

SEQUOYAH FUELS CORPORATION

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February 3, 1986

U.S. Nuclear Regulatory Commission
Document Control Desk
1717 H Street, N.W.
Washington, D. C. 20055

Re: License SUB-1010
Docket 40-8027
10 CFR 20.405 - Incident Exposure Response

Dear Sir:

Pursuant to 10 CFR 20.405, the following report provides required information concerning the January 4, 1986 incident at Sequoyah Fuels Corporation's Sequoyah Facility, Gore, Oklahoma. The incident resulted in an employee fatality and the exposure of plant personnel to airborne uranyl fluoride and hydrogen fluoride.

- I. 20.405(a)(2)(i): Estimates of each individual's exposure as required by paragraph (b) of this section.

As required by paragraph (b), the information is stated in a separate, confidential part of the report, which is identified as Individual Exposure Estimates. Seven of the thirty-two employees on-site during the incident received an estimated exposure greater than 40 MPC-hours. None of the employees exceeded the quarterly limit of 520 MPC-hours. Members of the public in the downwind plume path did not exceed the dose limits specified in 40 CFR 190.

- II. 20.405(a)(2)(ii): Levels of radiation and concentrations of radioactive material involved.

The facility routinely operates a network of air sampling stations located within the plant, at the plant fenceline and off-site. Analyses of the filters collected the afternoon of January 4, 1986 and for several subsequent days are shown in Tables 1-3.

Uranium and fluoride data for the four fenceline and five off-site air sampler stations are shown in Tables 1 and 2. The airborne concentration at the east perimeter fenceline for the sample period of midnight to 6 p.m. January 4, [01/04/86 (001) to 01/04/86 (1800)] was 7.7×10^{-10} uCi/ml. Airborne concentrations measured at the other perimeter fenceline sampling locations were not elevated during this time period. The only airborne concentration

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detected off-site was at the air sampling station located at I-40 to the south of the plant. This sampling point was in the path of the plume. The airborne concentration at this location for the sample collected over the period from noon December 31, 1985 to 6 p.m. January 4, 1986 [12/31/85 (1200) to 01/04/86 (1800)] was 1.3×10^{-11} uCi/ml. The results for all other off-site sampler locations are less than detectable.

The above airborne concentrations are based on the entire sampling period. If the activity measured was assumed to have been deposited within the approximate 30-minute period of the release, the concentrations would be 2.8×10^{-8} uCi/ml at the east perimeter fence line location and 2.7×10^{-8} uCi/ml for the I-40 location.

The air sampling results for the 45 samplers located in the process area are shown in Table 3. The process area and adjacent administrative areas were enveloped by the plume, and the employees immediately evacuated, thereby minimizing potential intake of uranium. The highest concentration measured in the building was 6.41×10^{-10} uCi/ml, for the eight-hour period between 8 a.m. and 4 p.m. on January 4. If the activity was assumed to be deposited over the 30-minute release period, the concentration would be 1×10^{-8} uCi/ml.

III. §20.405(a)(2)(iii): The cause of the exposure, levels or concentrations.

The tram bearing a 14-ton cylinder to be filled with UF_6 was improperly positioned on the loading scales. This caused an incorrect weight to be registered as the cylinder was filled. When the tram positioning error was noted, the scale indicated the cylinder contained 29,500 pounds of UF_6 . The maximum net shipping weight for a 14-ton cylinder is 27,560 pounds. Therefore, vacuum was applied to the cylinder at the loading station in order to remove the excess UF_6 . Since evacuation appeared to be going very slowly, a significant amount of solidification was believed to have occurred. The cylinder was then placed in the steam chest for reheating. Approximately two hours after steam was applied, a rupture occurred in the cylinder wall, releasing UF_6 to the atmosphere.

IV. §20.405(a)(2)(iv): Corrective steps taken or planned to prevent recurrence.

Sequoyah Fuels Corporation and Sequoyah Facility management have undertaken steps to assure that both immediate needs for total process risk control and long term needs for efficient and safe practice are addressed. These steps include a comprehensive review of facility safety and health physics procedures and employee training programs and engineering review of process operations.

The procedures review will result in revisions as necessary to assure that each is detailed and clear. As part of the SFC plant

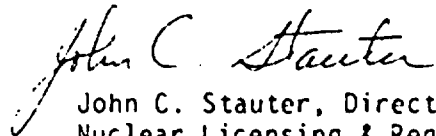
restart program, employees will participate in training and again demonstrate proficiency and understanding of the production and health and safety procedures applicable to their area of responsibility. Before restart, careful administrative practices will be developed to provide redundant checks for loading and handling cylinders.

In addition, engineering modifications to enhance process accountability are being scoped. Some modifications will be made before restart, while others will follow because of extended lead times. Detailed engineering of the cylinder loading stations is underway and will result in redesign to assure that a tram holding 2½-, 10- and 14-ton cylinders is always correctly positioned on the scale apparatus. Based on the scoping studies, process equipment modifications will provide more accurate gauging of material in process and in cold traps prior to loading. Redundant interlocked systems will provide backup confirmation of material loaded in a cylinder.

SUMMARY

The investigation of the accident continues by both Sequoyah Fuels Corporation and the Nuclear Regulatory Commission. This investigation includes evaluation of employee exposures and the environmental impacts from the release. As reports of findings are completed, they will be submitted as further fulfillment of the licensee's responsibility to assess completely the reasons for exposures and their impacts.

Sincerely,



John C. Stauter, Director
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JCS:cr
Enclosure

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TABLE 1

SEQUOYAH FACILITY FENCELINE AIR SAMPLING

Sampling Time	E-1 EAST		E-2 WEST		E-3 SOUTH		E-4 NORTH	
	MPC	Fluoride	MPC	Fluoride	MPC	Fluoride	MPC	Fluoride
01/01/86 (0001) to 01/01/86 (2400)	0.16		0.18		0.18		0.17	
01/02/86 (0001) to 01/02/86 (2400)	0.32		0.38		0.42		0.34	
01/03/86 (0001) to 01/03/86 (2400)	0.17		0.22		0.28		0.28	
01/04/86 (0001) to 01/04/86 (1800)	154.0	0.1*	0.15	0.0015*	0.28	0.018*	0.22	0.0028*
01/04/86 (1800) to 01/05/86 (1030)	0.90		0.40		0.46		0.50	
01/05/86 (1030) to 01/05/86 (2400)	0.19		0.19		0.28		0.19	
01/06/86 (0001) to 01/06/86 (1600)	0.19		0.20		0.20		0.15	
01/06/86 (1600) to 01/07/86 (1600)	<0.05		0.08		0.06		0.08	
01/07/86 (1600) to 01/08/86 (1600)	0.06		0.07		0.06		<0.05	
01/08/86 (1600) to 01/09/86 (1600)	<0.05		<0.05		<0.05		<0.05	
01/09/86 (1600) to 01/10/86 (1700)	2.00		<0.05		<0.05		<0.05	
01/10/86 (1700) to 01/11/86 (1800)	0.77		0.09		0.10		0.10	
01/11/86 (1800) to 01/12/86 (1500)	0.40		0.52		0.46		0.46	
01/12/86 (1500) to 01/13/86 (2400)	0.20		0.20		0.18		0.18	
01/14/86 (0001) to 01/14/86 (2400)	0.40	0.0021**	0.64	0.0020**	0.64	0.0005**	0.64	0.0022**
01/15/86 (0001) to 01/15/86 (2400)	0.18		0.40		0.48		0.30	

Fluoride results reported in ug/m³

Fluoride detection limit is 0.0005 ug/m³

* On 12/31/85 (1200) Off 01/04/86 (1800)

** On 01/04/86 (1800) Off 01/14/86 (1200)

Sampling rate for fluoride is 0.2 cfm.

Fluoride collected on calcium-impregnated filter paper.

Radionuclide results reported as fraction of MPC

MPC = 5×10^{-12} uCi/ml

Detection limit is 2.5×10^{-13} uCi/ml (daily)

Sampling rate for radionuclides is 1 cfm.

TABLE 2

SEQUOYAH FACILITY OFF-SITE ENVIRONMENTAL AIR SAMPLING

Sampling Time	2103		2105		2106		2107		2108	
	MPC	Fluoride	MPC	Fluoride	MPC	Fluoride	MPC	Fluoride	MPC	Fluoride
12/10/85 (1200) to 12/17/85 (1200)	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005
12/17/85 (1200) to 12/24/85 (1200)	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005
12/24/85 (1200) to 12/31/85 (1200)	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	<0.0005	<0.007	0.0005
*12/31/85 (1200) to 01/04/86 (1800)	<0.007	<0.0009	<0.007	<0.0009	<0.007	<0.0009	<0.007	<0.0009	2.6	<0.0005
*01/04/86 (1800) to 01/05/86 (1100)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/05/86 (1100) to 01/06/86 (1630)	<0.05		<0.05		<0.05		<0.05		<0.05	
01/06/86 (1630) to 01/07/86 (1530)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/07/86 (1530) to 01/08/86 (1530)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/08/86 (1530) to 01/09/86 (1530)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/09/86 (1530) to 01/10/86 (1700)	<0.05		<0.05		<0.05		NS		<0.05	
*01/10/86 (1700) to 01/11/86 (1700)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/11/86 (1700) to 01/12/86 (1500)	<0.05		<0.05		<0.05		<0.05		<0.05	
*01/12/86 (1500) to 01/14/86 (1200)	<0.05	<0.0005**	<0.05	0.0005**	<0.05	<0.0005**	<0.05	<0.0005**	<0.05	<0.0005**

Fluoride results reported in ug/l

Sampling rate for fluoride is 0.2 cfm.

Fluoride collected on calcium-impregnated filter paper.

** On 01/24/86 (1800) Off 01/14/86 (1200)

Radionuclide results reported as fraction of MPC.

Sampling rate for radionuclides is 1 cfm.

MPC = 5×10^{-12} uCi/ml

Detection limit is 3.6×10^{-14} uCi/ml (weekly); 2.5×10^{-13} uCi/ml (daily)

*Final count done on 01/23/86

Locations:

2103 -- East, 1,000 feet from plant

2105 -- $\frac{1}{2}$ Mile southwest of plant

2106 -- Carlisle School

2107 -- Highway 64 north of plant

2108 -- I-40 south of plant

TABLE 3

SEQUOYAH FACILITY PLANT AIR SAMPLING RESULTS^{1/}

Location Number	Area	Location Description	01/04/86 0001-0800	01/04/86 0800-1600	01/04/86 1600-2000	01/04/86 2000-2400	01/05/86 0001-0800	01/05/86 0800-1600	01/05/86 1600-2400
SAMPLING									
01		South Wall, 1st	0.09	0.36	0.25	0.10	0.07	0.05	0.05
02		Splitter, 2nd	0.11	0.33	0.20	0.13	0.09	0.08	0.06
03		Splitter, 3rd	0.11	0.34	0.21	0.14	0.09	0.08	0.07
04		Drum Dumper, 4th	0.12	0.33	0.25	0.15	0.08	0.13	0.06
05		Sample Prep Room	0.10	0.43	0.20	0.21	0.08	0.11	0.04
DIGESTION									
06		Center, 1st	0.12	0.69	0.12	0.17	0.16	0.12	0.10
07		East Walkway, 2nd	0.10	0.35	0.11	0.17	0.07	0.06	0.04
08		#3 Digester, 2nd	0.13	0.74	0.14	0.20	0.10	0.08	0.06
DENITRATION									
10		N. End #1, 1st	0.08	0.94	0.07	0.10	0.05	0.04	0.04
38		Between #3 and #4, 1st	0.11	0.94	0.09	0.11	0.07	0.03	0.04
37		W. #3 Bolldown Tank, 1st	0.06	1.08	0.08	0.16	0.09	0.04	0.04
11		W. Side #2, 2nd	0.10	0.94	0.09	0.17	0.08	0.12	0.06
12		E. Side #2, 2nd	0.14	1.18	0.12	0.12	0.10	0.06	0.07
40		Between #3 and #4, 2nd	0.13	0.89	0.17	0.10	0.10	0.04	0.05
REDUCTION- HYDROFLUORINATION									
13		A-Reactor Blower, 1st	0.09	1.33	0.10	0.18	0.08	0.03	0.04
41		B-Reduction Reactor, 1st	0.11	1.33	0.14	0.14	0.13	0.05	0.08
14		A-Backup Filters, 2nd	0.15	3.11	0.19	0.11	0.209	0.04	0.08
42		B-Line, 2nd	0.12	1.48	0.08	0.15	0.10	0.05	0.04
15		A-Line HF CUR, W., 4th	0.12	1.53	0.12	0.06	0.06	0.04	0.02
16		UO2 Seal Bin, E., 4th	0.15	1.53	0.19	0.17	0.14	0.08	0.07
43		B-Line, 3rd	0.17	1.58	0.22	0.23	0.18	0.13	0.14
17		2nd Stage HFR, 3rd	0.15	1.77	0.11	0.08	0.10	0.07	0.07
18		N. of UO3 Pulverizer, 3rd	0.11	1.73	0.11	0.08	0.04	0.04	0.04
44		B-Line HFR CUR, S., 4th	0.17	0.64	0.14	0.14	0.08	0.05	0.14
19		AHF Furnace, 1st	0.11	3.30	0.18	0.12	0.09	0.05	0.08

TABLE 3, continued

Location Number	Area	Location Description	01/04/86 0001-0800	01/04/86 0800-1600	01/04/86 1600-2000	01/04/86 2000-2400	01/05/86 0001-0800	01/05/86 0800-1600	01/05/86 1600-2400
FLUORINATION									
20		S11 Conveyor, S., 4th	0.15	2.27	2.30	1.60	0.69	0.37	0.56
21		S11 Conveyor, NE., 4th	0.12	3.30	0.86	0.89	0.13	0.24	1.30
22		#5 Tower, 1st	0.10	3.60	0.17	0.25	0.09	0.26	0.55
23		#3 Tower, 1st	0.13	6.41	0.41	0.52	0.31	0.12	0.18
24		F2 Heater #2, W., 2nd	0.37	2.56	0.21	0.13	0.11	0.06	0.06
25		F2 Heater #3, NW., 2nd	0.12	2.76	0.10	0.11	0.12	0.15	0.05
26		#5 Tower, S., 2nd	0.10	4.14	0.30	0.48	0.09	0.41	0.76
27		Cold Trap #2, E., 3rd	0.08	2.81	0.24	0.14	0.12	0.09	0.17
28		Cold Trap #2, W., 3rd	0.11	3.60	0.19	0.16	0.09	0.24	0.36
29		Feed Bin #3, 3rd	0.12	2.07	1.20	1.80	0.30	0.40	0.65
30		Feed Bin Center, 3rd	0.11	2.27	0.68	1.18	0.24	0.0	0.34
MISCELLANEOUS									
36		UF6 Scale Room	0.22	5.42	0.13	0.29	0.09	0.09	0.12
37s		Decon Room, South	0.57	0.54	0.10	0.10	0.06	0.03	0.05
37w		Decon Room, West	0.40	0.84	0.10	0.08	0.08	0.04	0.04
32		Maint. Shop, SE.	0.15	3.35	0.22	0.20	0.11	0.10	0.09
43		Maint. Shop, West	0.11	2.76	0.19	0.16	0.11	0.22	0.08
34		#1 F2 Plant	0.07	2.81	0.11	0.10	0.10	0.08	0.08
35		Coil Rework Area	0.08	4.93	0.13	0.19	0.08	0.03	0.10
46		#2 F2 Plant	0.09	1.73	0.06	0.12	0.06	0.09	0.06
MISCELLANEOUS DIGESTION									
47		N. Side Dumping Station, 3rd	--	--	--	--	--	--	--
48		S. Side Dumping Station, 3rd	--	--	--	--	--	--	--
49		Drum Filling Station, 1st	--	--	--	--	--	--	--
ASH RECEIVING									
50		Ash Receiver DeSmoke House	0.50	3.65	0.30	0.34	0.15	0.22	0.18

1/ All values reported are fraction of MPC (1×10^{-10} UCI/-1)