Docket file
50-346

JAN 4 1973.

R. C. DeYoung, Assistant Director for PWR's, L

DAVIS-BESSE FSAR ACCEPTANCE REVIEW

PLANT NAME: Davis-Besse
LICENSING STAGE: FSAR Acceptance Review
DOCKET NO: 50-346
RESPONSIBLE BRANCH: PWR #4
PROJECT MANAGER: H. Faulkner
DATE REQUEST RECEIVED: December 15, 1972
REQUESTED COMPLETION DATE: January 3, 1973
DESCRIPTION OF RESPONSE: Site Safety recommendation for not docketing
REVIEW STATUS: Site Safety - Complete to this stage

With respect to its areas of concern, Site Safety does not consider the report to be sufficiently complete for acceptance at this time. The principal inadequacies with respect to completeness were found in the areas of engineered safety feature (dose mitigation) design and hydrologic engineering. The enclosure provides our detailed comments.

Although our comments in some instances are provided in accordance with Revision 1 of the SAR Guide, we have made our overall judgment in the light of the February edition. Where differences occur, the applicant may be allowed additional time to complete his submittal, but, nevertheless, the information indicated will eventually be necessary to complete our evaluation.

Original signed by
H. R. Denton

Harold R. Denton, Assistant Director
for Site Safety
Directorate of Licensing

Enclosure:
As stated

cc: see next page

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DAVIS-BESSE 50-346

MINI-REVIEW

Sections 2.1 and 2.2 are satisfactory.

Section 15.0 Item 23 Fuel Handling Accident Analysis does not conform to the AEC staff model of assuming the failure of a complete fuel bundle. (The applicant assumed the failure of 56 out of 208 fuel rods.)

Astericked items on following pages refer to October issue of Standard Format.

SITE ANALYSIS BRANCH
DAVIS-BESSE
COMMENTS ON FSAR

Section 2.3 - Meteorology

The meteorology section of the FSAR is reasonably complete and is considered acceptable. However, some additional information should be provided by the applicant and some statements in the FSAR clarified.

The applicant should be requested to provide the following information:

1. A table of annual average atmospheric dispersion (X/Q) estimates for 16 radial sectors to a distance of 50 miles from the plant.

2. Evidence that the accuracy of the meteorological measurement equipment to be used in the operational onsite measurement program, especially with respect to the dewpoint measurements, meet the accuracy criteria recommended in Safety Guide 23.

3. A copy of a study of the potential effects of the cooling towers on the environment that is mentioned in section 2.3.2.3 of the FSAR.

4. A full year of onsite temperature and humidity data with a joint data recovery rate of at least 90 percent as soon as such dat. become available.

The applicant, in section 2.3.1.2.8, first paragraph, page 2-34 of the FSAR, states that high air pollution potential (atmospheric stagnation) conditions occur 20 to 30 percent of the time at the plant site. It is believed by the staff that these values must be in error. The applicant should be asked to verify the statement. Finally, section 2.3.1 of the FSAR-Regional Meteorology - should be titled "Regional Climatology."

The staff feels that these questions can be resolved at an early meeting with the applicant or through a response by the applicant to one round of questions from the staff.

HYDROLOGIC ENGINEERING MINI-REVIEW
DAVIS-BESSE NUCLEAR POWER STATION
FSAR

SAR Guide (Rev. 1) Section No. & Title	Comment
2.4.1 Hydrologic Description	Describe site drainage facilities, including the roofs of safety-related structures.
2.4.2 Floods	
2.4.2.1 Flooding History	Describe the meteorology surge and waves which occurred in the region in the fall of 1972.
2.4.2.2 Flood Design Considerations	Provide the bases for site drainage, including the roofs of safety-related buildings, against heavy rainfall, and the intake canal side slopes, intake, and both sides of the end structure to resist wave action. Provide a description of the canal and its terminal structures (profiles and cross sections).
2.4.3 Probable Maximum Flood (PMF) on Streams & Rivers	Provide additional bases for concluding a PMF on Toussaint River does not constitute a flood threat to the plant. Provide probable maximum rainfall estimates for site drainage and an analysis which demonstrates overflow (including roof drains of safety-related buildings) will not constitute a flood threat.
2.4.5 Probable Maximum Surge and Seiche Flooding	Compare the postulated probable maximum meteorological event with the 1972 seiche-causing storm to determine whether the probable maximum event is adequate as an upper limit eve Verify the probable maximum surge model by reconstituting

SAR Guide (Rev. 1) Section No. & Title	Comment
	the 1972 surge. Provide the bases for the wave estimates provided, including the components attributable to wave action refracted and reflected from and through offshore islands. Provide estimates of wave action on the lakeside of the intake canal terminal structure and along the intake canal. Discuss the potential for wave-induced resonance in the intake canal. (Cross reference sections 2.4.2.2 and 2.4.8).
2.4.11 Low-Water Considerations	Demonstrate the heat dissipation and inventory capability of the intake canal under the postulated low water surge conditions discussed in section 2.4.11.6. Discuss hydraulic short-circuiting potential under this condition, and under any other postulated condition requiring the use of the canal for total or partial recirculation. Describe the intake and discharge facilities along the canal for this mode of operation. Compare postulated environmental conditions with the guidelines suggested in Safety Guide 27, or appropriately cross reference other sections of the FSAR containing such material.
2.4.12 Environmental Acceptance of Effluents	Describe the range of anticipated dilution for normal and inadvertant releases to the lake and local public water supplies, to adjacent ground water users by direct subsurface movement and by

SAR Guide (Rev. 1) Section No. & Title	Comment
	lake recharge of adjacent aquifers.
2.4.13 Groundwater	Provide estimates of surficial soil permeabilities in plant site area, and along lake front near well users.
2.4.14 Technical Specifications & Emergency Operation Requirements	Because the cooling tower and portions of the water supply system may not be capable of withstanding extremely adverse hydrologically-related events, provide tech specs which assure a cold shutdown in advance of the occurrence of events which could cause the loss of safety systems, or portions thereof, required for operation.

ACCIDENT ANALYSIS BRANCH

REVIEW OF DAVIS-BESSE FSAR, CONTAINMENT SPRAY SYSTEM

In Chapter 15, Section 15.6.6.3 and 15.4.6.4 of a DRF of 1.7 for 0-2 hours, and 3.6 for 0-30 days, is claimed for the iodine cleanup effect of the boric acid spray system. However, this paragraph in 15.4.6.4 is the only place where the iodine removal function of the containment spray system is referred to. The following information is missing in its entirety:

6.2.3 Containment Air Purification and Cleanup Systems:

Description of the iodine removal function of the Containment Spray System

6.2.3.1 Design Basis (for iodine removal function)

6.2.3.2 System Design (as affected by iodine removal function)

6.2.3.3 Design Evaluation

Evaluation of iodine removal function of the contaminent spray system. In this section, sepcific attention should be given to the evaluation of the effects of spray solution chemistry, drop size spectrum, drop coalescence, steam condensation, drop saturation, iodine partition coefficient, containment coverage, unsprayed volumes, wall effects, and mixing in the sump.

Sections 6.2.3.4, 6.2.3.5 and 6.2.3.6 may be covered by reference to previous sections supplied in the description of the heat removal function of the containment spray system.

In chapter 15, the following sections are missing in their entirety:

15.1.X.2 (1) Estimated course of events, as related to actuation of the containment clean-up function of the spray system.

(2) Mathematical model employed to perform the analysis of iodine removal by spray, and the resulting dose reduction factor.

(3) Identification of any computer programs used in the analysis.

(4b) Fission product concentrations in the containment atmosphere and the sump solution (as a function of time) used in the spray iodine removal analyais, particularly their effect on the iodine partition coefficient.

(7) Justification of assumptions used, with reference to experimental data.

(8) System interdependency, particularly the interdependency of containment spray and filtration systems on the dose reduction factor claimed for each system.

(9) Results of analysis of iodine removal by sprays, and the margin of protection provided.

ACCIDENT ANALYSIS BRANCH

DAVIS-BESSE

COMMENTS ON FSAR

Section 9.4.1 Concerning the charcoal filter for the control room emergency ventilation system, provide the following:

- filter flow and residence time of filter
- amount and type of charcoal in filter
- description of charcoal impregnants if any
- flow rates during normal and emergency conditions of ventilation system
- discussion of strategies used to operate the ventilation system under all ~~conceivable~~ emergency conditions.

* Sections 15.3.1 and .2 These sections deal with small activity leaks. Provide discussions of the methods of detection and the time required to evaluate the occurrence and isolate the system or take other remedial action (see Standard Format 15.1. X .2-(1))

Section 15.4.2.2.2 (1.b.) Evaluate a case where the steam generator tube rupture results in a leak equal to the primary feed water make-up capability. How will this event be detected and are the consequences worse than the case presented?

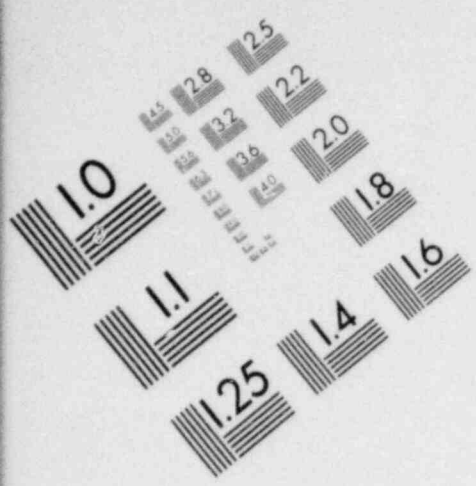
Table 15.4.6 - 3 This table summarizes operator exposure during a MHA. The assumptions used in arriving at these exposures are not given. Please provide the following information concerning control room protection:

1. Provide an analyses of the thyroid, beta skin, and whole body gamma doses received by control room operators during accident situations. The dose contribution from each separate source of radioactivity should be tabulated. When evaluating the effectiveness of the control room protection features, all types of accidents should be considered; however, only the limiting accidents need be analyzed in detail. As a minimum, calculate the doses received by the control room operator from a loss-of-coolant accident, a fuel handling accident and a waste gas decay tank accident. Clearly describe or reference the method used to calculate the doses. Provide a complete list of assumptions and input data, including:

   (a) The source terms used for each point of release. Consider all potential sources of radioactivity including containment leakage, exfiltration if any, vent releases, penetration leakage and activity which may be transferred directly to the control room from the radwaste and turbine buildings and from other portions of the control building. (See item c.)

   (b) The distances between the points of radioactivity release for each design basis accident and the air intake to the control room.

   (c) An evaluation of the potential for radioactive material, noxious gases, or steam to be transferred directly into the control room from adjacent areas and buildings. This should include a description of all potential paths for



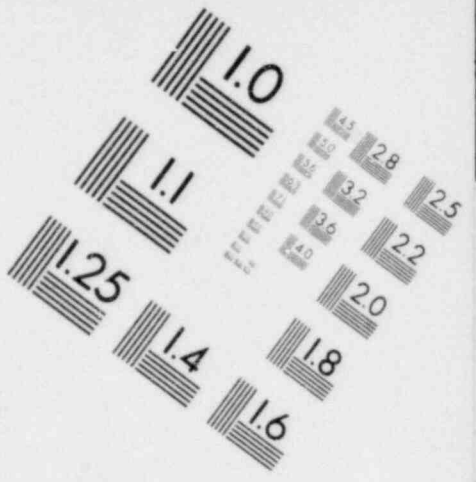
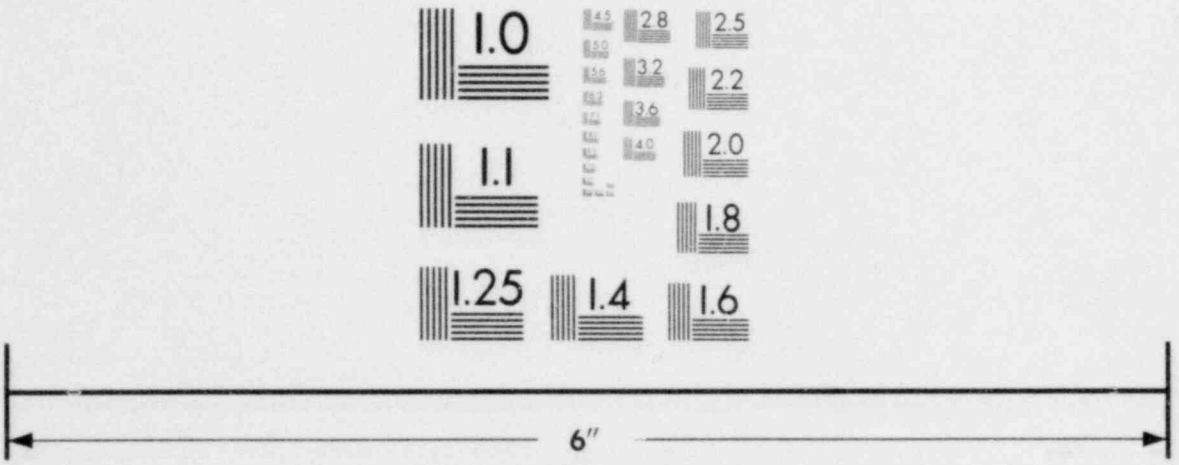
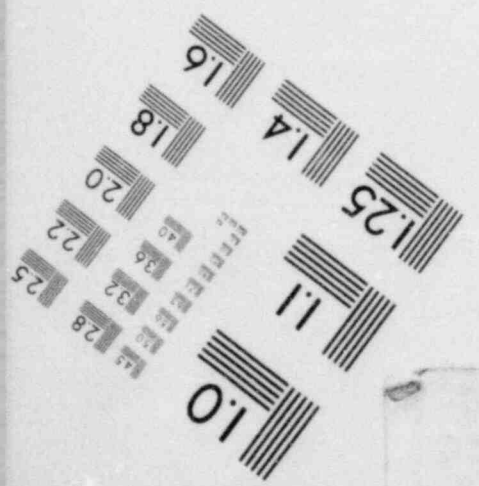
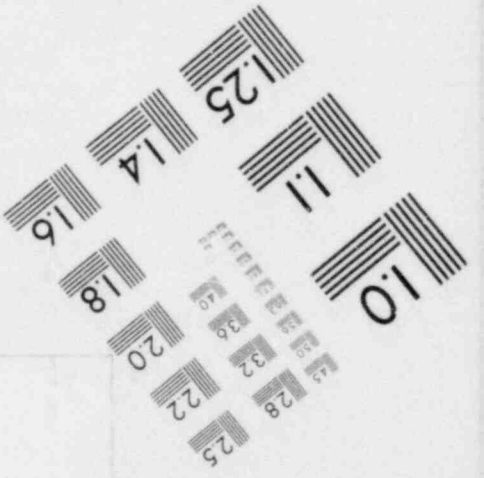


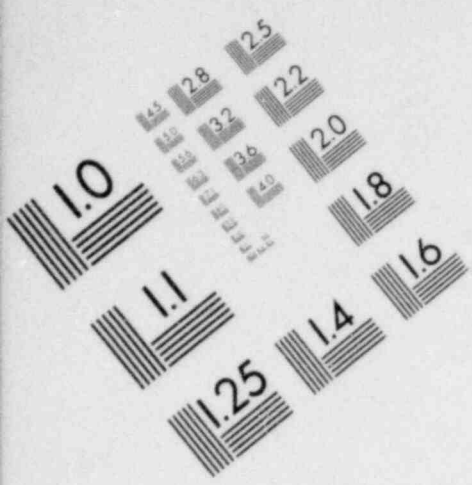
IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART







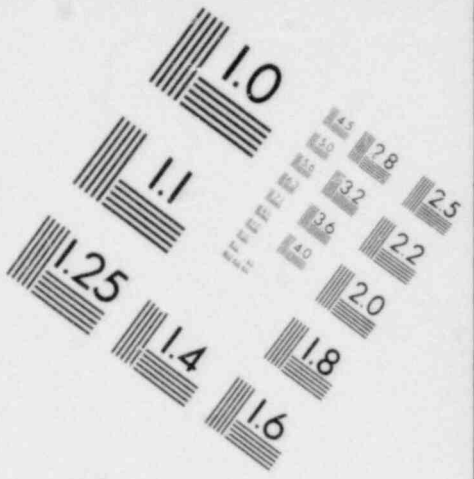
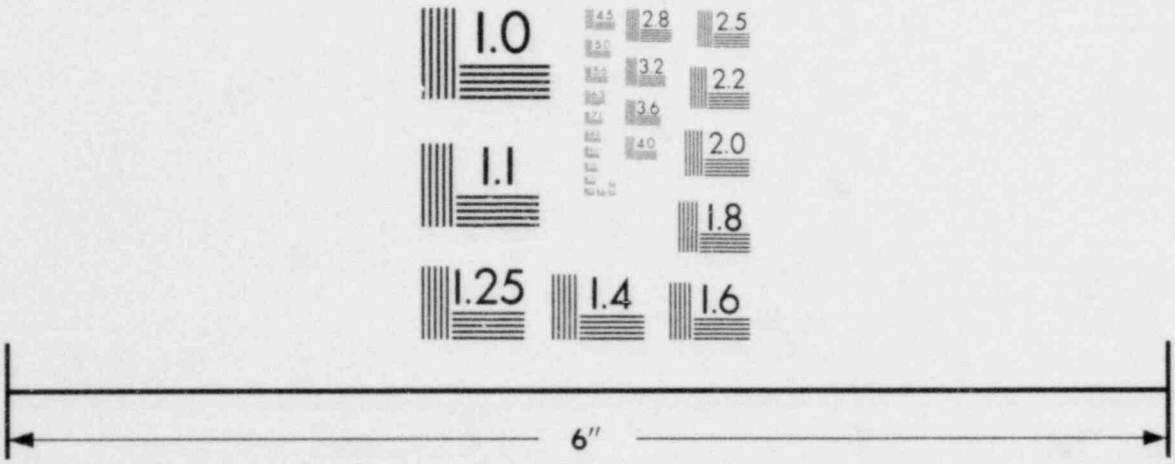
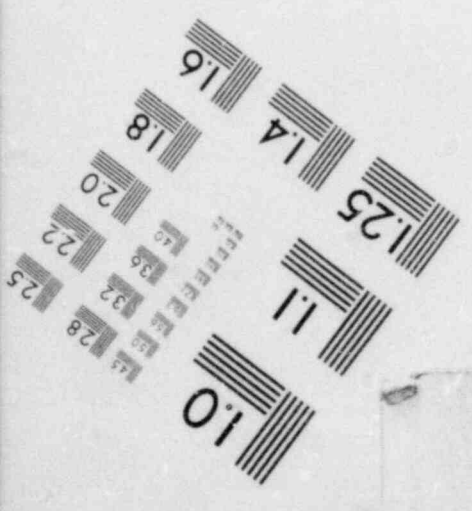
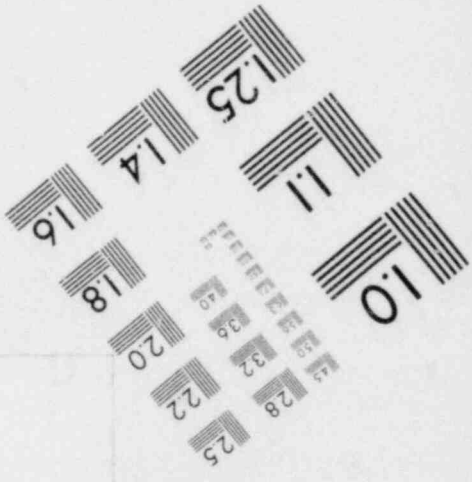


IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART





transport such as the duct work, corridors, doorways, elevator shafts, etc.

(d) The expected dilution factors between the expected release points and the control room air intake (or other appropriate opening). Assumptions as to wind speed and exposure frequency made during the course of the accident should be clearly stated. Provide technical references and/or experimental data to justify the factors used in your analysis.

2. Identify toxic material, such as chlorine, that may be stored on or in the vicinity of the site, which, assuming a container rupture, may interfere with control room operation. List the distances between the location of any such material and the air intake to the control room. Provide an analysis of the severity of such accidents, and discuss the steps to mitigate their consequences. The description of the analysis should clearly list all assumptions.

ACCIDENT ANALYSIS BRANCH

DAVIS BESSE

COMMENTS ON FSAR

I. Add to Section 9.4.1

Supply the same information for the control room filtration as was supplied for the containment air purification and cleanup systems of Section 6.2.3.

II. As required by 6.2.3.2 of the SAR guide supply

(1) preliminary piping and instrumentation diagrams of the ventilation and other clean up systems.

(2) Where building recirculation systems are provided the system description should include a discussion of the mode(s) of operation and mixing behavior. Layout drawings of system equipment and air flow guidance ducts should be provided (FSAR). Provide the expected initial and final exhaust flow rates and the rate of change between initial and final flow rates; the recirculation rate; and the mixing volume.

III. The filtration systems should include demisters, heaters and HEPA filters downstream of the adsorption unit.

* IV. List by type (epoxy, phenolic, xinc, etc.) and manufacturer's designation all known paints used in the containment. In addition list the dry density and surface area covered by each paint. List the total surface area and estimated volume covered by unknown paints. Explicitly state the curing procedures applied or to be applied for each paint. A

quality assurance program for paint applications should be detailed in Chapter 17.

* V Insufficient details and design criteria of the reactor building sump and its intake screens are given.

Construction and layout details of the containment sump should include:

(a) the degree to which the concept has been, or will be, proven sufficiently by experience, tests under simulated accident conditions, or conservative extrapolations from present knowledge;

(b) how the system will function during the entire period required to accomplish its intended purpose (e.g., include consideration of component reliability, system interdependency, redundancy and separation of components or portions of system); and

(c) provisions made for initial and periodic testing and surveillance.

An analysis of the containment sump should be given which describes the flow path and restrictions (including sizes) which a particle would follow in circulating the different systems which must use the sump as a source. An analysis describing the eventual fate of paint chips or other debris which may enter the sump should be presented.

VI. Boric acid sprays are used in the plant. The ability of the plant to raise the pH of the spray solution to at least 7 within four hours of the onset of the LOCA in order to preclude stress corrosion cracking is not given.

VII. As required by Section 6.2.3.4 of the SAR Guide

Provide information concerning the program of testing and inspection applicable to preoperational testing and in-service surveillance to assure a continued state of readiness to perform for those ventilation and cleanup systems required to reduce the radiological consequences of an accident. Results of tests performed and a detailed, updated program should be provided (FSAR).

RADIOLOGICAL ASSESSMENT BRANCH
DAVIS-BESSE
COMMENTS ON FSAR

Chapter 11 is approximately 80% completed from the standpoint of RAB--the most notable deficiencies being in omission of the radwaste system design and performance tests sections, and that the environmental radiological sampling program should be much further developed at this stage of licensing (and there should be some discussion of both preoperational and operational aspects of the program).

Chapter 11

The System Designs, Performance Tests, and pertinent experience for Gaseous and Liquid Radwaste Systems are not adequately presented. Applicant is referred to "Standard Format" sections 11.2.3, 11.2.5, 11.3.3, and 11.3.5.

Section 11.2.8

1) Present a map illustrating the location of Ohio Fishing District 1 with respect to discharge canal.

2) Give basis for the statement that a dilution factor of 5000 is conservative.

3) The text indicates that at 8.6 miles the dilution factor is 4070--justify the value of 5000 at 5 miles.

Section 11.6.3

Prepare a suitable map showing the site boundary and the location of all sampling points and indicate either in a table or on the map the types of samples to be taken at each point as well as the sampling frequency. Justify the selection of sampling locations.

The necessary sensitivity for I detection in milk should be at least 1pCi/l.

Describe the methods by which pulses of radioactivity, with half lives short in comparison to the sampling frequency, will be detected in the environment--for example, milk samples and I-131.

Indicate the following information on a map of suitable scale (the map showing the sampling locations would be acceptable). 1) The location of the nearest residences (within 3 miles) outside the site boundary, 2) the location of the nearest cows, 3) the location of the nearest possible pasture.

Appendix 11 A

The models for the calculation of dose to biota are not presented.

Chapter 12

The information provided in Chapter 12 is approximately 90% complete. The following items which are numbered in accordance with the sections of the FSAR to which they apply should be addressed so that RAB can complete their review.

12.1.4 Describe the records of in-plant area radiation levels that will be maintained and the length of time they will be retained.

12.1.6 Provide estimates of typical yearly external dose rates to plant personnel for normal operation. These estimates can be obtained by supplying the length of time (hrs/wk) personnel are expected to spend in the areas listed in Table 12-5A.

12.2.4 Describe the records of in-plant airborne radioactivity levels that will be maintained and the length of time for which they will be retained.

12.2.6 Provide estimates of typical yearly inhalation dose rates to plant personnel for normal operation.

12.3.1 Provide a description of the health physics program organization and the duties of individuals within the organization.

12.3.2.1 Indicate the personnel responsible for issuing radiation work permits and the information necessary for their issuance.

Based on the material presented in the FSAR, although lacking in certain respects, we feel that the presentation is acceptable. This acceptance is based on prompt submittal of the information necessary to complete these sections.