B 05/09/78

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL 50-269/270/287

REC: CASE E G ORG: PARKER W O DOCDATE: 04/27/78
NRC DUKE PWR DATE RCVD: 05/04/78

DOCTYPE: LETTER NOTARIZED: NO COPIES RECEIVED
SUBJECT: LTR 1 ENCL 1
FURNISHING INFO CONCERNING LOW LEVEL RADIOACTIVITY FROM SECONDARY POLISHING DEMINERALIZERS TO THE ONSITE WASTE WATER COLLECTION BASINS AT SUBJECT FACILITY...W/ATT TABLE OF REVISED ISOTOPIC INVENTORY LIMITS FOR THE WASTE WATER COLLECTION BASINS.

PLANT NAME: OCONEE - UNIT 1 REVIEWER INITIAL: XJM
OCONEE - UNIT 2 DISTRIBUTER INITIAL: mk
OCONEE - UNIT 3

********** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS **********

NOTES:
1. M. CUNNINGHAM - ALL AMENDMENTS TO FSAR AND CHANGES TO TECH SPECS

CHANGE REQUESTS FOR ENVIRON TECH SPECS (APPEND B)
(DISTRIBUTION CODE C004)

FOR ACTION: BR CHIEF REID**W/5 ENCL

INTERNAL:
REG FILE**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: LTR 43 ENCL 40 CONTROL NBR: 781240040
SIZE: 2P+3P

********** THE END **********

DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

April 27, 1978

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

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

Dear Sir:

My letters of December 2, 1976 and August 4, 1977, addressed the disposal 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:

(1) The amount of radioactivity expected to be routinely released as a result of maintaining the inventory should be less than ten percent of the station's 10CFR50, Appendix I limits.

(2) The release of the entire contents of the waste water collection 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.

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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,

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 pond #1 — 1.34 E6 gal
Waste water retention pond #2 — 1.48 E6 gal
Oil collection basin — 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

$$\frac{A_i\ (\text{curies})}{3.74\ \text{E+6 gal}} \times \frac{10^6\ \text{u}C_i}{C_i} \times \frac{\text{gal}}{3785.7\ \text{ml}} = \frac{2\text{mrem/hr}}{500\text{mrem/yr}} \times \frac{8760\text{hr}}{\text{yr}} \times C_i$$

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/ml)

then;

$$A_i = 4.96\ \text{E+5}\ C_i$$

Case 2

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

$$\frac{1 \text{ year}}{3.47 \text{ hr}} \quad X \quad \text{Part 20}$$

then,

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

$$\boxed{A_i = 3.57 \text{ E+7 } C_i}$$

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 E-8/ft^3

$$A_i \text{ (curies)} \times \frac{10^6 \text{ u } C_i}{C_i} \times 4.6 \text{ E-8/ft}^3 \times \frac{ft^3}{7.48 \text{ gal}} \times \frac{\text{gal}}{3785.7 \text{ ml}} = C_i$$

$$\boxed{A_i = 6.16 \text{ E+5 } C_i}$$

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 4.

Radionuclide Limits
On Waste Water Collection Ponds

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