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April, 29, 1996

Mr. Nathan Hartman
Engineering Services Branch
Air Division
Alabama Department of Environmental Management
PO Box 301463
Montgomery, Alabama 36130-1463

Dear Mr. Hartman:

TENNESSEE VALLEY AUTHORITY (TVA), BROWNS FERRY NUCLEAR PLANT (BFN) - CLEAN AIR ACT TITLE V OPERATING PERMIT, REQUEST FOR MINOR SOURCE DESIGNATION

As we have discussed, BFN has examined its operations in light of the requirements under the Alabama Department of Environmental Management (ADEM) regulations for Air Pollution Control. This examination indicates that BFN can qualify for designation as a minor source of air pollution.

I have enclosed the assumptions and calculations that support this designation for your consideration.

If you have any questions or require any additional information, please contact me at (205) 729-2448. We appreciate your consideration of this matter.

Sincerely,

John B. Brellenthin /
Environmental Manager

LGA:
Enclosure
cc (Enclosure):
S. G. Bugg, POB 2D-BFN
D. B. Nida, BR 5D-C
RIMS, WT 3B-K

airperm1.doc

BROWNS FERRY NUCLEAR PLANT
MINOR SOURCE EMISSION CALCULATIONS

PERTINENT CALCULATION INFORMATION **SOURCE**

- BTU Value of Diesel fuel = 19,600 BTU/lb — 1995 ADEM Inspection
- Diesel Fuel % Sulfur = 0.5% — Permitted value
- Density of Diesel Fuel = 7.218 lb/gal — MSDS/Calculation
- BTU/gal = 19,600 BTU/lb X 7.218 lb/gal = 141,473 BTU/gal
- Capacity of Auxiliary Boilers (3) = 62.5 mm BTU/hr each — 1978 Air Permit
- Capacity of Diesel Generators (8) = 28 mm BTU/hr each — 1978 Air Permit
- Diesel Generator Operation (Non Emergency) — BFN Tech Specs.
  1 hour per month operability test
  24 hours once per 18 months emergency test — BFN Tech Specs
- Diesel Generator Operation (Worst Case Emergency) — BFN FSAR
  7 days continuous operation
- BFN Diesel Fuel Purchases 1990-1995 (Gallons)

1990	1991	1992	1993	1994	1995	Average
185,651	610,676	380,009	345,243	426,830	489,251	406,276

1990-1995 CALCULATION ASSUMPTIONS

- Diesel Generator Operation (hours) = 1 hr/mo X 8 gen. X 12 mo = 96 hrs/year
  Assume 24 hour runs occur each year = 24 hrs X 8 gen = 192 hrs/year
  Total 288 hrs/year
- Remainder of Diesel fuel burned in Auxiliary Boilers
- Gallons of Diesel used by Aux. Boilers = $\frac{62,500,000 \text{ BTU/hr}}{141,473 \text{ BTU/gal}}$ = 441.8 gal/hr
- Gallons of Diesel used by Diesel Gens. = $\frac{28,000,000 \text{ BTU/hr}}{141,473 \text{ BTU/gal}}$ = 197.9 gal/hr
- Annual Diesel Gen. Fuel Use (Normal Operation) = 197.9 gal/hr X 288 hrs = 57,000 gal

- For 1990-1995 Fuel Use and operating hours are shown below:

	1990		1991		1992		1993		1994		1995	
	gal	hrs	gal	hrs	gal	hrs	gal	hrs	gal	hrs	gal	hrs
DG	57000	288	57000	288	57000	288	57000	288	57000	288	57000	288
AB	128651	291	533676	1253	323009	731	288243	652	369830	837	432251	978
TOT	185651		610676		380009		345243		426830		489251	

EMISSION CALCULATIONS

Emission Factors From AP-42

Diesel Generators 1990-1995 (Normal Operation)

$$PM = \frac{28 \text{ mm BTU/hr} \times .0763 \text{ lb/mm BTU} \times 288 \text{ hrs}}{2000 \text{ lbs/ton}} = 0.31 \text{ TPY}$$

$$SO2 = \frac{28 \text{ mm BTU/hr} \times 0.51 \text{ lb/mm BTU} \times 288 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 2.05 \text{ TPY}$$

$$NOx = \frac{28 \text{ mm BTU/hr} \times 3.1 \text{ lbs/mm BTU} \times 288 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 12.50 \text{ TPY}$$

$$CO = \frac{28 \text{ mm BTU/hr} \times .81 \text{ lbs/mm BTU} \times 288 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 3.26 \text{ TPY}$$

$$VOC = \frac{28 \text{ mm BTU/hr} \times .10 \text{ lb/mm BTU} \times 288 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 0.40 \text{ TPY}$$

Diesel Generators (Worst Case Emergency = 7 day operation, 8 generators + normal operation)
Total = 1632 operating hours

$$PM = \frac{28 \text{ mm BTU/hr} \times .0763 \text{ lb/mm BTU} \times 1632 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 1.74 \text{ TPY}$$

$$SO2 = \frac{28 \text{ mm BTU/hr} \times 0.51 \text{ lb/mm BTU} \times 1632 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 11.6 \text{ TPY}$$

$$NOx = \frac{28 \text{ mm BTU/hr} \times 3.1 \text{ lb/mm BTU} \times 1632 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 70.82 \text{ TPY}$$

$$CO = \frac{28 \text{ mm BTU/hr} \times .81 \text{ lb/mm BTU} \times 1632 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 18.5 \text{ TPY}$$

$$VOC = \frac{28 \text{ mm BTU/hr} \times .10 \text{ lb/mm BTU} \times 1632 \text{ hrs/yr}}{2000 \text{ lbs/ton}} = 2.28 \text{ TPY}$$

EMISSIONS CALCULATIONS

AUXILIARY BOILERS

Based on 5 year average diesel fuel use of 349,276 gallons per year (range = 128,651 to 553,676)

PM = $\frac{349{,}276 \text{ gal/yr} \times 2 \text{ lbs/1000 gal}}{2000 \text{ lbs/ton}}$ = 0.349 TPY

SO2 = $\frac{349{,}276 \text{ gal/yr} \times 71.0 \text{ lbs/1000 gal}}{2000 \text{ lbs/ton}}$ = 12.4 TPY

NOx = $\frac{349{,}276 \text{ gal/yr} \times 20 \text{ lbs/1000 gal}}{2000 \text{ lbs/ton}}$ = 3.49 TPY

CO = $\frac{349{,}276 \text{ gal/yr} \times 5 \text{ lbs/1000 gal}}{2000 \text{ lbs/ton}}$ = 0.87 TPY

VOC = $\frac{349{,}276 \text{ gal/yr} \times 0.2 \text{ lbs/1000gal}}{2000 \text{ lbs/ton}}$ = 0.034 TPY

WORST CASE YEAR (1991)

Fuel use for Auxiliary Boilers was 1.58 times the five-year average use. Therefore emissions would be:

PM = 0.349 TPY X 1.58 = 0.55 TPY

SO2 = 12.4 TPY X 1.58 = 19.5 TPY

NOx = 3.49 TPY X 1.58 = 5.51 TPY

CO = 0.87 TPY X 1.58 = 1.37 TPY

VOC = 0.034 TPY X 1.58 = 0.053 TPY

If we combine the highest Auxiliary Boiler useage year (1991) with the worst case diesel generation operation, the emissions totals are as follows:

	Auxiliary Boiler		Diesel Generators		Total
PM	0.55 TPY	+	1.74 TPY	=	2.29 TPY
SO2	19.5 TPY	+	11.6 TPY	=	31.1 TPY
NOx	5.51 TPY	+	70.82 TPY	=	76.33 TPY
CO	1.37 TPY	+	18.5 TPY	=	19.87 TPY
VOC	0.053 TPY	+	2.28 TPY	=	2.33 TPY