PDR

70-1257

EXXON NUCLEAR COMPANY, Inc.
RESEARCH AND TECHNOLOGY CENTER
2955 George Washington Way, Richland, Washington 99352
PHONE: (509) 943-7100

August 8, 1979

Mr. William T. Crow
Division of Fuel Cycle & Material Safety
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Required Reporting of Effluents Under 10 CFR 70.59

License No. SNM-1227
Docket No. 70-1257

Dear Mr. Crow:

Exxon Nuclear Company, Inc. operates a fuels fabrication plant under U. S. Nuclear Regulatory Commission License No. XNM-1227 at 2101 Horn Rapids Road in Richland, Washington 99352. The discharges from this plant are listed as required by the regulations for the reporting period of January 1, 1979 through June 30, 1979.

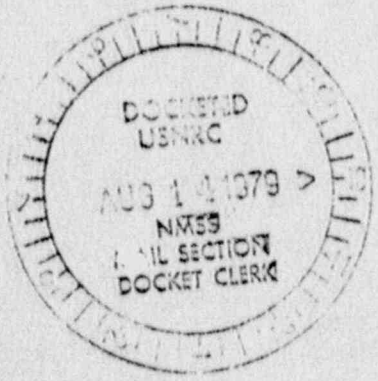
Uranium Released to the Atmosphere	20.68 µCi
Plutonium Released to the Atmosphere	0.03 µCi
Uranium Released to the Public Sewer	2.66 mCi
Plutonium Released to the Public Sewer	0.0 µCi

Attached is a copy of this information as required by 10 CFR 70.59.

Sincerely,

W. S. Nechodom, Manager
Licensing and Compliance

WSN:HPE:gf
Attachment
As noted



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RADIOACTIVE MATERIAL RELEASES DURING FIRST HALF OF 1979

QTR.	EXHAUST AIR VOLUME (cm^3)	ALPHA ACTIVITY (μCi) Pu	U
1	5.8417338×10^{14}	0.0210	12.0221
2	5.9673095×10^{14}	0.0100	8.6576

QTR.	VOLUME OF LIQUID EFFLUENT (liters)	MATERIAL (grams) Pu	U	ALPHA ACTIVITY (μCi)
1	151,375,826	< MDA*	1772	2660
2	163,072,094	< MDA*	< MDA*	< MDA*

* Less than minimum detectable amount.

QTR.	SOLID WASTE (Grams) SCRAP FUEL ≤ 3% ENRICHED	HEPA FILTERS ≤ 3% ENRICHED	ALPHA ACTIVITY (Ci) SCRAP FUEL	FILTERS
1	12 980	12 924	.0195	.0194
2	11 146	2710	.0167	.0041

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TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1979)

GASEOUS EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter	Quarter	Est. Total Error, %
A. Fission & activation gases N. A.				
1. Total release	Ci	E	E	E
2. Average release rate for period	μCi/sec	E	E	
3. Percent of Technical specification limit	%	E	E	
B. Iodines N. A.				
1. Total iodine-131	Ci	E	E	E
2. Average release rate for period	μCi/sec	E	E	
3. Percent of technical specification limit	%	E	E	
C. Particulates		(1)	(2)	
1. Particulates with half-lives >8 days	Ci	1.2 E-5	6.7 E-6	±5.0 E0
2. Average release rate for period	μCi/sec	9.3 E-5	1.1 E-6	
3. Percent of technical specification limit	%	4.1 E0	2.9 E0	
4. Gross alpha radioactivity	Ci	1.2 E-5	6.7 E-6	
D. Tritium N. A.				
1. Total release	Ci	E	E	E
2. Average release rate for period	μCi/sec	E	E	
3. Percent of technical specification limit	%	E	E	

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TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1979)

GASEOUS EFFLUENTS–ELEVATED RELEASE

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
1. Fission gases	N. A.				
krypton-85	Ci	E	E	E	E
krypton-85m	Ci	E	E	E	E
krypton-87	Ci	E	E	E	E
krypton-88	Ci	E	E	E	E
xenon-133	Ci	E	E	E	E
xenon-135	Ci	E	E	E	E
xenon-135m	Ci	E	E	E	E
xenon-138	Ci	E	E	E	E
Others (specify)	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
unidentified	Ci	E	E	E	E
Total for period	Ci	E	E	E	E
2. Iodines	N. A.				
iodine-131	Ci	E	E	E	E
iodine-133	Ci	E	E	E	E
iodine-135	Ci	E	E	E	E
Total for period	Ci	E	E	E	E
3. Particulates		(1)	(2)		
strontium-89	Ci	E	E	E	E
strontium-90	Ci	E	E	E	E
cesium-134	Ci	E	E	E	E
cesium-137	Ci	E	E	E	E
barium-lanthanum-140	Ci	E	E	E	E
Others (specify)	Ci	E	E	E	E
U	Ci	1.2 E-5	8.7 E-6	E	E
Pu	Ci	2.1 E-5	1.0 E-6	E	E
unidentified	Ci	E	E	E	E

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TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1979)

GASEOUS EFFLUENTS–GROUND-LEVEL RELEASES N. A.

Nuclides released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter	Quarter	Quarter	Quarter
1. Fission gases					
krypton-85	Ci	E	E	E	E
krypton-85m	Ci	E	E	E	E
krypton-87	Ci	E	E	E	E
krypton-88	Ci	E	E	E	E
xenon-133	Ci	E	E	E	E
xenon-135	Ci	E	E	E	E
xenon-135m	Ci	E	E	E	E
xenon-138	Ci	E	E	E	E
Others (specify)	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
unidentified	Ci	E	E	E	E
Total for period	Ci	E	E	E	E
2. Iodines					
iodine-131	Ci	E	E	E	E
iodine-133	Ci	E	E	E	E
iodine-135	Ci	E	E	E	E
Total for period	Ci	E	E	E	E
3. Particulates					
strontium-89	Ci	E	E	E	E
strontium-90	Ci	E	E	E	E
cesium-134	Ci	E	E	E	E
cesium-137	Ci	E	E	E	E
barium-lanthanum-140	Ci	E	E	E	E
Others (specify)	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
unidentified	Ci	E	E	E	E

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TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1979)

LIQUID EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter	Quarter	Est. Total Error, %
A. Fission and activation products N.A.				
1. Total release (not including tritium, gases, alpha)	Ci	. E	. E	. E
2. Average diluted concentration during period	µCi/ml	. E	. E	
3. Percent of applicable limit	%	. E	. E	
B. Tritium N.A.				
1. Total release	Ci	. E	. E	. E
2. Average diluted concentration during period	µCi/ml	. E	. E	
3. Percent of applicable limit	%	. E	. E	
C. Dissolved and entrained gases N.A.				
1. Total release	Ci	. E	. E	. E
2. Average diluted concentration during period	µCi/ml	. E	. E	
3. Percent of applicable limit	%	. E	. E	
D. Gross alpha radioactivity		(1)	(2)	
1. Total release	Ci	2.66 E-3	0.0 E	25.0 L0
E. Volume of waste released (prior to dilution) (diluted)	liters	1.521 8	1.631 8	25.0 L0
F. Volume of dilution water used during period	liters	. E	. E	. E

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TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1975

LIQUID EFFLUENTS

Nuclides Released		Unit	CONTINUOUS MODE Quarter (1)	Quarter (2)	BATCH MODE Quarter	Quarter
strontium-89	N.A.	Ci	E	E	E	E
strontium-90		Ci	E	E	E	E
cesium-134		Ci	E	E	E	E
cesium-137		Ci	E	E	E	E
iodine-131		Ci	E	E	E	E
cobalt-58		Ci	E	E	E	E
cobalt-60		Ci	E	E	E	E
iron-59		Ci	E	E	E	E
zinc-65		Ci	E	E	E	E
manganese-54		Ci	E	E	E	E
chromium-51		Ci	E	E	E	E
zirconium-niobium-95		Ci	E	E	E	E
molybdenum-99		Ci	E	E	E	E
technetium-99m		Ci	E	E	E	E
barium-lanthanum-140		Ci	E	E	E	E
cerium-141	N.A.	Ci	E	E	E	E
Other (specify)		Ci	E	E	E	E
U		Ci	E	E	E	E
Pu		Ci	2.66 1-3	0.0	E	E
		Ci	0.0	0.0	E	E
unidentified	N.A.	Ci	E	E	E	E
Total for period (above)		Ci	2.661-3	0.01	E	E
xenon-133	N.A.	Ci	E	E	E	E
xenon-135	N.A.	Ci	E	E	E	E

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TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) (1979)

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of waste	Unit	6 month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3		
	Ci		1
b. Dry compressible waste, contaminated equip, etc.	m^3		
	Ci		E
c. Irradiated components, control rods, etc.	m^3		
	Ci		E
d. Other (describe) HEPA air filters and unrecoverable fuel material	m^3		
	Ci	5.97E-2	1.0 E 0

2. Estimate of major nuclide composition (by type of waste)

a.	Ci	
	Ci	
	Ci	
b.	Ci	
	Ci	
	Ci	
c.	Ci	
	Ci	
	Ci	
d. Natural uranium enriched up to 3 w/o in U-235		10.0 E 2

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
8	Overland (Motor Freight)	Nuclear Engineering Co. (Hanford Disposal Site)

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination

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AVERAGE ALPHA CONCENTRATION = $\mu Ci / ml$

QTR. 1: $12.0431\ \mu Ci / 5.8417338 \times 10^{14}\ ml$
$= 2.0615626 \times 10^{-14}\ \mu Ci/ml$

QTR. 2: $8.6676\ \mu Ci / 5.9673095 \times 10^{14}\ ml$
$= 1.4525139 \times 10^{-14}\ \mu Ci/ml$

NRC LIMIT = $5 \times 10^{-12}\ \mu Ci/ml$
ENC LIMIT = $5 \times 10^{-13}\ \mu Ci/ml$

MEAN CONCENTRATION COMPARED TO ENC LIMIT FOR TABLE 1A
Percent of Tech. Spec. Limit:

QTR. 1: $\left(2.0616 \times 10^{-14}\ \mu Ci/ml \,/\, 5 \times 10^{-13}\ \mu Ci/ml\right) \times (100)$

$= 4.1\ \%$

QTR. 2: $\left(1.4525 \times 10^{-14}\ \mu Ci/ml \,/\, 5 \times 10^{-13}\ \mu Ci/ml\right) \times (100)$

$= 2.9\ \%$

WASTE SHIPMENTS (FILTERS & SCRAP FUEL)

1st. QTR. (5 SHIPMENTS)

238	Drums	=	12 980 grams	3% U =	.0195 Ci
572	Filters	=	12 924 grams	3% U =	.0194 Ci

2nd. QTR. (3 SHIPMENTS)

196	Drums	=	11 146 grams	3% U =	.0167 Ci
196	Filters	=	2710 grams	3% U =	.0041 Ci

WASTE LIQUID EFFLUENT

1st. Qtr. 1.2 ppm in 1, 476, 228 liters

$[1.2 \times 10^{-6}] \times [1\ 476\ 228\ l] \times 1000$ grams/l = 1771.5 grams U

3% U = 1.5 μCi / gram

[1.5 μCi /gram] × [1771.5 grams] = 2660 μCi

Total volume = 151, 375, 826 liters

2nd. Qtr.

U & Pu less than minimum detection limit in 163, 072, 094 Liters of liquid waste discharge during the 2nd Qtr.