ATTACHMENT No. 2 TO JPN-84-17

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

Proposed Disposal Procedures for Radioactively Contaminated Fuel Oil

1.0 INTRODUCTION

In accordance with the provisions of 10 CFR 20.302(a), this document describes procedures proposed by the New York Power Authority for the incineration of radioactively contaminated fuel oil at the James A. FitzPatrick Nuclear Power Plant.

2.0 DESCRIPTION OF LICENSED MATERIAL

Seven 55-gallon drums filled with #6 fuel oil have become contaminated with very low levels of Co-60 and Cs-137. The total activity of these drums is approximately 51 micro Ci.

This contaminated fuel oil was recovered from the Auxiliary Boiler Room Floor Drain Oil Separator. (Refer to Table 1.)

2.1 Other Radioactive Material Involved

No other radioactive material will be involved.

2.2 Proposed Manner and Conditions of Disposal

The oil will be incinerated in the auxiliary boilers at the Authority's James A. FitzPatrick Nuclear Power Plant. The contaminated oil will be transferred from seven, fifty-five gallon drums to underground auxiliary boiler storage tank 1A where it will be used as fuel for the boilers. The auxiliary boiler storage tank has a capacity of 30,000 gallons which will further dilute the contaminated fuel oil. The average burn rate of fuel oil in an auxiliary boiler is 165 gal/hr (the maximum burn rate is 496.2 gal/hr). The gases are vented through a boiler outlet equipped with a dust collector and a fly-ash collection system.

No special conditions will be imposed on auxiliary boiler operation.

The release of the particulates will be included in the appropriate seminannual report as a batch release occurring on the day that the drum's contents were added to the fuel oil tank.

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Alternate Disposal Costs

Disposal of fuel oil by this method will save approximately $25,000 in burial costs (including absorbant material, preparation and handling time and transportation fees) and will save approximately 250 cubic feet of space in a commercial waste-disposal site.

Table 2 describes our estimate of the disposal costs associated with burial.

2.3 Analysis and Evaluation

Radiological Effects

Using the current Technical Specification formula for particulate and halogen airborne releases to the environment, a 51 micro Ci release would result in a maximum of 20.5% of Technical Specifications limits. Based upon actual quarterly releases, this release would result in an average percentage increase of 0.007% percent.

No credit is taken for treatment of releases in the exhaust path and the assumption is that the contaminated oil would be burned and the total activity released in approximately three-quarters of an hour.

The instantaneous release rate to the environs of I-131 equivalent halogen and particulates with half-lives greater than eight days is limited by Environmental Technical Specification Section 2.3.B.2. The portion of the formula limiting ground level releases from FitzPatrick is:

$$\frac{}{} + \frac{}{} + (Q_V FITZ/8.9E\text{-}8) \leq 1$$

and the estimated duration of the release assuming no dilution and boiler at maximum firing rate is:

(385 gals ÷ 496.2 gal/hr) x 3600 sec/hr = 2793 sec

therefore, assuming no dilution and boiler operating at maximum firing rate, the maximum instantaneous release is:

$$\frac{51E\text{-}6 \text{ Ci}/2.79E+3 \text{ sec}}{8.9E\text{-}8} = 0.205$$

or approximately 20.5% for 0.78 hours.

When averaged over a calendar quarter in accordance with semiannual radiological effluent reporting requirements, that average is:

$$\frac{51E\text{-}6 \text{ Ci}/7.78E+6 \text{ sec}}{8.9E\text{-}8} = 7.36E\text{-}5\%$$

or approximately 0.007%.

FitzPatrick Tecnnical Specifications currently limit tne dose to persons witnin unrestricted areas to 500 mrem/yr. This limit applies to whole body or any organ doses from airborne halogens and particulates with half-lives greater than eight days. This limit applies to releases from the main stack and vents of both FitzPatrick and Nine Mile Point Unit 1. The dose attributable to the proposed contaminated oil is calculated as follows:

500 mrem/yr. x 7.36E-5% = 3.68E-2 or approximately 0.04 mrem/yr.

A second calculation using tne draft ODCM (Offsite Dose Calculation Manual) methodology agreed with tne whole body or any organ dose of 0.04 mrem within ± 25%.

The following is an estimation of residual radioactive material of tne tank assuming that tne 385 gallons is thoroughly mixed with the contents of a full Fuel Oil Tank 1A.

$$\text{Activity of tank} = \frac{5[illegible]\ \mu Ci\ \ (Co\text{-}60 + Cs\text{-}137)}{30{,}000\ gal \times 3{,}785\ ml/gal}$$

$$= 4.49E\text{-}7\ \mu Ci/ml$$

If tne content of the tank is completely used (burned) assume that oil 1 cm thick will cling to the tank walls.

$$\text{Contamination} = 4.49E\text{-}7\ \mu Ci/cc \times 2.22E+6\ dpm/\mu Ci \times 100\ cm$$

$$= 9.97E+1\ \ dpm/100\ cm^2$$

Disc smears are approximately 20% efficient; tnerefore measurable smearable activity would be:

$$\text{Smearable contamination} \cong 100\ dpm/100\ cm^2 \times 0.20$$

$$\cong 20\ dpm/100\ cm^2$$

The plant's unrestricted area smearable contamination limit is 1,000 dpm/100 cm^2.

Nature of Environment

Refer to the James A. FitzPatrick Final Safety Analysis Report (FSAR), Chapter 2 (Site and Environment) for pertinent information as to the nature of the environment, including topographical (Section 2.1.1), geological (Section 2.5), meteorological (Section 2.2), hydrological (Section 2,4) characteristics; usage of ground and surface waters in the general area (Sections 2.1.2, 2.4.1 and 2.4.2) and location of other potentially affected facilities (Section 2.1.3).

2.4 Procedures to Minimize Risk of Unexpected or Hazardous Exposures

Prior to transferring the contents of the seven fuel oil drums to Fuel Oil Tank 1A, a sample from each drum will be taken. These samples will be subjected to Ge"Li" isotopic analysis. Analysis results will be compared with prior samples to ensure accuracy and consistency.

Other than this analysis, the Authority does not propose using any special procedures related to the incineration of this fuel oil. The analysis presented in Section 2.3 of this document clearly shows that the incineration of this fuel oil represents an insignificant change in the amount of radioactive effluents released and no significant environmental impact can be attributed to the proposed action. Therefore no special procedures are proposed.

3.0 REFERENCES

1. Code of Federal Regulations, Title 10, Part 20.302, "Method for obtaining approval of proposed disposal procedures."

2. 10 CFR 20.305, "Treatment or disposal by incineration."

3. USNRC Office of Inspection and Enforcement Information Notice No. 83-05, "Obtaining Approval for Disposing of Very-Low-Level Radioactive Waste - 10 CFR Section 20.302," dated February 24, 1983.

4. NRC Policy Statement on Low-level Waste Volume Reduction, October 16, 1981 - 46 FR 51100.

5. 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste," July 24, 1981 - 46 FR 38031.

6. James A. FitzPatrick Nuclear Power Plant Environmental Technical Specifications, Section 2.3.B, "Airborne Effluents."

7. James A. FitzPatrick Nuclear Power Plant Final Safety Analysis (FSAR), Revision 0 dated July 1982, Chapter 2, "Site and Environment."

TABLE 1

#6 FUEL OIL SAMPLE AND ANALYSIS
JANUARY 11, 1983

Waste Oil Labeled As	μCi/ml		Total Activity in μCi	
	Co-60	Cs-137	Co-60	Cs-137
#1	3.37E-5	ND*	7.02	ND
#3	3.44E-5	ND	7.16	ND
#4	3.77E-5	ND	7.85	ND
#5	1.49E-5	ND	3.10	ND
#6	5.31E-5	ND	11.05	ND
#7	4.70E-6	ND	0.98	ND
#8	6.14E-5	4.40E-6	12.78	0.92
		TOTAL	49.94	0.92

*ND-Not Detected

TABLE 2

COST OF BURIAL DISPOSAL OF
SEVEN DRUMS OF NUMBER 6 FUEL OIL

Solidification Cost	7 drums of #6 oil x $\frac{10 \text{ solidified drums}}{\text{drum of \#6 oil}}$ x \$130/drum	= \$ 9,100
Burial Cost	70 drums x $\frac{7.5 \text{ cu. ft.}}{\text{drum}}$ x \$18.97/cu ft	= 9,960
Labor Cost	20 hours x $\frac{\$ 15.60}{\text{hour}}$	= 300
Transportation		= 5,000
	TOTAL	\$24,360

Notes for Table 2:

a. Because of the viscosity of #6 fuel oil, "Speedy Dry" type absorbants cannot be used. Instead, contractors are retained to perform the required solidification. Based upon previous experience, the cost for solidifying #6 oil using concrete, soaps, etc., is approximately $130 per solidified drum.

b. For the purpose of estimation, a 10:1 solidification factor is used.

c. The current cost of burial is $18.97/cubic foot.

d. 20 man-hours would be expended for preparing the load for shipment at an average rate of $15.60/hr.

e. Transportation cost is approximately $5,000.