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*Idaho National Engineering Laboratory*

December 6, 1988

Mr. L. Ruth  
Technical Assistance Management Branch  
Mail Stop 11H22  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

LETTER REVIEW OF ODCM REVISION 6 FOR THE MONTICELLO NUCLEAR GENERATING PLANT -  
SIM-134-88

Dear Mr. Ruth:

Attached is the final Letter Report with an addendum containing EG&G Idaho's evaluation of the Offsite Dose Calculation Manual (ODCM) updated through Revision 6 for the Monticello Nuclear Generating Plant.

This Letter Report is being transmitted under the provisions of Project 5 of Fin D6036, "Review of Radiological Issues." A draft of this Letter Report was provided earlier for NRC review and comments and found to be acceptable.

Yours very truly,

F. B. Simpson  
Nuclear Sciences

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Attachment:  
As stated

cc: W. Meinke, NRC  
G. L. Jones, DOE-ID

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6pp

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The ODCM was completely retyped, but there were no major changes except the addition of Appendix F describing the MIDAS computer program which is to be used for accident dose assessment. The ODCM states that MIDAS may also be used for dose and dose rate assessments required by Section 3.0 of the ODCM.

The Licensee addressed all recommendations made in the Safety Evaluation (SER) of ODCM Revision 5 and all recommendations in Appendix D to EGG-PHY-7157 except the four discussed below:

1. No reference was cited for the dilution factor  $D_w$  reported as 7:1 on page 2-12 of the ODCM.

The dilution factor  $D_w$  is explained as being determined "by assuming that effluents are completely mixed in 50 percent of the Mississippi River flow (7431 cfs at Anoka, Minnesota)." Omission of a reference for this dilution factor is not considered a major deficiency, since MNGP has a policy of no releases of radioactive materials in liquid effluents. This policy has been followed quite consistently, at least since 1979. However, ideally, the parameters used to obtain the 7:1 far field dilution factor should be referenced or justified; (e.g., the river flow should be identified as the minimum or average flow, the assumed rate of release of liquid waste should be stated, and the 50% mixing in river water should be justified by referring to calculations or possibly the slug waste dispersion studies mentioned in Section 2.4.2.1 of the Updated Safety Analysis Report, Revision 4.)

2. A value of the critical organ dose parameter for I-133 was not added to Table 3.2-1.

The lack of a critical organ dose parameter for I-133 in Table 3.2-1 is consistent with the requirements of the Licensee's Technical Specification 3.0.B.a.2. This technical specification requires that the dose rate at any time due to radioactive materials released in gaseous effluents from the site shall be limited to less than or equal to 1500 mrem/yr to any organ for doses due to "I-131, tritium, and radioactive particulates, with half-lives greater than eight days."

Although meeting the requirements of Technical Specification 3.0.B.a.2, the methodology to determine organ dose rates without considering releases of I-133 does not appear to meet the intent of NUREG-0473, Revision 3, Draft 7". (This discrepancy apparently occurred because the radiological effluent technical specifications (RETS) for MNGP were prepared following the guidance of an earlier version of NUREG-0473.) Based on releases of radioiodines during the 1979 - June 1988 period, the contributions to the average organ dose rate via the inhalation pathway are about the same for I-131 and I-133. This fact implies that it would be possible to release radioiodines giving twice the 1500 mrem/yr dose rate limit while following the methodology of the ODCM. In practice, the dose rate limit is unlikely to be exceeded at MNGP because the average dose rate for the 1979 - 1988

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period was apparently less than one mrem/year, and no batch releases were reported.

3. The word "dose" was not changed to "dose rate" in several places in Sections 3.2.2 and 3.2.3. This is not a significant deficiency, since the meaning is clear from the context.
4. The ODCM does not contain simplified flow diagrams illustrating the treatment paths and the components of the radioactive liquid, gaseous and solid waste management system.

This is not required by the Licensee's RETS or NUREG-0133, but is a recommendation of "General Contents of the Offsite Dose Calculation Manual," Radiological Assessment Branch Technical Position, Revision 1, February 8, 1979.

Revision 6 of the ODCM is a well-written document that meets essentially all of the requirements of the Licensee's technical specifications and NUREG-0133.

EVALUATION OF MONTICELLO ODCM UPDATED THROUGH REVISION 6 - SIM-134-88

Northern States Power Company (NSP), the Licensee for Monticello Nuclear Generating Plant (MNGP), transmitted a complete ODCM for MNGP, updated through Revision 6, to the NRC with a letter from F. L. Fey, Jr. (MNGP) to Document Control Desk (NRC) dated August 26, 1988.

This revision was transmitted with the Licensee's Effluent and Waste Disposal Semiannual Report (for January 1, 1988 through June 30, 1988), as required by the Monticello Technical Specifications. The ODCM was completely retyped, incorporating moderate format changes that improved the readability of some sections. It is a well-organized and well-written document that meets essentially all of the requirements of the Licensee's technical specifications and NUREG-0133.

In addition to the format changes mentioned above, Revision 6 addressed the three concerns identified in the Safety Evaluation (SER) transmitted to NSP by a letter from J. A. Zwolinski (NRC) to D. M. Musolf (NSP) dated October 22, 1986. In this revision the Licensee also addressed most of the concerns identified in Attachment III to the SER (Appendix D of Technical Evaluation Report EGG-PHY-7157).

The Licensee's ODCM Revision 6 addressed the three concerns identified in the SER by making the following changes to Revision 5:

1. The reference age group was changed from infant to child in calculations for limiting the gaseous effluent dose rate corresponding to the inhalation pathway to the 10 CFR 20 limit of 1500 mrem/yr to any organ of an individual. However, the "1.4" in Equation E.1-2 was not corrected to read "3.7," obviously due to an oversight.
2. A sentence on page 4-1 of MNGP ODCM Revision 5, which was easily mis-interpreted to mean that doses due to direct shine were excluded in calculating the total dose, was deleted. The Licensee's ODCM contains a commitment to include the dose due to direct radiation in determining the total dose for comparison with the limits of 40 CFR 190. The ODCM includes a statement that the direct dose components will be determined by calculation or actual measurement, and that the method used will be documented in the Special Report (which is required by Technical Specification 3.8.D if calculated offsite doses exceed technical specification limits).
3. A statement of the Licensee's no-release policy with regard to radioactive liquid effluents was included in Section 2.0 of ODCM Revision 6.

These changes are all considered to be acceptable and to be complete and satisfactory responses to the concerns expressed in the SER.

The following changes recommended in Attachment III to the SER were incorporated in Revision 6 of the MNGP ODCM:

1. Radionuclides Mn-54, Fe-59, Co-58, Zn-65, and Ce-141 were added to Table 2.1-1, which lists the radionuclides specifically required to be considered for limiting effluents to the concentration specified in 10 CFR 20.
- 2 Several typographical errors were corrected.

Several sections and brief additional discussions of existing sections were added as part of Revision 6 of the ODCM. These additions all improve the document by making it more comprehensive or clarifying its use, and are therefore considered acceptable. The most extensive and important of the additions are discussed below:

1. Appendix F was added describing the MIDAS computer program used for accident dose assessment. Section 3.0 of the ODCM now states that the applicable MIDAS dose evaluation routines for gaseous effluents may be utilized to perform the dose and dose rate assessments specified in the ODCM. Discussions of the use of MIDAS to calculate air doses and organ doses, respectively, were added as Section 3.3.1.2 and 3.3.2.2.
2. Methodology to determine the high-high alarm set-point for the Turbine Building Normal Drain Sump Monitor was added as Section 2.1.4.
3. Section 5.1 was expanded to specifically require a land use survey to locate irrigated crops if the plant begins routine discharges of liquid radioactive waste into the Mississippi River.

Several radiation environmental monitoring program sampling locations were changed, apparently on the basis of the land use census results. These locations satisfy the requirements of the Licensee's RETS, so the changes are considered acceptable.

The following comments concern items in ODCM Revision 6 that are unchanged from Revision 5, but which were not noted in the review included as Appendix D of EGG-PHY-7157:

1. The Licensee's dose factors in Tables 3.3-1 through 3.3-21 were compared with references or with the equations given in ODCM Revision 6. The reviewer's values agreed with values in the ODCM tables except for Tables 3.3-7 through 3.3-17, which give  $R_i$  values for the meat, cow-milk, and goat milk pathways. The Licensee's values in these tables (except for H-3, which agreed)

were generally 15 to 25% lower than values obtained by the reviewer. The equations given in the ODCM for these dose factors,  $R_i$ , are based on equations in Regulatory Guide 1.109, Revision 1. The reason for differences between the Licensee's and reviewer's values of  $R_i$  was not determined, so it is not certain that the Licensee's values are in error. It is suggested that the Licensee verify that the equations and parameters used to calculate the values of  $R_i$  are identical to those given in the ODCM.

2. Equation 3.2-2 for the dose rate limit for releases during drywell purges and the associated definitions are in error or confusing. The term " $-D_{dw}$ " should be removed if  $D_{cy}$  and  $D_{cs}$  include only doses due to continuous releases, as stated; or  $D_{cy}$  and  $D_{cs}$  should be redefined if they include doses due to all releases from MNGP, as calculated in Equation 3.2-1.
3. The current best value of the phosphorus bioaccumulation factor for freshwater fish referenced in the definition of  $BF_i$  in Section 2.3.2 is  $3.0E+03$ . The Licensee may wish to update the value in Regulatory Guide 1.109, Revision 1.

The following errors, arising from the retyping and an obvious oversight, were noted in Revision 6 and should be corrected in a future revision of the ODCM:

1. References to Appendix G in Sections 3.2.2 and 3.3.2.2 should be corrected to read Appendix F. The ODCM does not contain an Appendix G.
2. Appropriate parentheses should be inserted in Equations E.2-3, E.2-5, and E.2-7.
3. The term "1.4" in Equation E.1-2 should be changed to "3.7."

The methodology described in Revision 6 of the ODCM for the Monticello Nuclear Generating Station satisfies the requirements of the MNGP RETS and is, in general, within the guidelines of NUREG-0133.

This review was performed by T. E. Young.

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