

DUKE POWER COMPANY

P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

May 3, 1989

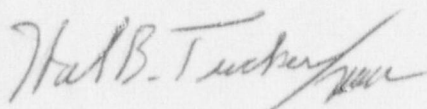
Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Units 1 and 2
Docket Nos. 50-413 and 50-414
Offsite Dose Calculation Manual (ODCM)

Attached are responses to the discrepancies documented in your letter dated November 16, 1988. These discrepancies were discovered during a review of the ODCM by EG&G Idaho, Inc. As noted in the attachment, several of the concerns noted by EG&G will be addressed in an upcoming revision to the ODCM. We expect to issue this revision by September, 1989.

I realize this delay in issuing the ODCM revision could delay the issuance of the Technical Specification amendment I requested June 12, 1987. However, the next revision of the ODCM is contingent upon several procedure changes associated with operation of the Waste Monitor Tank Building. Due to other higher priority work activities, these procedure changes can not be expedited.

Very truly yours,



Hal B. Tucker

Attachment

PGL/IV/36

cc: Mr. S. D. Ebnetter, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. W. T. Orders
NRC Resident Inspector
Catawba Nuclear Station

8905220387 890503
PDR ADOCK 05000413
PDC

A009
11

CONCERN-1:

"The introduction to the ODCM states that LADTAP and GASPAR are normally used for calculation of offsite doses. Therefore, all site specific data required as input to the codes should be included in the ODCM, as recommended by NUREG-0133."

RESPONSE-1:

Site-specific data required as input to LADTAP and GASPAR (excluding radionuclide releases which vary from release period to release period) will be provided in site-specific sections of the ODCM in a future revision.

CONCERN-2:

"The source of the data and the equations used to calculate the values in Table 1.2-2 should be identified in the ODCM."

RESPONSE-2:

The notation "These values were provided on 12/8/82 by M.E. Wangler, RAB:NRN:NRC." will be added to Table 1.2-2 in a future revision to the ODCM.

CONCERN-3:

"The equation of Section 3.1.2.2 and the data in Tables 3.1-13 through 3.1-18 should be made consistent by either adding the adjustment factor E (=0.5) to the equation for the grass-cow-meat pathway or by doubling the values of the R_i 's for iodines in the tables."

RESPONSE-3:

An adjustment factor E(=0.5) will be added to the equation for the grass-cow-meat pathway (page 3-6) for iodines in a future ODCM revision.

CONCERN-4:

"The external dose factors for radioiodines in Table 3.1-10 should be doubled, since they were apparently calculated using the adjustment factor E (=0.5), which is permitted only for food pathways."

RESPONSE-4:

Although Regulatory Guide 1.109 guidance for calculating external dose from direct exposure to activity deposited on the ground plane does not account for an iodine deposition fraction, treating iodine deposition consistently when calculating ground plane external dose and food pathway doses is considered a reasonable and acceptable variation from (if not an interpretation of) Regulatory Guide 1.109 guidance. This position is supported by NRC sponsored GASPARG calculational methodology, (reference NUREG-0597) which also treats iodine deposition as a physical constant applied consistently in both ground plane and food pathway dose calculations. Duke Power does not propose to change the ODCM Table 3.1-12 Ri-values for iodines since 1) such a change will result in the need for a significant modification of the GASPARG computer code, and 2) assuming iodine deposition fractions for ground plane pathway dose calculations consistent with guidance provided for the food pathways is considered acceptable.

CONCERN-5:

"For accuracy, the statements in Sections 3.1.2, 3.1.2.1, and C4.2.2.1 should be changed to indicate that the doses to be calculated are doses to air and not doses to an individual."

RESPONSE-5:

Sections 3.1.2 and C4.2.2.1 will be changed as suggested. Section 3.1.2.1 does not reference individual doses and therefore will not be changed.

CONCERN-6:

"The equation in Section C2.2.1 that accounts for simultaneous releases via the WC and WL lines should be expanded to account for simultaneous releases from both the Waste Monitor tanks and the Auxiliary Monitor Tanks."

RESPONSE-6:

Section C3.1.1 states that situation is not normal and that station procedures have been implemented to insure that instantaneous concentration limits will not be exceeded if releases are simultaneously made from these sources. (rev. 20 dated 7/1/88)

CONCERN-7:

"Section C2.2 should specifically require that releases from the Auxiliary Monitor Tank Building be considered when determining offsite dose rates due to gaseous effluents."

RESPONSE-7:

Section C2.2 will be updated in a future revision to include the Auxiliary Monitor Building.

CONCERN-8:

"Section C2.2 should contain requirements for calculating offsite organ dose rates due to radioiodines, etc., in gaseous effluents at frequencies consistent with the frequency of analyses required by Technical Specification Table 4.11-2, as required by Technical Specification 4.11.2.1.2."

RESPONSE-8:

Section C2.2 contains release rate information. Dose calculations are performed either by (1) manual use of the generic section, (2) manual use of Section C4.0, or (3) the use of the computer code GASPAR. Additionally, when Section 11 of Tech Specs is incorporated within the ODCM this information will be directly addressed.

CONCERN-9:

"The example in Section C3.1.1 of how the setpoints on the waste Liquid Effluent Line may be calculated is unnecessary and could be deleted, since the previous sentence identifies the setpoint. Also, following the example to determine the setpoint may permit too high a concentration of unidentified radionuclides to be released to unrestricted areas; i.e., $1.0E-07$ uCi/ml instead of the $3.0E-08$ uCi/ml allowed by 10CFR20."

RESPONSE-9:

This information is placed here for clarity purposes and follows the same format that is used extensively throughout the ODCM. The value " $1.0E-07$ " is allowed per footnote 3c of Appendix B of 10CFR20. This footnote states "If it is known that (I 129, Table II only), Ra 226, and Ra 228 are not present" Table II, Column 2 provides a value of $1.0E-07$.

CONCERN-10:

"The MPC for an unidentified mixture released to an unrestricted area used in Section C3.1.5 to calculate the setpoint should be $3.0E-08$ uCi/ml instead of $1.0E-07$ uCi/ml."

RESPONSE-10:

The value " $1.0E-07$ " is allowed per footnote 3c of Appendix B of 10CFR20. This footnote states "If it is known that (I 129, Table II only), Ra 226, and Ra 228 are not present" Table II, Column 2 provides a value of $1.0E-07$.

CONCERN-11:

"Figure C1.0.1 should show whether the Conventional Waste Water Treatment System Effluent Line and the Liquid Waste Effluent Discharge Line release liquids to the unrestricted area at the same point. This information is necessary to determine if the methodology of Section C3.1.5 ensures that releases are within the limits of 10CFR20."

RESPONSE-11:

Figure C1.0-1 will be clarified to show that the Conventional Waste Water Treatment System Effluent Line and the Liquid Waste Effluent Discharge Line release effluent liquids to the unrestricted area at different points. Additionally, with the operation of the Auxiliary Monitor Tank Building, Sections C2.1 and C3.1.5 will be updated to show that the setpoint of the Turbine Building Sump radiation monitor (EMF-31) will be set at $1.0E-06$ uCi/ml (the monitor's minimum practical setpoint) plus background to assure that activity is not unknowingly discharged to the WC system. Should radioactivity be detected in the Turbine Building Sump, station personnel will determine by sample analysis what processing, if any, is required (ie. Does Tech Spec 3.11.1.3 require that the effluent be processed prior to release?) References to Section C3.1.5 will be removed from Sections C3.1.3. and C3.1.4.

These updates will be made in the next revision to the ODCM.

CONCERN-12:

"Methodology should be added to Section C3.1 to ensure that the concentration limit for radionuclides released offsite in liquid effluents is not exceeded when releases from the Turbine Building Sumps Discharge Line are released directly to the Liquid Waste Effluent Discharge Line, as permitted by Section C2.1.2.d."

RESPONSE-12:

With the operation of the new Auxiliary Monitor Tank Building, Section C3.1 will be updated to show that the normal discharge path of radioactive TBS water will be batch released via EMF-53 after having been pumped to an Auxiliary Monitor Tank, recirculated, and sampled.

CONCERN-13:

"Section C3.2 should include instructions for determining the setpoint for the gaseous effluent monitor on the Auxiliary Monitor Tank Building."

RESPONSE-13:

Section C3.2 will be updated to specifically include instructions for determining the setpoint for the gaseous effluent monitor on the Auxiliary Monitor Tank Building.

CONCERN-14:

"Section C4.1 states that the methodology of the generic section shall be used for calculating dose contributions to the maximum exposed individual and generic Section 3.1.1 states that doses due to liquid effluents will be calculated for each age group. Therefore, site related ingestion dose commitment factors should be added for the teenager, child, and infant age groups."

RESPONSE-14:

Individual site related ingestion dose commitment factors can be hand-calculated from the information contained within the ODCM. However, to reduce this burdensome task, data for the teenager, child, and infant will be added to Table C4.0-3.

CONCERN-15:

"Section C4.1 or 3.0 should include a commitment to assign releases of radioactive material and the resultant doses to the individual reactor units, especially for cases of disproportionate release from the two units."

RESPONSE-15:

Section 3.1 of NUREG-0133 states that "The licensee should estimate the contributions from each unit based on input conditions, e.g., flow rates and radioactivity concentrations, or, if not practicable, the treated effluent releases may be allocated equally to each of the radioactive waste producing reactors sharing the treatment system".

CONCERN-16:

"The Licensee should clarify whether Section C4.2 is intended to apply to all dose calculations or only to the calculations described in Section C4.3. If the assumptions of Section C4.2 are intended to apply to calculations required by Section C4.1, there are apparent conflicts with the generic sections of the ODCM."

RESPONSE-16:

Clarification of this point was added in Revision 24 dated 1/1/89.

CONCERN-17:

"In Section C4.3.1, the value of 37.7 for the dilution factor, DW, should be justified or referenced."

RESPONSE-17:

A reference to a letter written by W. J. McCabe determining this value will be provided.

CONCERN-18:

"Methodology should be added to Sections C4.3.1 and C4.3.2 for projecting doses, including provisions to account for anticipated unusual releases."

RESPONSE-18:

Clarification and additional guidance was added to ODCM in Revision 24 dated 1/1/89.

CONCERN-19:

"Section C4.4 should require that the fuel cycle dose (total dose) be calculated using the methodology of Sections 3.1.1 and 3.1.2."

RESPONSE-19:

Section C4.4 is provided as simplified dose estimate based on Section 3.3.1 and/or Section 3.1.2. and the previous years operational source term data. As stated on page iii of the ODCM, the computer programs LADTAP and GASPAP will normally be used to calculate the Fuel Cycle doses.

CONCERN-20:

"Equations and parameters used to calculate values in the site-specific data tables should either be referenced or given in the ODCM."

RESPONSE-20:

Data Table C4.0-1 (page 1 of 1) is referenced on page 2 of 2 (see Revision 13 dated 1/1/87).

Data Table C4.0-2 (page 1 of 1) is referenced on page 2 of 2 (see Revision 13 dated 1/1/87).

Data Table C4.0-3 has a footnote "Methodology for table provided by: M. E. Wangler, RAB:NRR:NRC on 3/17/83" (Revision 4 dated 7/18/84).

CONCERN-21:

"Section C5.0 of the ODCM should include information concerning any radiological environmental monitoring samples required by the Technical Specification 3.12.1 (that) are not available; e.g., milk samples."

RESPONSE-21:

Section 12 of Tech Specs is to be incorporated within the ODCM and this information can be added at that time.

CONCERN 22:

"The inhalation and ingestion dose factors in ODCM Tables 3.1-2 through 3.1-7 should be corrected to agree with the values from Regulatory Guide 1.109."

RESPONSE-22:

Typographical errors found in Tables 3.1-2 through 3.1-7 will be corrected to agree with the values from Regulatory Guide 1.109."

CONCERN 23:

"The value of the stable element transfer parameter in Table 3.1-11 for Te in cow milk should be $1.0E-03$ d/L and the parameter for Fe in goat milk should be $1.3E-04$ d/L."

RESPONSE-23:

Table 3.1-11 contains typographical errors and will be corrected.

CONCERN-24:

"In Table 3.1-1, the bioaccumulation factor for Na in fish should be corrected to $1.0E+02$, and the bioaccumulation factors for P (for which the "best values" are now 3000 for fish and 6000 for invertebrates) should be added."

RESPONSE-24:

Table 3.1-1 contains a typographical error for sodium and will be corrected in a future revision to the ODCM. P-32 sampling requirements were deleted from Catawba's Technical Specifications several years ago and subsequently P-32 data was removed from the ODCM.

CONCERN-25:

"Ingestion dose factors for P-32 should be added to Tables 3.1-2 through 3.1-5."

RESPONSE-25:

P-32 sampling requirements were deleted from Catawba's Technical Specifications several years ago and subsequently P-32 data was removed from the ODCM.

CONCERN-26:

"Data for Mo-99 should be added to Tables 3.1-1 through 3.1-9 (inhalation dose factors) and Tables 3.1-12 through 3.1-30 (Ri-values) should be added to the ODCM, since Mo-99 is one of the principle gamma emitters identified in the ODCM for which the LLD is specified."

RESPONSE-26:

Data for Mo-99 will be added to Tables 3.1-1 through 3.1-9 (inhalation dose factors) and Tables 3.1-12 through 3.1-30 (Ri values) of the ODCM in a future revision.

CONCERN-27:

"The Licensee should re-check the calculations of Ri values in Tables 3.1-16 through 3.1-26 by verifying the input parameters and the equations. The reviewer's values differed from the values in these tables for all radionuclides except H-3."

RESPONSE-27:

Ri values in Tables 3.1-16 through 3.1-26 were generated using the GASPARG computer program. The GASPARG code implements the radiological impact models of NRC Regulatory Guide 1.109, Revision 1, for atmospheric releases. The input parameters used in the Ri/GASPARG calculations have been reviewed and no discrepancies with respect to NUREG-0133 or Regulatory Guide 1.109 were found. One exception is that a discrepancy in the milk pathway stable element transfer coefficient was identified between Regulatory Guide 1.109 and the GASPARG data library (1.0E-04 vs. 6.0E-04 respectively). This discrepancy will be resolved by modifying the GASPARG data library and revising affected ODCM Ri values accordingly. Additionally, an independent computer code is currently being developed to further investigate the other Ri value discrepancies identified by this comment.

CONCERN-28:

"The Licensee may wish to take advantage of the 1000 cfs per reactor dilution flow permitted by Section 4.3 of NUREG-0133 for reactors with closed-cycle cooling systems. Using this value would require increasing the value of the recirculation factor and probably reducing the value of DW for drinking water, but should result in a lower and more realistic calculated dose than the present calculational method. As another alternative, the NRC Staff allows the dose for a reporting period (calendar quarter or calendar year) to be calculated using the average dilution flow for the reporting period. If this method is chosen for the dose calculations, the total dilution flow for the reporting period should be included in the semi-annual report."

RESPONSE-28:

Duke Power Company uses the alternative method and per Regulatory Guide 1.21 guidance, the total dilution flow for the reporting period has been included in all semi-annual effluent release reports.

CONCERN-29:

"Although the use of the actual dilution flow (F) averaged over the reporting period is acceptable for the calculations of doses due to liquid effluents in Section 3.1.1, the Licensee may wish to take advantage of the 1000 cfs per reactor permitted by Section 4.3 of NUREG-0133 for reactors with closed-cycle cooling systems. Using this value would require increasing the value of the recirculation factor and probably reducing the value of DW for drinking water, but should result in a lower and more realistic calculated dose than the present calculational method."

RESPONSE-29:

Please see Response-28.

CONCERN 30:

"The Licensee may wish to include requirements in the ODCM that the setpoints of radiation monitors on the liquid and gaseous effluent pathways be set to alarm before offsite dose rate limits are exceeded."

RESPONSE-30:

Duke Power Company already incorporates this precaution in various radiation monitor setpoint determination procedures and does not feel that duplication of information is warranted.

CONCERN 31:

"To prevent spurious alarms of the radiation monitor on the Waste Liquid Effluent Line the Licensee may wish to add a requirement to Section C3.1.1 that the radiation monitor be set some fraction above the concentration in the line, and to add a requirement to Section C2.1.1 that the flow rate be set an equal fraction lower than is now required."

RESPONSE-31:

Please see Response 30.

CONCERN-32:

"The Licensee may wish to follow the recommendations of the bases statements in the CNS Technical Specifications and in NUREG-0472 and eliminate the calculations for McGuire from the fuel cycle calculations."

RESPONSE-32:

Because McGuire Nuclear Station is upstream of Catawba Nuclear Station and subsequently contributed 4.0% of the maximum total body dose and 21.9% of the maximum organ dose to the liquid portion of Catawba's 1988 Fuel Cycle Calculations, Duke Power does not feel that McGuire's contribution can be ignored.

CONCERN-33:

"In Section 3.1.2.2 the Licensee may wish to increase the value of t_f , (transport time from pasture to receptor) for the grass-cow-meat pathway to the 20 days recommended by Regulatory Guide 1.109."

RESPONSE-33:

The value of t_f will be changed to 20.

CONCERN-34:

"The Licensee may wish to modify the requirements in Section 1.2 and C2.2 to match the recommendations in the bases statement for Technical Specification 3.11.2.1.b for CNS and in NUREG-0472: i.e., that the organ dose rate limit may be applied to the thyroid of a child via the inhalation pathway."

RESPONSE-34:

This concern was addressed in Revision 24 dated 1/1/89.

CONCERN-35:

"The terms "activity" and "gross activity" are used throughout the ODCM where "concentration" or "activity concentration" should be used. Changes in this notation would improve the accuracy of many statements in the ODCM."

RESPONSE-35:

These terms will be changed in the next revision of the ODCM.

CONCERN-36:

"The value of F in the definition of F1 in Section 3.1.1 could be defined as the average dilution flow during the reporting period, calendar quarter or calendar year, when calculating the quarterly and annual doses due to liquid effluents; this procedure for calculating the quarterly and annual doses is acceptable to the NRC Staff, if the total volume released in the diluting stream is also reported in the semiannual reports."

RESPONSE-36:

The Semi-Annual Report includes the total volume released in the diluting stream.