

REGULATORY OPERATIONS
U.S. NUCLEAR REG. COMMISSION

70-143

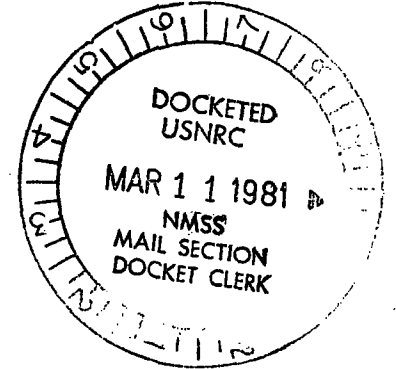
Nuclear Fuel Services, Inc. ERWIN, TENNESSEE 37650

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(615) 743-9141

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March 2, 1981
U.S. NUCLEAR REG.
COMMISSION
MAIL SECTION



Division of Fuel Cycle and Material Safety
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. R. G. Page, Chief
Uranium Fuel Licensing Branch

Reference: (1) Docket 70-143; SNM License 124
(2) License Amendment No. 6 dated May 15, 1980

Gentlemen:

NFS is enclosing recent stack release data and an evaluation of potential off-site radiation exposure as Attachment I to this letter. Based upon the measured data at the nearest residence, the potential infant dose commitment does not exceed 2.8 mrem. per year, or 11% of EPA guidelines.

Attachment II is a projected schedule for ventilation upgrade which would be required to provide assurance of continual compliance with a 25 mrem. per year limit. This schedule is based upon both quoted and NFS experience. The engineering phases are developed from quotations from Lockwood-Green Engineering Company and Science Applications, Inc. Sampling, testing, and analyses have been initiated and the procurement and installation phases are supported by NFS experience. The projected completion date is December 31, 1982.

If you have any questions, please contact me.

Very truly yours,

W. C. Manser, Jr.
W. C. Manser, Jr.
General Manager

WCM:kj

Attachment

cc: Director, Region II

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ATTACHMENT I

PRELIMINARY STATUS REPORT
ENVIRONMENTAL AIR SAMPLING

(AS REQUIRED BY AMENDMENT 6; SNM-124, DATED May 15, 1980)

I. STACK 234U* CONCENTRATIONS (Condition No. 61)The following stack concentrations (total alpha) have been measured since December 1, 1980. Units = $\mu\text{Ci/ml} \times 10^{-12}$

Date	<u>Building 233</u>		<u>Building 302/3</u>	
	<u>Daily</u>	<u>Weekly Average</u>	<u>Daily</u>	<u>Weekly Average</u>
12/1/81	48	84	90	100
12/2/81	7	74	240	127
12/3/81	41	70	126	133
12/4/81	72	72	105	121
12/5/81	103	73	35	117
12/6/81	58	66	17	112
12/7/81	3	47	41	94
12/8/81	21	44	623	170
12/9/81	52	50	189	163
12/10/81	46	51	114	161
12/11/81	48	47	187	173
12/12/81	8	34	92	180
12/13/81	117	42	60	186
12/14/81	39	47	44	187
12/15/81	156	67	51	105
12/16/81	58	67	84	90
12/17/81	27	64	107	89
12/18/81	42	63	55	70
12/19/81	3	63	28	62
12/20/81	7	47	17	55
12/21/81	8	43	11	50
12/22/81	23	24	28	47
12/23/81	5	16	11	37
12/24/81	58	21	5	23
12/25/81	30	19	12	16
12/26/81	15	21	5	15
12/27/81	16	22	29	16
12/28/81	4	22	22	18
12/29/81	42	24	45	18
12/30/81	24	27	90	29
12/31/81	68	28	79	40

Building 233Building 302/3

<u>Date</u>	<u>Daily</u>	<u>Weekly Running Avg.</u>	<u>Daily</u>	<u>Weekly Running Avg.</u>
1/1/81	37	26	87	51
1/2/81	100	38	56	59
1/3/81	37	40	58	64
1/4/81	6	41	46	67
1/5/81	155	57	7	62
1/5/81	17	56	28	53
1/7/81	43	52	23	45
1/8/81	82	59	10	34
1/9/81	20	51	23	28
1/10/81	18	48	18	22
1/11/81	52	56	14	17
1/12/81	7	34	7	17
1/13/81	57	39	45	20
1/14/81	144	54	17	19
1/15/81	29	47	43	24
1/16/81	15	46	86	33
1/17/81	15	46	17	33
1/18/81	11	40	36	36
1/19/81	4	39	1	35
1/20/81	15	33	20	31
1/21/81	58	21	10	30
1/22/81	75	27	15	27
1/23/81	14	27	47	21
1/24/81	22	29	12	20
1/25/81	114	43	20	18
1/26/81	16	45	32	22
1/27/81	5	43	22	22
1/28/81	7	37	98	35
1/29/81	6	27	29	38

Building 233Building 302/3

	<u>Daily</u>	<u>Weekly Running Avg.</u>	<u>Daily</u>	<u>Weekly Running Avg.</u>
1/30/81	7	25	47	37
1/31/81	9	23	16	38
2/1/81	6	8	37	40
2/2/81	8	7	9	37
2/3/81	8	7	6	35
2/4/81	22	9	6	21
2/5/81	37	14	5	18
2/6/81	3	13	20	14
2/7/81	124	31	14	14
2/8/81	8	30	26	12
2/9/81	3	29	60	20
2/10/81	13	30	12	21
2/11/81	1	27	17	22
2/12/81	4	22	29	26
2/13/81	19	24	32	27
2/14/81	161	29	79	36
2/15/81	9	30	12	35
2/16/81	1	29	46	32
2/17/81	2	28	25	34
2/18/81	1	28	24	35
2/19/81	1	27	21	34
2/20/81	13	27	16	32
2/21/81	55	12	22	24
2/22/81	282*	50	47	28
2/23/81	9	52	71	33
2/24/81	723*	155	37	34
2/25/81	26	159	38	36

*Under Investigation.

*All alpha activity assumed to be 234U

II.. ISOTOPIC ANALYSIS - URANIUM (Amendment 62)
 MONTHLY ISOTOPIC ANALYSIS (1980)

Perimeter and Environmental Air Uranium Isotopic Concentration

Units = $\mu\text{Ci/ml} \times 10^{-14}$

<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
170	June	2.8	0.2	0.1	3.2
NNE	July	3.3	0.3	0.1	3.7
Perimeter	Aug.	3.6	0.9	0.4	4.9
	Sept.	5.8	0.1	0.1	6.0
	Oct.	3.0	0.1	0.0	3.1
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
171	June	2.6	0.1	0.2	2.9
NW	July	2.1	0.1	0.0	2.2
Perimeter	Aug.	2.5	0.1	0.4	2.9
	Sept.	2.5	0.1	0.0	2.6
	Oct.	0.9	0.1	0.0	1.0
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
172	June	2.1	0.0	0.0	2.2
SW	July	1.2	0.0	0.0	1.3
Perimeter	Aug.	6.9	0.1	0.0	7.1
	Sept.	1.1	0.0	0.0	1.2
	Oct.	6.2	0.2	1.0	7.3
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
173	June	2.8	0.1	0.0	2.9
ENE	July	2.9	0.1	0.0	3.0
Perimeter	Aug.	2.3	0.0	0.0	2.4
	Sept.	3.3	0.1	0.1	3.5
	Oct.	2.1	0.1	0.0	2.2
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
174	June	3.2	0.2	0.1	3.4
SE	July	2.9	0.1	0.0	3.0
Perimeter	Aug.	2.5	0.1	0.1	2.6
	Sept.	2.5	0.1	0.1	2.7
	Oct.	1.0	0.0	0.0	1.0
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
217	June	2.2	0.0	0.0	2.2
ENE	July	1.4	0.1	0.0	1.5

<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
Perimeter	Aug.	2.0	0.1	0.0	2.0
	Sept.	2.5	0.1	0.0	2.6
	Oct.	2.0	0.1	0.0	2.0
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
218	June	2.8	0.4	0.3	3.4
SE	July	6.5	0.2	0.1	6.7
Perimeter	Aug.	5.3	0.5	0.7	6.5
	Sept.	5.1	0.2	0.3	5.6
	Oct.	4.0	0.1	0.1	4.1
<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>	<u>Total</u>
322	June	1.0	0.0	0.0	1.0
600 meters	July	1.0	0.0	0.0	1.0
NE of	Aug.	0.7	0.0	0.0	0.7
Plant	Sept.	0.8	0.0	0.0	0.9
	Oct.	1.0	0.1	0.0	1.2
	<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>
323	June	1.9	0.0	0.0	1.9
290 meters	July	1.5	0.0	0.0	1.6
E of	Aug.	0.7	0.0	0.0	0.7
Plant	Sept.	1.6	0.0	0.0	1.6
	Oct.	3.5	0.1	0.0	3.6
	<u>Sample</u>	<u>Month</u>	<u>234U</u>	<u>235U</u>	<u>238U</u>
324	June	0.3	0.0	0.0	0.3
8 km	July	0.1	0.0	0.0	0.2
SW of	Aug.	0.1	0.0	0.0	0.1
Plant	Sept.	0.1	0.0	0.0	0.1
	Oct.	0.1	0.0	0.0	0.1

0.0 indicates less than $0.5 \times 10^{-15} \mu\text{Ci/ml}$

III. Uranium Solubility (Condition No. 63)

Samples collected during the last two quarters of 1980 have been collected and sent to BNWL for solubility determinations. These analyses have not yet been completed and the preliminary results (identifying the Class D fraction) will probably not be available until early March.

Although the purpose of this test is not to quantitatively measure uranium, 200 μ grams of uranium were collected in the presence of 9.7 grams of total particulate during the last quarter of 1980. This represents a concentration of approximately 1.4×10^{-6} μ g/l. Since the specific activity is not known, no statement can be made relative to the radioactivity concentration. When preliminary data on solubility become available, BNWL will telephone results to NFS.

IV. Particle Size Distribution (Condition No. 64)

Three quarterly air samples (of one week duration) using multi-stage cascade impactor (Anderson 2000), in which particles are aerodynamically fractionated into five ranges and the respirable fraction can be estimated, have been made. These data are presented below:

Particle Size Distribution
(Carolina Ave. Sampling Station)
Sample No. 323

	ICRP Resp. (%) [*] -R _f	Concentrations (μ Ci/ml $\times 10^{-14}$)		
		August, 1980	December, 1980	January, 1981
Stage 1 (>7 μ)	6%	1.3 (17.1%)	0.8 (10.1%)	0.5 (14.3%)
Stage 2 (3.3-7 μ)	11%	1.0 (13.2%)	0.9 (11.4%)	0.7 (20.0%)
Stage 3 (2.3-3 μ)	20%	1.0 (13.2%)	1.0 (12.7%)	0.6 (17.1%)
Stage 4 (1.1-2 μ)	22%	1.0 (13.1%)	1.2 (15.2%)	0.5 (14.3%)
Stage 5 (0.1-1.1 μ)	45%	3.3 (43.4%)	4.0 (50.6%)	1.2 (34.3%)
Total	-	7.6	7.9	3.5
$\sum R_f$ (.01)(%) Percent Respirable		27.6%	30.5%	25.1%

*ICRP Pub. 30, 1978

Environmental Air
Total Alpha Concentrations (Near Residents)

January, February, 1981

Units - $\mu\text{Ci/ml} \times 10^{-14}$

<u>Sample No. 323</u>	<u>Week Ending</u>	<u>Total Alpha</u>
290 meters	1/5/81	1.6
E of Plant	1/12/81	2.5
	1/19/81	2.1
	1/26/81	1.4
	2/2/81	3.3
	2/9/81	0.8
	2/16/81	2.1

<u>Sample No. 372</u>	<u>Week Ending</u>	<u>Total Alpha</u>
240 meters	1/5/81	2.7
SSE of	1/12/81	2.4
Plant	1/19/81	2.4
(nearest Resident)	1/26/81	2.1
	2/2/81	2.1
	2/9/81	1.4
	2/16/81	2.8

V. Dose Commitment Estimate - Nearest Resident (Condition No. 65)

Assumptions: Exposed Individual is an infant
100% soluble with bone as critical organ
Respirable Fraction = 0.27
All Alpha Activity from 234U
NUREG - 0172 Dose Commitment Factors Used
Avg. Alpha Conc. = $2.3 \times 10^{-14} \mu\text{Ci/ml} = 2.3 \times 10^{-8} \mu\text{Ci/M}^3$
Infant Breathing Rate = 2045 M³/yr

Dose Commitment - Bone (Class D)

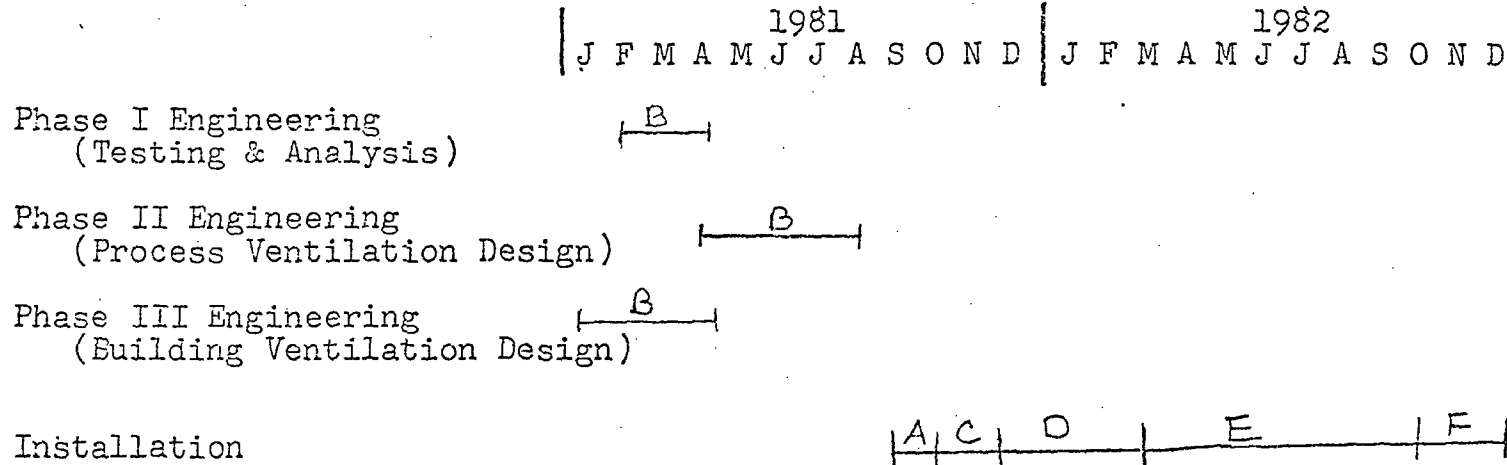
Adult Dose Commitment:

$(7300 \text{ M}^3/\text{yr}) (0.27) (2.3 \times 10^{-8} \mu\text{Ci/M}^3) (41.2 \text{ rem}/\mu\text{Ci}) = 1.9/\text{mrem}\cdot\text{a}$

Infant Dose = $(0.0019) (1.5) = 0.0028 \text{ rem} = 2.8 \text{ mrem}$

ATTACHMENT II

VENTILATION UPGRADE SCHEDULE



- A - Quotation
- B - Engineering Design
- C - Award Contract
- D - Equipment Delivery
- E - Construction
- F - Check-out & Start-up

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