



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

May 15, 1984

Docket Nos: 50-390  
and 50-391

Mr. H. G. Parris  
Manager of Power  
Tennessee Valley Authority  
500A Chestnut Street, Tower II  
Chattanooga, Tennessee 37401

Dear Mr. Parris:

Subject: Comments on the Proposed Offsite Dose Calculation  
Manual for the Watts Bar Nuclear Plant, Units 1 and 2

The staff has completed its first round review of the Offsite Dose Calculation Manual (ODCM) for the Watts Bar Nuclear Plant, Units 1 and 2, that was submitted on February 8, 1984. Our specific comments are enclosed. The majority of the comments are directed at either clarifying the dose calculation methodology or documenting the bases for particular values that are used in the dose calculations.

These comments should be incorporated into the ODCM and resubmitted for final approval by June 1, 1984, to support your projected fuel load date. If you have any questions concerning this matter, please contact the project manager, T. J. Kenyon, at FTS 492-7266.

Sincerely,

Elinor G. Adensam, Chief  
Licensing Branch No. 4  
Division of Licensing

Enclosure:  
As stated

cc: See next page

INDICATED ORIGINAL

Certified By for E. A.

8405290445 840515  
PDR ADOCK 05000390  
A PDR

WATTS BAR

Mr. H. G. Parris  
Manager of Power  
Tennessee Valley Authority  
500A Chestnut Street, Tower II  
Chattanooga, Tennessee 37401

cc: Herbert S. Sanger, Jr., Esq.  
General Counsel  
Tennessee Valley Authority  
400 West Summit Hill Drive, E 11B 33  
Knoxville, Tennessee 37902

Mr. D. Checchet  
Westinghouse Electric Corporation  
P.O. Box 355  
Pittsburgh, Pennsylvania 15230

Mr. Ralph Shell  
Tennessee Valley Authority  
400 Chestnut Street, Tower II  
Chattanooga, Tennessee 37401

Mr. Donald L. Williams, Jr.  
Tennessee Valley Authority  
400 West Summit Hill Drive, W10B85  
Knoxville, Tennessee 37902

Resident Inspector/Watts Bar NPS  
c/o U.S. Nuclear Regulatory  
Commission  
Rt. 2 - Box 300  
Spring City, Tennessee 37381

Mr. David Ormsby  
Tennessee Valley Authority  
400 Chestnut Street, Tower II  
Chattanooga, Tennessee 37401

James P. O'Reilly, Regional Administrator  
U.S. Nuclear Regulatory Commission,  
Region II  
101 Marietta Street, Suite 3100  
Atlanta, Georgia 30303

COMMENTS ON THE PROPOSED  
OFFSITE DOSE CALCULATION MANUAL  
FOR WATTS BAR UNITS 1 AND 2 (REV. 0)

1. Provide a title page which contains the date of the latest revision of the ODCM.
2. Pages 1 and 2 of the ODCM contain a table of contents for the entire ODCM; however, the table of contents does not list the tables and figures for the entire ODCM. Provide a listing of tables and figures for the entire ODCM.
3. Section 1.0, "Gaseous Effluents"
  - a. Section 1.1 of the ODCM incorrectly states that the dose rate limit of 1500 mrem/yr applies to radioiodines and particulates. Per 3/4 11.2.1 of the RETS, include I-131, I-133, H-3, and all radionuclides in particulate form with half lives greater than 8 days in estimating dose rates.
  - b. In Assumption 3 under A and B of Step 1 (pp. 1, 4) the mix of noble gases, iodine -131 and -133, tritium, and all radionuclides in particulate form with half lives greater than 8 days provided in Table 1.1 may only be used on a limited basis, i.e., initially and if no detectable activity of these nuclides is found in a purge sample. Furthermore, to be complete, Table 1.1 should include tritium and releases from the service building ventilation exhaust. Normally noble gas activity monitor setpoints should be calculated and adjusted if necessary at least once per month. These calculations should be based on the mix of the above nuclides in samples obtained from releases made during the previous month. In addition, prior to containment purge and venting, the monitor

setpoint for the containment purge and exhaust system should be recalculated. However, the setpoint during purging should not be increased above the setpoint determined for continuous releases. Revise the ODCM to resolve the preceding comments.

- c. In Step 2, the plant documentation (see p. 11) referred to should be identified. A methodology should be provided, as is provided for liquid effluent monitor setpoints, for considering the simultaneous releases from other release points in the setpoint determination for individual noble gas activity monitors. Provide a methodology to assure that the noble gas curie limit in each gas decay tank is not exceeded.
- d. Figure 1.3 should show the entire gaseous radwaste treatment system, which includes both the ventilation exhaust treatment system and the waste gas holdup system. The figure should locate and identify all monitors addressed in the technical specifications and all release points. Provide a legible foldout figure with the above information.
- e. Provide the value(s) for  $X/Q$  and  $D/Q$  that are to be used in eqs. 1.1 through 1.8. Briefly state the basis for the value(s) and provide a reference for the value(s). The basis for the value(s) should include the years in which the data was gathered, the location by sector and distance, and the type of release (e.g., ground level, elevated, or mixed-mode, exit velocities, and cross-sectional areas used to determine building wake).

Use of a straight-line trajectory dispersion model without adjustments for temporal and spatial variations in airflow should be substantiated. The location of the Watts Bar Plant in a pronounced river valley makes the use of a straight-line trajectory model suspect because of diurnal variations in airflow (e.g., upvalley flow during the day and downvalley flow during the night), channeling, and other physical restrictions to airflow and dispersion. Also, stable atmospheric conditions accompanied by low wind speeds predominate at the Watts Bar site, and these conditions are also more likely to result in airflow trajectories which are not straight lines.

- f. Table 1.4 provides meteorological dispersion factors for numerous points of interest; however, it does not list the date of the land-use census, or provide references for the land-use census, and the meteorological dispersion factors. Provide the date of the land-use census that was used in identifying the controlling receptor locations, and the appropriate references.
- g. Equation 1.6 provides a method for estimating doses to the thyroid from ground shine. This part of Section 1.1.1, while permissible, can be deleted (see NUREG-0133, Ch. 5).
- h. Pages 8-19 and Tables 1.4 - 1.8 contain values for many parameters (e.g.,  $r$ ,  $\lambda_{E_i}$ ,  $Y_V$ ,  $H$ ,  $B_{iV}$ ,  $UM$ ); however, in many cases the bases for the parameters are not stated. Briefly state the basis for all parameters. Presumably many generic values were taken from the Appendices in Regulatory Guide 1.109, Rev. 1 (October 1977). List all site-specific values used to estimate doses, and provide references.
- i. On p. 12, it is stated that certain noble gases will be considered in estimating doses. Doses should be estimated using all of the radioactive noble gases released from the plant, and the ODCM should explicitly state these.
- j. On p. 16, it is stated that only certain nuclides will be considered in estimating doses. Doses should be estimated using I-131, I-133, tritium and all particulates with half lives greater than 8 days. (See comments 3(a) and (b).)
- k. Table 1.6 incorrectly references NUREG/CR-1004 as the bases for all values in Table 1.6. Provide references for specific values in this table.
- l. Provide references for specific values in Table 1.7.
- m. Provide a numbered and captioned figure showing the site boundary and the unrestricted area boundary for gaseous effluents.

4. Section 2.0, "Liquid Effluents"

- a. Eq. 2.1 on p. 21 is missing a dividing sign. Correct this typographical error in eq. 2.1.
- b. Provide a reference for the minimum dilution flow rate used in eq. 2.3 on p. 21.
- c. Identify the plant instructions and documentation referred to on p. 22 of Section 2.2.1.
- d. Although p. 23 of Section 2.3.1 refers to Fig. 2.2.1-1, no figures are provided in Section 2 of the ODCM. Provide all appropriate figures in the ODCM. Figure 2.1.1-1 should show the entire liquid radwaste treatment system. The figure should locate and identify all monitors addressed in the technical specifications, all pathways to the final release points including all dilution flows, and all release points.
- e. On p. 24, it is stated that only 11 nuclides will be considered in estimating doses. Doses should be estimated using all of the radionuclides in liquid effluents released from the plant, and the ODCM should explicitly state this.
- f. Provide the basis for the correction factor of 0.95 used in eq. 2.11.
- g. Provide a reference for the dilution factor of 1/5 used in eqs. 2.12 and 2.14.
- h. Section 2.3.2.3 provides a method for estimating doses to individuals from exposure to radionuclides deposited on the shoreline and from swimming. Since doses from these pathways are typically negligible, this section (while permissible) can be deleted (see NUREG-0133, Ch. 4).
- i. Tables 2.4 a, b and c are not necessary since doses to the population do not have to be computed.

- j. Provide a numbered and captioned figure showing the site boundary and the unrestricted area boundary for liquid effluents.

5. Section 3.0 "Radiological Environmental Monitoring"

- a. Table 3.1 lists the number of samples, but does not provide the specific location of all samples. The table should contain the following columns: (1) exposure pathway and or sample; (2) criteria for selection of number of samples and location (see Branch Technical Position, Table 1); (3) sampling and collection frequency; (4) sample location number (the number should be keyed to a figure in the ODCM); (5) location (distance and direction); (6) type and frequency of analysis.
  - b. Figures 3.1, 3.2 and 3.3 do not contain compass headings which are needed for locating sampling sites. Provide the 16 compass sectors, the unrestricted area boundary and concentric circles to locate sampling sites.
6. Provide a methodology to estimate total doses for showing compliance with RETS 3/4.11.4 (see NUREG-0133, pp. 10, 11). Include in this section the methodology that will be used to estimate doses from direct radiation.
  7. Provide a brief section that describes implementation of the methodology in the ODCM. Presumably the methodology described in the ODCM will be implemented via computer codes. The computer codes should be verified. After the codes are verified, provide a reference (individual or company name, title of document, and date) in the ODCM to document the validation of the codes.