REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8712090004 DOC. DATE: 87/11/30 NOTARIZED: NO DOCKET #
FACIL: 50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270
50-287 Oconee Nuclear Station, Unit 3, Duke Power Co. 05000287
AUTH. NAME AUTHOR AFFILIATION
TUCKER, H. B. Duke Power Co.
RECIP. NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Forwards addl info re elevated levels of radiocesiums in environ per 870923 NRC request.

DISTRIBUTION CODE: IE23D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8
TITLE: Environmental Event Report (per Tech Specs)

NOTES: AEOD/Ornstein: 1cy. 05000269
AEOD/Ornstein: 1cy. 05000270
AEOD/Ornstein: 1cy. 05000287

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD2-3 LA	1	0	PD2-3 PD	1	1
	PASTIS, H	1	1			
INTERNAL:	AEOD/DOA	1	1	AEOD/DSP/TPAB	1	1
	AEOD/PTB	1	1	NRR/DEST/ADE	1	1
	NRR/DOEA/EAB	1	1	NRR/DREP/EPB	1	1
	NRR/DREP/RPB	1	1	NRR/PMAS/ILRB	1	1
	NRR/PMAS/PTSB	1	1	OGC/HDS2	1	1
	REG FILE	1	1	RGN2 FILE 01	1	1
	RGN2/DRSS/EPRPB	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			
NOTES:		1	1			

TOTAL NUMBER OF COPIES REQUIRED: LTTR 20 ENCL 19

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

November 30, 1987

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287
Elevated Levels of Radiocesiums in the Environment
Additional Information

Dear Sir:

By a letter dated September 23, 1987, the NRC transmitted to Duke power Company a request for additional information concerning elevated levels of radiocesiums in the environment. Please find this information attached. If there are additional questions, please contact us.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

WHM/1037/sbn

Attachment

xc: Dr. J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Ms. Helen Pastis
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. J. C. Bryant
NRC Resident Inspector
Oconee Nuclear Station

IE23
1/1

OCONEE NUCLEAR STATION
ELEVATED LEVELS OF RADIOCESIUMS IN THE ENVIRONMENT
ADDITIONAL INFORMATION

Request #1

As stated on page 1 of Reference 1, Duke Power Company (DPC) has monitored groundwater at the Oconee Nuclear Power Plant, although the plants Technical Specifications do not require such monitoring. Accordingly, DPC submitted some groundwater sampling data (Attachment 2 of Reference 1) which show that migration from the chemical treatment ponds is not significant. Since the data do not cover all of the years that the Oconee Nuclear Power Plant has operated, confirm that Attachment 2 of Reference 1 lists the principal groundwater sampling data obtained by DPC, or, if appropriate, state that data for the years prior to 1985 would still lead to the same conclusion (i.e., migration of radionuclides from the chemical treatment ponds would not lead to exposure of a member of the public to a large fraction of the annual dose design objectives). If there are other data that would lead to a different conclusion, then provide such data.

Response:

Prior to the implementation of Appendix I Technical Specification, bottom sediment and aquatic vegetation were also sampled at the tailrace and Highway 183 bridge. The station has approximately 8 years of trended data for these samples which does not demonstrate any positive trends for activity. Duke concludes that migration of radionuclides from the chemical treatment ponds would not lead to exposure of a member of the public to a large fraction of the annual dose design objectives. Groundwater sampling data from environmental monitoring, since 1985, shows that migration of radionuclides from the chemical treatment ponds into groundwater is insignificant and that data from years prior to 1985 would still lead to the same conclusion.

Request #2:

Attachments 8 and 10 of Reference 1 compare estimated concentrations of Cs-134 and Cs-137, respectively, in fish with the mean measured concentrations over the years 1976 through 1985. Supposedly, these attachments provide evidence that use of Oconee's Offsite Dose Calculation Manual (ODCM), which is based on the Regulatory Guide 1.109 model (hereinafter referred to as the RG model), is more likely to lead to overestimates of radiocesiums in fish rather than underestimates. However, the comparisons of the RG calculated concentrations with the mean measured values at large distances from the plant may not be valid if realistic dilution factors were not used in the analysis. Since the location of the sampling sites changed over the years (from 4.2 miles south southeast of the plant (i.e., location #067) to 0.8 miles east southeast (i.e., location #063)), it would appear that any additional dilution provided by the receiving water body should be taken into account before comparing the mean values at one location with the ODCM estimated values. Presumably, the estimated concentrations of radiocesiums in fish would be higher at the plant discharge area than at location #067. Based on the data contained in Tables 1 and 2 of Attachment 12, it does not appear that the additional dilution provided by the receiving water body was taken into account.

(a) Provide the additional dilution factors that were used in the subject calculations, or

(b) If the additional dilution of the receiving water body was not taken into account, then revise Attachments 8 and 10 accordingly. Provide the basis for the estimates. The revised attachments should show ODCM estimated concentrations for each sampling location.

Response:

The dilution model used in the subject calculations does not account for any additional dilution by receiving waters at location #067, which is 4.2 miles south of the plant. However, the ODCM estimated fish concentrations provided in Attachments 8 and 10 of DPC's April 17, 1987 letter to NRC are not significantly affected by accounting for additional dilution. This is explained by considering the negligible amount of additional dilution realistically present at location #067 over that estimated at the plant discharge area.

Although there is no actual measured data available indicating flow past location #067 (reference Figure 1), an estimate of this flow can be calculated based on major flow contributors. The major flow contributors identified are releases past Keowee Dam just upstream of Oconee, leakage flow past Little River Dam, and rain runoff contributed downstream of Keowee and Little River Dams and upstream of location #067. The average flow past Keowee Dam (i.e., reported) is approximately 1170 CFS. The average flow past Little River Dam is estimated to be <1CFS (identified leakage flow). A best guess estimate for the rain water runoff contribution is <50 CFS (assumes 2.5 CFS/mile^2 runoff and a 20 mile^2 watershed area). Therefore, the total flow past location #067 is estimated to be 1220 CFS, or less than 5% higher than the dilution flow assumed in developing the ODCM estimated fish concentrations provided in the above referenced attachments. Using this higher dilution flow value would reduce the ODCM fish concentration estimates by less than 5%.

Request #3:

In view of DPC's response to Question 2, provide a basis for maintaining that the models in the ODCM are sufficiently conservative for predicting doses to individuals from fish consumption, or commit to revising the dose calculation models for consumption of fish. If DPC decides to revise the models, then provide a schedule for submitting the revised ODCM for NRC's review. In revising the ODCM, DPC should determine whether the models for consumption of fish need to be revised for any other radionuclides.

Response:

A 5% reduction in the ODCM fish concentration estimates presented in Attachments 8 and 10 of DPC's April 17, 1987 letter to NRC would not alter the conclusion that the ODCM models are sufficiently conservative for predicting doses to individuals from fish consumption.

Requests #4 & #5:

In regard to the chemical treatment ponds, DPC did not state whether the radioactive inventory limit on CTP-1 and CTP-2 is applicable to each pond, or the sum of the activities of both ponds. In addition, based on the descriptive material provided by DPC (see Reference 1, pages 6 and 7), it is not clear that DPC includes radionuclides deposited in the pond as part of the pond inventory. Describe the method by which DPC keeps track of the total quantities of radionuclides in CTP-1 and CTP-2 to assure conformance with the inventory limits in TS 3.9.4. Compare the estimated quantities of radionuclides in each pond (i.e., in the water and in the sediment) with the inventory limits, and provide the basis for the estimates.

Provide similar estimates (and their basis) for CTP-3.

Response:

The radionuclide inventory limit for CTP-1 and CTP-2 is for the sum of the activities of both ponds. Radionuclides deposited in the ponds are included as part of the pond inventory. In order to assure conformance with the technical specification limits, the following methods are used to track the total quantities of radionuclides in CTP-1 and CTP-2. Attachment 1 describes the bases for activity limits. This includes the CTP technical specification limits.

According to Technical Specifications, no batch of used Powdex resin shall be transferred to the CTP unless the preceding batch from a cell on the same unit contains less than 0.1% of the CTP inventory limit. After a primary to secondary leak is detected, the initial batch of used Powdex resin from the affected unit shall not be transferred to the CTP. Also, according to Technical Specifications, the isotope inventory per batch of used Powdex resin transferred, average over the transfers of the previous 13 weeks, shall not exceed 0.01% of the CTP isotope inventory limit. Decay of isotopes may be taken into account in determining inventory levels. A request was made in a March 3, 1987 letter to the NRC to revise this technical specification requirement to better describe how Oconee is to comply with established limits.

Decants from the Powdex Batch Tank or Powdex sump water should not be transferred to the CTP unless the resulting activity in the CTP is less than the limits in 10 CFR 20, Appendix B, Table II, Column 2 for isotopes with half lives less than ten (10) days and one tenth (0.1) these limits if the isotope half life is greater than ten days. To insure that the above requirements are met, the activity input into the CTP will be limited to 0.01% of the CTP isotope inventory limit (A_j).

A computer program is available at the station that will generate all the necessary weekly reports. These reports include the Weekly Powdex Backwash Summary, CTP Radionuclide Inventory, 13-Week Resin Batch Average, and an Environmental Summary.

Attachment 2 is a comparison of the combined Environmental CTP Radionuclide Inventory with the inventory limits. CS-137 demonstrated that 15% of the limit was used. Other isotopes made insignificant contributions.

As for CTP-3, there is no applicable inventory. Conservatively, it is assumed that all contaminated effluents entering CTP-3 are assumed to pass directly to Lake Hartwell, even though slight amounts of activity are expected to deposit in the pond sediment. The radionuclides inventory at CTP-3 contains about 0.11% of Cs-134 and 0.05% of Cs-137 compared to the limit for CTP-1 and CTP-2 as discussed in page 7 of the April 10, 1987 submittal.

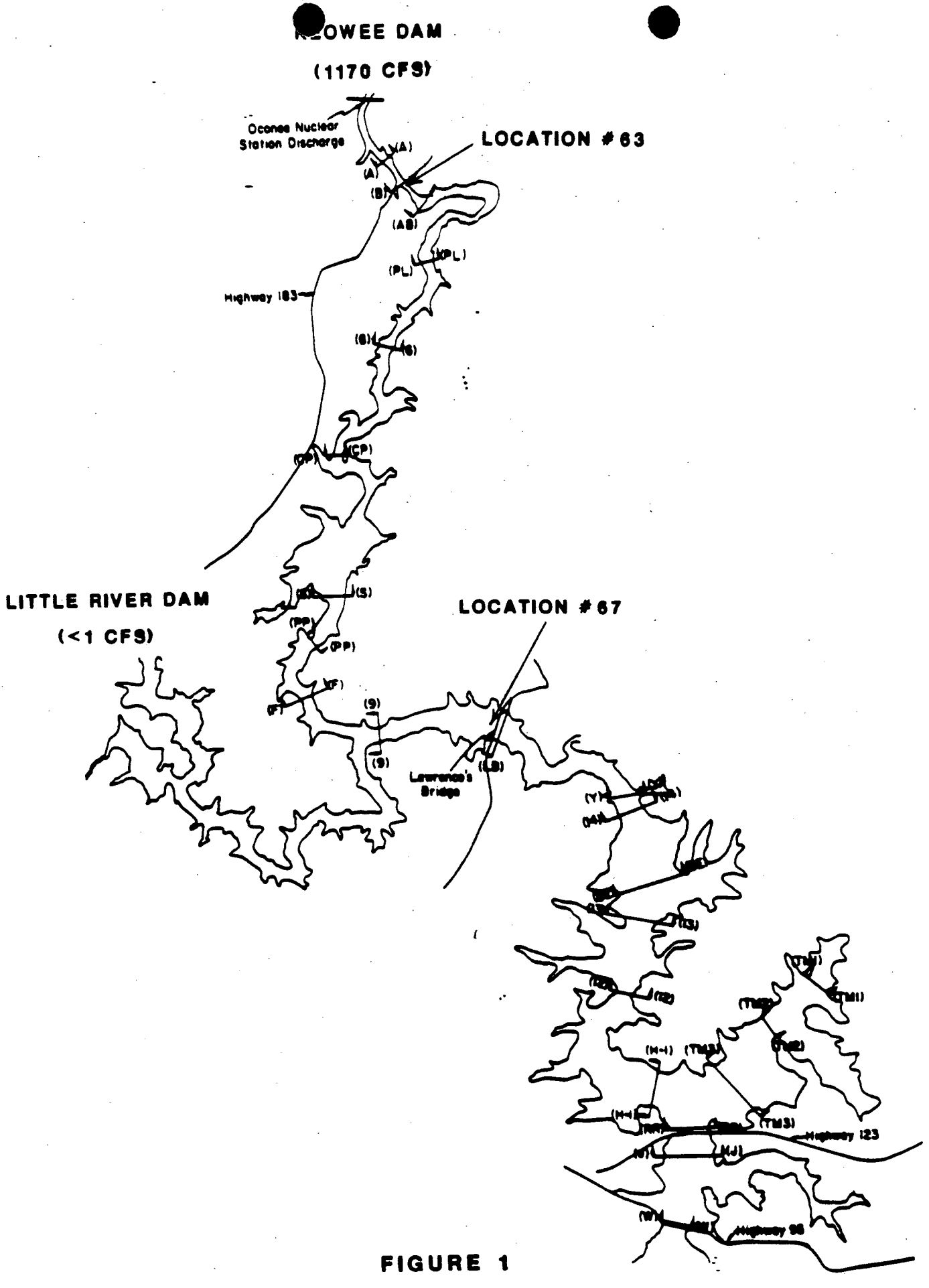
KEOWEE DAM
(1170 CFS)
Oconee Nuclear Station Discharge
LOCATION # 63
Highway 183
LITTLE RIVER DAM
(<1 CFS)
LOCATION # 67
Lawrence's Bridge
Highway 123
Highway 98

FIGURE 1

Attachment 1

BASES FOR ACTIVITY LIMITS

- Bases for Technical Specification Section 3.9

The inventory limits of the Chemical Treatment Ponds are based on limiting the consequences of an uncontrolled release of the pond inventory. The short term rate limit (2 mrem/hr) of 10 CFR 20.105 is applied to 10 CFR 20.16 in the following expression:

$$\frac{\frac{A_j}{1.3 \times 10^6 \text{ gal}}}{C_j} \times \frac{10^6 \text{ μCi}}{\text{curie}} \times \frac{\text{gal}}{3785 \text{ ml}} \leq \frac{2 \text{ mrem/hr}}{500 \text{ mrem/yr}} \times \frac{8760 \text{ hr.}}{\text{yr}}$$

or

$$\frac{A_j}{C_j} \leq 1.7 \times 10^5$$

where A_j = CTP inventory limit for radionuclide "j" (curies)

C_j = 10 CFR 20 Appendix B, Table II, Column 2 concentration for radionuclide "j"

1.3×10^6 gal = estimated volume of smaller CTP

The batch limits provide assurance that activity input to the CTP will be minimal.

- CTP Technical Specification Limits

The quantity of radioactive material in the CTPs (1 and 2) shall be limited so that, for all isotopes identified, excluding noble gases and tritium, the sum of the ratios of activity (in curies) to the limits in 10 CFR 20, Appendix B, Table II, Column 2 shall not exceed 1.7×10^5.

$$\sum_j \frac{A_j}{C_j} \leq 1.7 \times 10^5$$

where A_j = CTP inventory limit for single isotope "j" (curies)

C_j = 10 CFR 20, Appendix B, Table II, Column 2, concentration (soluble or insoluble, whichever is more conservative) for single isotope "j".

Attachment 2

ENVIRONMENTAL CTP RADIONUCLIDE INVENTORY

ISOTOPE	INVENTORY, MCI	LIMIT, MCI	PERCENTAGE OF LIMIT USED	LIMIT NOT USED, MCI
I-131	3.3	0.43E+05	0.0%	0.43E+05
I-133	0.0	0.14E+06	0.0%	0.14E+06
CS-134	77.5	0.13E+07	0.0%	0.13E+07
CS-137	511505.3	0.34E+07	15.0%	0.29E+07
CO-58	6.5	0.13E+08	0.0%	0.13E+08
CO-60	3046.3	0.43E+07	0.1%	0.43E+07
MN-54	30.5	0.14E+08	0.0%	0.14E+08
CS-136	0.7	0.87E+07	0.0%	0.87E+07
CO-57	2.0	0.58E+08	0.0%	0.58E+08
BA-140	0.7	0.29E+07	0.0%	0.29E+07
ZR-95	5.6	0.87E+07	0.0%	0.87E+07
NB-95	2.6	0.14E+08	0.0%	0.14E+08
SE-59	3.6	0.72E+07	0.0%	0.72E+07
AG-110M	5.9	0.43E+07	0.0%	0.43E+07
CR-51	2.5	0.29E+09	0.0%	0.29E+09
TRITIUM	0.0	0.43E+09	0.0%	0.43E+09