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REC: CASE E G NRC	ORG: PARKER W O DUKE PWR	DOCDATE: 04/27/78 DATE RCVD: 05/04/78
DOCTYPE: LETTER SUBJECT: FURNISHING INFO (DEMINERALIZERS T(FACILITY. W/ATT WATER COLLECTION	NOTARIZED: NO CONCERNING LOW LEVEL RADIOACTI THE ONSITE WASTE WATER COLLE TABLE OF REVISED ISOTOPIC INV BASINS.	COPIES RECEIVED LTR 1 ENCL 1 VITY FROM SECONDARY POLISHING CTION BASINS AT SUBJECT ENTORY LIMITS FOR THE WASTE
PLANT NAME: OCONEE OCONEE OCONEE	I - UNIT 1 I - UNIT 2 I - UNIT 3	REVIEWER INITIAL: XUM DISTRIBUTER INITIAL:
***	DISTRIBUTION OF THIS MATERIA	L IS AS FOLLOWS *************
NOTES: 1. M. CUNNINGHAM CHANGE REQUEST (DISTRIBUTION FOR ACTION:	- ALL AMENDMENTS TO FSAR AND (S FOR ENVIRON TECH SPECS (APP) CODE COO4) BD CHIEF RETOXXM/5 ENCI	CHANGES TO TECH SPECS END B)
INTERNAL:	ERCENTER W/ENCL I & E**W/2 ENCL GOSSICK & STAFF**W/ENCL EISENHUT**LTR ONLY J MCGOUGH**W/ENCL BALLARD**W/ENCL J COLLINS**W/ENCL	NRC PDR**W/ENCL OELD**W/ENCL HELTEMES**W/ENCL EEB**W/ENCL DENTON & MULLER**LTR ONLY VOLLMER**LTR ONLY KREGER**W/ENCL
EXTERNAL:	LPDR'S WALHALLA, SC**W/ENCL NATL LAB ORNL**W/3 ENCL NSIC**W/ENCL TIC**W/1 ENCL ACRS CAT B**W/16 ENCL	

DISTRIBUTION: SIZE: 2P+3P

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CONTROL NER:

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THE END

FORY DOCKET FILE COPY POWER BUILDING 422 South Church Street, Charlotte, N. C. 28242

April 27, 1978

DUKE POWER (

WILLIAM O. PARKER, JR. VICE PRESIDENT STEAM PRODUCTION

TELEPHONE: AREA 704 373-4083

Mr. Edson G. Case, Acting Director Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission Washington, D. C. 20555

Oconee Nuclear Station RE: Docket Nos. 50-269, -270, -287

Dear Sir:



1978

My letters of December 2, 1976 and August 4, 1977, addressed the desposal of low level radioactivity from secondary polishing demineralizers (the powdex system) to the onsite waste water collection basins at Oconee Nuclear Station. Specific isotopic limits were identified for the collection basins which were based on the following criteria:

- The amount of radioactivity expected to be routinely released as a (1)result of maintaining the inventory should be less than ten percent of the station's 10CFR50, Appendix I limits.
- The release of the entire contents of the waste water collection (2) basins should result in off-site doses below 10CFR20, Appendix B limits.

These duel criteria were specified to assure public health and safety were properly safeguarded and to minimize the impact of resin disposal on the normal operation of the basins for effluent chemical treatment. By establishing isotopic inventory limits based only on criterion (2) above, however, and by applying controls to the basin effluent to comply with radioactive discharge limits, public health and safety would continue to be adequately protected and overall station operating flexibility would be increased.

Accordingly, please find attached a table of revised isotopic inventory limits for the waste water collection basins based on assuring that an incident in which the contents of the basins are released results in off-site doses below 10CFR20 limits. The method of evaluating accident consequences has been revised based on our experience and a description of the method by which the limits were determined is also attached.

1004

Mr. Edson G. Case, Acting Director Page Two April 27, 1978

As stated in our August 4, 1977 letter, inventory of radioactive material retained within the basins at any given time is on Duke Power Company property and ultimate disposal will be addressed at a later date.

Very truly yours, 10. Tack William O. Parker, Jr

RLG:ge

Attachment



Attachment 1 Basis for Isotopic Limits

The previous accident limit was based on a model that assumed a flow through based on annual average pond inputs and homogenous mixing of the activity with the pond volumes. Samples taken from the ponds, however, indicate that there is not homogenous mixing - infact most of the activity settles out on the bottom of the ponds. Because of this it is felt that the homogenous mix continuous flow through model is not accurate. A more appropriate model would be one based on the more restrictive of the following cases:

- 1) 10CFR20.105 (b) (1) limit of 2 mrem/hr must not be exceeded
- 2) 10CFR20.105 (b) (2) limit of 100 mrem/7 consecutive days must
- not be exceeded
- 3) 10CFR20.106 (a) limits must not be exceeded
- 4) 10CFR20 App. B Table II concentrations must not be exceeded at the nearest surface water intake (Clemson) as per Standard. Review Plan section 15.7.3 - Postulated Radioactive Releases due to Liquid-Containing Tank Failures.

To determine the more restrictive of cases 1 & 2, the time for which an individual would be exposed to the spill must be calculated. For conservatism, minimum available river flow (dam leakage) of 40 cfs will be used. Also, for conservatism it will be assumed that all of the activity is contained in the smaller pond.

Pond volumes;	Waste water retention p	ond #1	1.34 E6 gal
• •	Oil collection basin		1.48 E6 gal 2.4 E6 gal

the total volume of the spill is there; 1.34 E6 gal +2.4 E6 gal 3.74 E6 gal

then, the time for this spill to pass a point in the river, i.e. the time a receptor would "see" the spill, is simply

 $3.74 \ \text{E6 gal} / 40 \ \text{cfs} = 3.47 \ \text{hr}$

From this it is clear that in that the receptor "sees" the spill for only 3.47 hours, case 1 will be more restrictive than case 2.

Case 1

A _i (curies) 3.74 E+6 gal	$\frac{10^6 \text{ uC}_{i}}{C_{i}}$	X <u>gal</u> 3785.7 ml	=	2mrem/hr 500mrem/yr	X	8760hr yr	х	Ci
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where: $A_i = pond$ inventory limit for isotope i, (curies) $C_i = 10CFR20$ App B, Table II, Col. 2 concentration for isotope i, (u C_i/m1)

then;

 $A_i = 4.96 E+5 C_i$

Shown to be less restrictive than case 1.

Case 3

Again, the time for which the receptor is exposed to the spill is 3.47 hours. The allowable release concentration is then

then,

$$C_{i} \times \frac{1 \text{ yr}}{3.47 \text{ hr}} \times \frac{8760 \text{ hr}}{\text{yr}} = \frac{A_{i} \text{ (curies)}}{3.74 \text{ E+6 gal}} \times \frac{10^{6} \text{ u } C_{i}}{C_{i}} \times \frac{\text{gal}}{3785.7 \text{ ml}}$$

$$A_{i} = 3.57 \text{ E+7 } C_{i}$$

This method is obviously not as restrictive as case 1.

Case 4

For this case, a dilution factor was conservatively calculated to be used to dilute the slug spill from Oconee to the Clemson water intake. See attached letter.

dilution factor = $4.6 \text{ E}-8/\text{ft}^3$

A_i (curies) x $\frac{10^6 \text{ u C}_i}{C_i}$ x 4.6 E-8/ft³ x $\frac{\text{ft}^3}{7.48 \text{ gal}}$ x $\frac{\text{gal}}{3785.7 \text{ ml}}$ = C_i $A_i = 6.16 \text{ E+5 C}_i$

This case is slightly less restrictive than case 1. Case 1, the peaking limit of 2 mrem/hr will then be used as the basis to calculate the new accident inventory limits.

This revised accident analysis results in the isotopic inventory limits listed in the following table.

Note:

This 2 mrem/hr peaking limit is actually a hypothetical limit based on daily average intake factors. It is imposed in order to assure that doses from the subject accident will be on the order of doses that are the intent of 10CFR20 regulations. The only truely accident assumption oriented limit would be

Case 2

Radionuclide Limits On Waste Water Collection Ponds

	Isotope	Accident Inventory Limit (Curice)
		inventory Entre (curies)
	Cr 51 Mn 54 Fe 59 Co 57 Co 58 Co 60	9.92 E+2 4.97 E+1 2.48 E+1 1.98 E+2 4.47 E+1 1.49 E+1
۰.	Sr 89 Sr 90	1.49 1.49 F-1
	Sr 91 Zr 95 Zr 97	2.48 E+1 2.98 E+1 9 92
	Nb 95 Nb 97 Mo 99	4.97 E+1 4.47 E+2 1 98 E+1
	Ru 103 Te 129m	3.97 E+1 9.92
	le 131m I 130 I 131	1.98 E+1 1.49
	I 131 I 132 I 133	1.49 E-1 3.97
	I 135 Cs 134	4.97 E-1 1.98 4.47
	US 136 Cs 137 Ba 140 La 140 Ce 143	2.98 E+1 9.92 9.92 9.92 9.92
	W 187	1.98 E+1 · 2.98 E+1