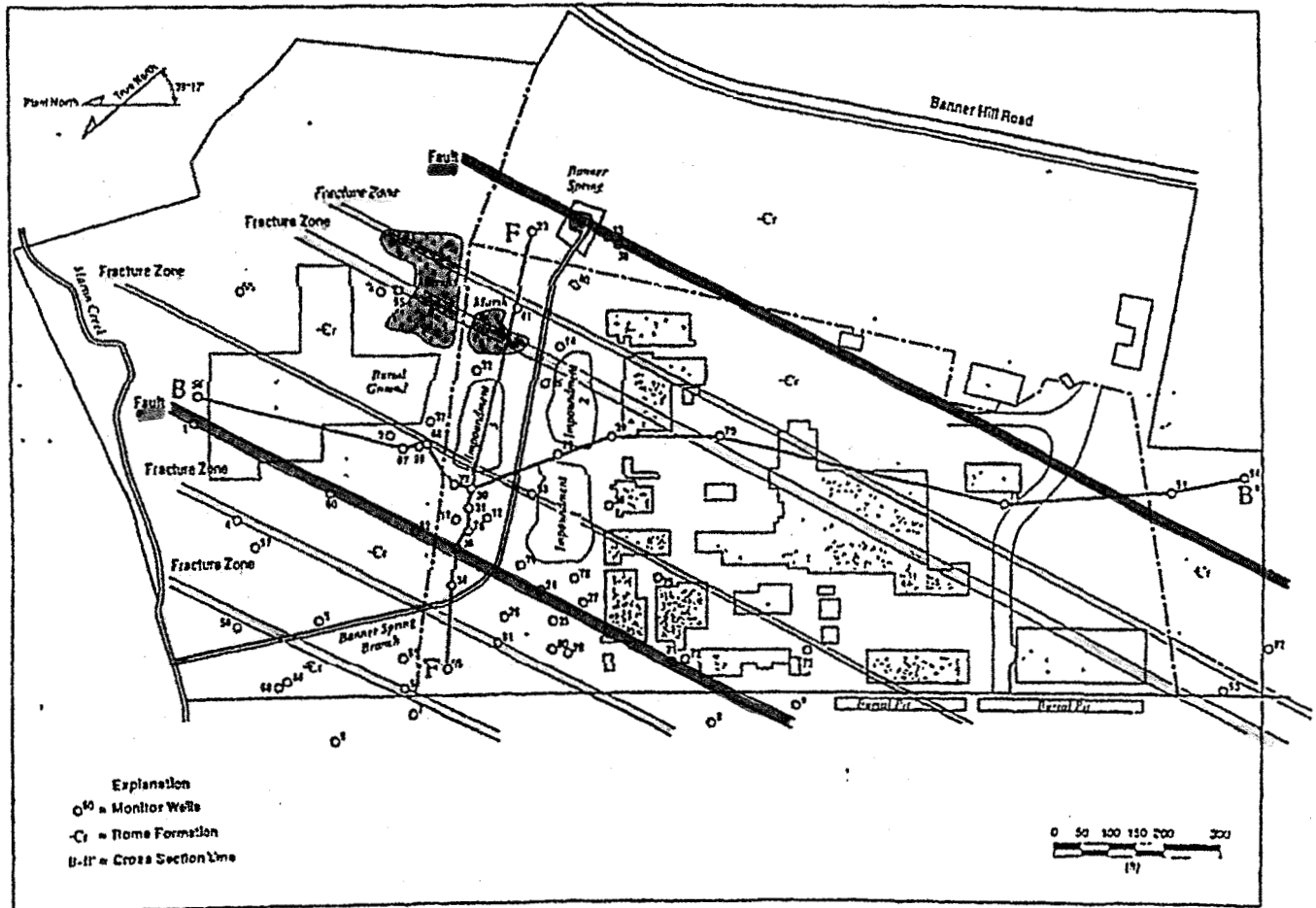


Figure 3.3 Bedrock features underlying the NFS Erwin Plant
[modified from Ecotek, 1989 (Ref. 7)]

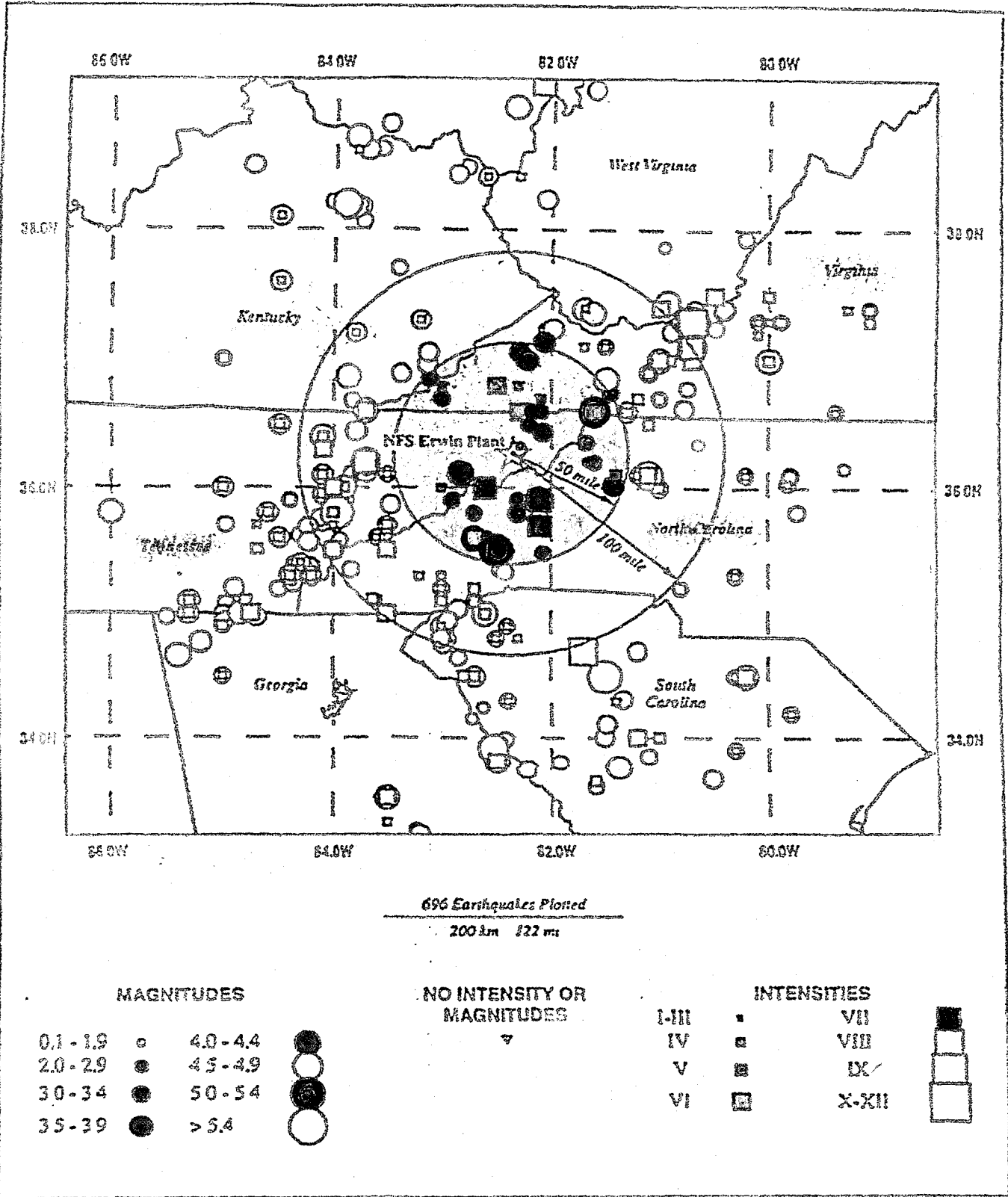


Figure 3.4 Earthquake epicenters located within 320 kilometers (200 miles) of the NFS Erwin Plant [modified from National Geophysical Data Center (Ref. 14)]

**Nuclear Fuel Services (NFS)
(Known) Fires and Explosions**

- 1962 Over **10 kilograms** of UF6 (Uranium Hexafluoride) gas released to air. (ATSDR Public Health Assessment-NFS, 5/29/07, p. 51; hereinafter ATSDR Report).
- 1964 Over **4 kilograms** of UF6 released. (ATSDR Report, p. 51).
- 1977 **5 lbs. (approx. 2.3 kg)** of enriched uranium and a microscopic trace of plutonium released within a 5-mile circle of the plant. (The Atlanta Journal and Constitution, 4/30/78).
- 1979 Over **3 kilograms** of UF6 (Uranium Hexafluoride) released. (ATSDR Report, p. 51).
- 8/07/79 **7 lbs (3,000 grams)** uranium accidentally vented into atmosphere. (The Tennessean, 1/26/81).
- 9/26/80 & 12/11/80. About **35 grams** of radioactive feedstock drawn into vent duct instead of furnace. (The Tennessean, 1/26/81).
- 10/7/80 **100 grams** Uranium Fluoride gas released. (Atlanta Journal & Constitution, 11/29/81).
- 10/11/80 Radioactive gas released not normal. (Johnson City Press, 10/20/80).
- 11/7/80 Gaseous Uranium could have escaped. (The Tennessean, 1/26/81).
- 12/11/80 Less than **1 gram** was released when hydraulic column overflow line malfunctioned. (The Tennessean, 1/26/81).
- 1981 Over **150 grams** of UF6 released. (ATSDR Report 5/29/2007, p. 51). On more than 3 occasions, NFS accidentally released into the atmosphere a cumulative total of more than 40 lbs. (about 18,144 grams) of radioactive hexafluoride. (The Progressive, April, 1981).
- 1/26/81 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 EIA when NFS was relicensed. (The Tennessean 1/26/81).
- 1983 NFS fires threatened to release high-enriched uranium (HEU) to the area environment. A fire occurred in **1983 in the HEU incinerator vent duct exterior in Building 302**. Earlier a **fire took place in Building 233**. (Markey Hearing, Sep. 18, 1986, p. 43).
- 9/10/92 A **fire and explosion** occurred during a process used by NFS to transform Uranium that did not meet Navy specifications. (Johnson City Press, 1/21/93 and 2/19/93).
- 4/10/96 A **fire** inside a building which processes radioactive material **spread into a section of ventilation exhaust ductwork for the incinerator** at the facility. Waste contaminated with Uranium was being burned in the incinerator at the time of the fire. (The Erwin Record, 4/10/96. Johnson City Press, 8/23/96).
- 4/21/04 Uranium metal shavings ignited inside a glass vial shaken by an operator during sampling; it could have produced a combustion event (Elizabethton Star, 4/21/04).

