220.0 STRUCTURAL ENGINEERING BRANCH

220.1 (3.4.2) Provide information on any underdrains or pressure relieving systems used at the Palo Verde station.

220.2 Provide information on the strain levels of soil during an OBE and SEE, and the variations of soil strain with the depth and layering of the supporting soil media. Describe the procedure of using strain-dependent soil properties (damping and shear modulus) to model the soil-structure interaction system. To what extent is the computer program SHAKE used to develop strain-corrected damping values for foundation materials and what is the theoretical basis for such use?

220.3 (3.7.2) Explain why each of the Category I structures (containment building, auxiliary building, control building, and fuel building) have different sets of natural frequencies for OBE and for SSE. Do the natural frequencies listed in tables 3.7-3 through 3.7-6 represent the structural modes only, or the soil-structure interaction modes as well?

220.4 (3.7.2) Supply, for each mode of vibration listed in tables 3.7-3 through 3.7-6, the mode shape and its corresponding participating factor.

220.5 (3.72) Perform a comparative study of structural response results obtained by two different approaches of soil modeling to soil-structure interaction analyses: the half-space method (lumped parameter, compliance

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function, or impedance function methods) and the finite boundary method (also known as the finite element, shear beam, or one-dimensional shear wave methods). Quantities to be compared should include floor response spectra in typical Category I structures; e.g. at the basemat, operating floor and an upper elevation of the containment building, and at the basement and an intermediate elevation of the auxiliary building. The input ground motion or control motion should be applied at the foundation level as required by Appendix A to 10CFR100.

220.6 (3.7.3) Provide the specific number of earthquake cycles used in the design of subsystems of the Palo Verde Station. The Standard Review Plan 3.7.3 states that postulating one safe shutdown earthquake and five operating basis earthquakes with ten stress cycles per earthquake is acceptable.

220.7 (3.7.3) The criteria for combining responses of three components of earthquake motion have been stipulated in Regulatory Guide 1.92. The criteria suggested in NUREG/CR 0098 are for certain operating plants only and have not been approved for use at the Palo Verde station. The applicant should either provide justification for using the NUREG/CR 0098 criteria or commit to using R. G. 1.92 criteria for the Palo Verde seismic analysis.

220.8 (3.8.1) The acceptance of the topical report BC-TOP-5A as a reference for prestressed concrete nuclear reactor containment structures

excludes its applicability to subsection 3.8.1.6, Materials, Quality Control and Special Construction Techniques. Identify all deviations from PSAR commitments and all exceptions to accepted codes. Provide explanation and justification for these deviations and exceptions.

220.9 (3.8.3 3.8.4) Identify any deviations from the PSAR design criteria used for Category I structures and any exception to applicable accepted codes.. Provide explanation and justification for these deviations and exceptions.

220.10 (3.8.4) Are there any concrete masonry walls used in any of the Category I structures of the Palo Verde plant? If there are, provide answers to the following questions:

(a) Indicate the loads and load combinations which the walls are designed to resist. If load factors other than one (1.0) have been employed, indicate their magnitudes.

(b) In addition to complying with the applicable requirements of the SRP Sections 3.5, 3.7 and 3.8, is there any other code, such as the "Uniform Building Code" or the "Building Code Requirements for Concrete Masonry Structures" (proposed by the American Concrete Institute) which was or is being used to guide the design of these walls? Please identify and discuss any exceptions or deviations from the SRP requirements or the aforementioned codes.

(c) Indicate the method that you used to calculate the dynamic forces in masonry walls due to earthquake, i.e., whether it is a code method such as Uniform Building Code, or a dynamic analysis. Identify the code and its effective date if the code method has been used. Indicate the input motion if a dynamic analysis has been performed.

(d) How were the masonry walls and the piping/equipment supports attached to them designed? Provide enough (numerical) examples including details of reinforcement and attachments to illustrate the methods and procedures used to analyze and design the walls, and the anchors needed for supporting piping/equipment (as applicable).

(e) Provide plan and elevation views of the plant structures showing the location of all masonry walls for your facility.

260.0 QUALITY ASSURANCE

260.1. (17.2.0) Provide a statement that the responsibility for the PVNGS QA program is retained and exercised by APS during the operations phase.

260.2. (17.2.1) Identify and describe any major delegation of work involved in establishing and implementing the QA program for the operations phase of the PVNGS.

260.3. (17.2.1 & 13.1.1) Section 17.2.1.1.2 of the FSAR indicates that the Operations Executive Vice President is responsible for procurement. Figure 13.1-2 shows no procurement organization, and the FSAR does not describe the QA responsibilities of a procurement organization. Clarify.

260.4. (17.21. & 13.1.1) Figure 13.1-4 shows a Site Quality Assurance Supervisor and Site Quality Assurance Personnel reporting to the Quality Assurance Manager. These site personnel are not shown on Figure 17.2.1, and page 17.2-9 indicates the Quality Assurance Department is organized into but two sections. Clarify. Also, discuss the need of the QA Manager to have some full time onsite staff in order to verify effective implementation of the Corporate Operations QA Program.

260.5. (17.2.2) Section 17.2.2.2.2 states: "Quality verification is the basic responsibility of the organization or group performing the activity." Actually the organization or group performing a quality-related activity (Maintenance, Engineering, Operation, Procurement, etc.) should be responsible for the activity resulting in a quality product, and verification should be the responsibility of an "independent" organization. Discuss the separation of responsibilities by organization for performance of the work activities and for performance of quality control (quality verification).

260.6. (17.2.1) Clarify that the minimum qualification requirements for the Quality Assurance Manager include a) management experience and b) the requirements of Section 4.4.5 of ANSI/ANS-3.1-1978 as endorsed by Regulatory Guide 1.8.

260.7. (17.2.1) Identify (by position title) the person responsible for the onsite QA Program. The individual in this position should be free of non-QA duties such that he can give full attention to assuring that the QA program at the plant site is being effectively implemented.

260.8. (17.2.2) Section 17.2.2.3 addresses implementation of the operational QA program. Provide therein a commitment that the QA program for operations will be implemented at least 90 days prior to fuel loading.

260.9. (17.2.2) Provide a commitment that the QA program will be applied to the development, control, and use of computer programs and describe its application.

260.10. (17.2.2 & 3.2) Table 17.2-1 indicates that the Fire Protection QA Program is met as part of the QA Program under 10 CFR Part 50, Appendix B. Item 16 in Table 3.2-1 of the FSAR indicates that the PVNGS QA Program does not apply to the fire protection system. Clarify.

260.11. (17.2.2) Provide a commitment that special equipment, environmental conditions, skills, and processes will be provided as necessary.

260.12. (17.2.2) Provide a commitment to notify the NRC (cc: QA Branch) of a) changes to the QA program prior to implementation and b) organizational changes within 30 days after announcement. (Note that editorial changes and personnel reassignments which are not substantive need not be reported.)

260.13. (17.2.2 & 1.8) The following items refer to APS's position on QA-related regulatory guides and standards:

(1) Regulatory Guide 1.28 - Commitment should be to Revision 3, February 1976.

(2) Regulatory Guide 1.29 - Commitment should be to Revision 3, September 1978.

(3) Regulatory Guide 1.30 - Reference to the Bechtel quality program for construction should be deleted.

(4) Regulatory Guide 1.33 -

(a) Exception 1 is unacceptable. It is the staff position that proposed changes to technical specifications or license amendments be reviewed and approved by the independent review body prior to submittal to the NRC for approval.

(b) The interpretation regarding Section 5.2.2 of ANSI N18.7 is acceptable providing the other requirements of Section 5.2.2 are met.

(c) The interpretation regarding Section 5.2.17 of ANSI N18.7 is acceptable with the understanding that all deviations are documented and corrected.

(5) Regulatory Guide 1.37 - Reference to the Bechtel position during construction should be replaced by the APS position for comparable activities during the operations phase.

(6) Regulatory Guide 1.38 -

(a) Commitment should be to Revision 2, May 1977.

(b) Same as (5) above.

(7) Regulatory Guide 1.39 - Same as (5) above.

(8) Regulatory Guide 1.58 - Commitment should be to Rev. 1, September 1980.

(9) Regulatory Guide 1.64 -

(a) Commitment should be to Revision 2, June 1976.

(b) Same as (5) above.

(10) Regulatory Guide 1.88 - Commitment should be to Rev. 2, October 1976.

(11) Regulatory Guide 1.94 - Include APS Position on Rev. 1, April 1976.

(12) Regulatory Guide 1.116 - Include APS Position on Rev. 0-R, May 1977.

(13) Regulatory Guide 1.123 - Include APS Position on Rev. 1, July 1977.

(14) Regulatory Guide 1.144 - Include APS Position on Rev. 0, January 1979. (Note that this Reg. Guide references ANSI N45.2.12-1977 as listed in Table 17.2-1.)

(15) Regulatory Guide 1.146 - Include APS Position on Rev. 0, August 1980. (Note that this Reg. Guide references ANSI N45.2.23-1978 as listed in Table 17.2-1.)

260.14. (17.2.2) The last sentence of Section 17.2.2.4 indicates that Appendix 17B is a cross-reference of Appendix B to 10 CFR Part 50 and procedures in the Corporate Operations QA Manual. This is not what Appendix 17B contains, and it appears the reference should be to Table 17.2-2 on page 17.2-35 of the FSAR. Clarify.

260.15. (17.2.2) Describe how responsibilities and control of quality-related activities are transferred to APS during the phaseout of design and construction and during preoperational testing and plant turnover.

260.16. (17.2.2) In Section 17.2.2.9, "Personnel Indoctrination and Training," provide commitments that

(1) Personnel responsible for performing quality-affecting activities are instructed as to the purpose, scope, and implementation of the quality-related manuals, instructions, and procedures.

(2) Personnel verifying activities affecting quality are trained in the principles, techniques, and requirements of the activity being performed.

(3) Proficiency of personnel performing and verifying activities affecting quality is maintained by retraining, reexamining, and/or recertifying as determined by management or program commitment.

260.17. (17.2.3). Describe measures which assure that plant personnel are made aware on a timely basis of design changes/modifications which may affect the performance of their duties.

260.18. (17.2.3) The last paragraph in Section 17.2.3 commits APS to take action to prevent recurrence of errors or deficiencies in the design process. Include a commitment to also correct all such errors or deficiencies.

260.19. (17.2.3) Describe how APS differentiates between design documents which require formal design review by interdisciplinary or multi-organizational teams and those which can be reviewed by a single individual. Provide a list of typical examples of each. Include such documents as specifications, calculations, computer

programs, system descriptions, SAR when used as a design document, and drawings including flow diagrams, piping and instrument diagrams, control logic diagrams, electrical single line diagrams, structural systems for major facilities, site arrangements, and equipment locations.

260.20. (17.2.3) Clarify whether the responsibilities of the verifier, the areas and features to be verified, the pertinent considerations to be verified, and the extent of documentation are identified in procedures.

260.21. (17.2.3) Describe measures which assure that the following provisions are included if a design or a design feature is verified by test:

(1) Procedures provide criteria that specify when verification should be by test.

(2) Prototype, component or feature testing is performed as early as possible (i.e., prior to installation of plant equipment).

(3) The tests simulate the most adverse design conditions as determined by analysis.

260.22. (17.2.3) Describe measures which assure that only verified computer codes are certified for use and that only certified computer codes are used for design.

260.23. (17.2.4) Identify the APS organization(s) responsible for

(1) procurement planning;

(2) the preparation, review, approval, and control of procurement documents;

(3) supplier selection;

(4) bid evaluations; and

(5) review and concurrence of supplier QA programs prior to initiation of activities affected by the program.

Describe the involvement of the Nuclear Quality Assurance organization in these activities.

260.24. (17.2.5) Section 17.2.5 indicates the PVNGS Quality Section reviews and concurs with instructions, procedures, drawings, etc. which govern safety-related work at the site. Verify that this review determines:

(1) the need for inspection, identification of inspection personnel, and documentation of inspection results;

(2) that the inspection requirements, methods, and acceptance criteria are identified.

260.25. (17.2.7) To the list of documents in Section 17.2.6, add "as-built" documentation. Indicate which of the documents on the list are reviewed and concurred with by the QA organization with regards to QA-related aspects.

260.26. (17.2.6) Describe how APS assures that obsolete and superseded documents are removed and replaced by applicable revisions in work areas in a timely manner.

260.27. (17.2.6) Describe the document control system established by APS (Is a master list routinely updated and distributed to responsible personnel?) which identifies the applicable revision of instructions, procedures, specifications, drawings, and procurement documents.

260.28. (17.2.7) Section 17.2.7.2 states that surveys made by third parties such as CASE may be used to evaluate a potential supplier. Provide a commitment that, when such surveys are used, documentation identifies the survey used and provides evidence of review of the survey and its results by APS Quality Assurance.

260.29. (17.2.7 & 17.2.4) The last paragraphs of Sections 17.2.4.3 and 17.2.7.1 both address controls for the procurement of spare or replacement parts. It is not clear that these procurements are subject to the latest QA program controls and to codes, standards, and technical requirements equal to or better than originally imposed or as required to preclude repetition of defects. Clarify.

260.30. (17.2.7) Regarding receiving inspection:

(1) The last sentence in 17.2.7.4.1 states: "Receiving inspection will be conducted prior to release of items for installation or storage.". Change "conducted" to "completed" as this makes the sentence compatible with the last sentence of 17.2.7.5.

(2) Section 17.2.7.5 does not make it clear that items are not installed or used prior to supplier/contractor documentation being available at the site. Clarify.

260.31. (17.2.7) The last sentence of 17.2.7.4.2 places the responsibility for selecting the measures to be used for acceptance of "services only" contracts with the organization responsible for the procurement action. Make QA a party to such decisions or justify not doing so.

260.32. (17.2.7) Describe how APS evaluates the validity of suppliers' certificates of conformance.

260.33. (17.2.8) Describe measures which assure the verification of correct material, parts, and components immediately prior to installation.

260.34. (17.2.9) Provide a more nearly complete list of processes that are controlled as special processes by APS.

260.35. (17.2.9) Identify the APS organizations involved in qualifying special processes used at PVNGS and describe the responsibilities of each.

260.36. (17.2.10) Describe measures which assure that when inspections associated with normal operations of the plant (such as routine maintenance, surveillance, and tests) are performed by individuals other than those who performed or directly supervised the work, but are within the same group, the following controls are met:

(1) The quality of the work is demonstrated through a functional test when the activity involves breaching a pressure retaining item.

(2) The inspection procedures, personnel qualification criteria, and independence from undue pressure such as cost and schedule are reviewed and found acceptable by the QA organization prior to initiating the inspection.

260.37. (17.2.10) Describe measures which assure that a qualification program for inspectors is established and documented, and the qualifications and certifications of inspectors are kept current.

260.38. (17.2.10) Expand the list of items included in inspection procedures, instructions, and checklists on page 17.2-46 to include

(1) Identification of applicable procedures, drawings, and specifications and revisions.

(2) Identification of the required measuring and test equipment.

260.39. (17.2.10) Describe how APS assures that inspection results are documented, evaluated, and their acceptability determined by a responsible individual or group.

260.40. (17.2.11) Section 17.2.11 at the top of page 17.2-50 states regarding test control that administrative procedures "will be developed and implemented...." Provide a schedule.

260.41. (17.2.12) Identify the APS organizations involved in establishing, implementing, and assuring effectiveness of the PVNGS calibration program, and describe the responsibilities of each.

260.42. (17.2.12) Provide a commitment that calibration of measuring and test equipment is against standards that have an accuracy of at least four times the required accuracy of the equipment being calibrated or, when this is not possible, have an accuracy that assures the equipment being calibrated will be within required tolerance and that the basis of acceptance is documented and authorized by responsible management. Also provide a commitment that calibrating standards have greater accuracy than standards being calibrated. (Calibrating standards with the same accuracy may be used if it can be shown to be adequate for the requirements and the basis of acceptance is documented and authorized by responsible management.)

260.43. (17.2.13) Describe provisions for the storage of chemicals, reagents (including control of shelf life), lubricants, and other consumable materials.

260.44. (17.2.15) Identify the organizations which have the authority and responsibility to identify nonconformances, to disposition nonconformances, and to independently review nonconformances, their disposition, and closeout. Describe in more detail the APS nonconformance control procedure.

260.45. 17.2.15) Clarify that nonconformances will be corrected or resolved before beginning preoperational testing of the nonconforming items.

260.46. (17.2.16) Part 17.2.16 uses the expression "conditions adverse to quality" throughout. In part 17.2.16 or in Appendix B, define what this expression means. Also describe the directions provided to aid in the determination of whether or not a "condition adverse to quality" is significant.

260.47. (17.2.16) Describe measures which assure that corrective action is taken and closed out in a timely manner.

260.48. (17.2.17) Identify the organization(s) under the Plant Manager responsible for implementing activities related to QA records.

260.49. (17.2.18) Clarify that audit schedules are routinely updated to reflect status, that audit schedules include the audits conducted by the PVNGS Quality Section, and that results of audits conducted by the PVNGS Quality Section are provided to the Quality Assurance Department for review and assessment.

281.0 CHEMICAL ENGINEERING BRANCH

281.1 (6.1.1, 6.5.2) In the FSAR you indicated that, following an accident which requires operation of the containment spray system, hydrazine will be used in the spray water for short-term injection and trisodium phosphate will be added to the sump water for long-term recirculation. In view of the fact that trisodium phosphate has a tendency to cake, it may not be readily dissolved in the sump water following the accident. Provide design basis information and a proposed surveillance program to ensure that by commencement of the recirculation of sump water, sufficient trisodium phosphate will be dissolved in the sump water to achieve a pH value of at least 8.5.

281.2 (9.1.3) For the fuel pool cleanup system, indicate that chemical analyses / at least weekly and continuous radiological monitoring will be made for measuring the efficiency of the filters and ion exchange resins to remove impurities and radioactive materials from the pool water. State what criteria (chemical parameters, decontamination factors, etc.) will be used to determine replacement of the filters and ion exchange resins.

281.3 (9.3.2 and Action Plan II.B.3) Describe the provisions to meet the requirements of post-accident sampling of the primary coolant and containment atmosphere. The description should address all the requirements outlined in Section II.B.3 of Enclosure 3 in NUREG-0737 (Clarification of TMI Action Plan Requirements) and should include the appropriate P & ID's. In addition, if gas chromatography is used for reactor coolant analysis, special provisions (e.g., pressure relief and purging) should be provided to prevent high-pressure carrier gas from entering the reactor coolant. With respect to clarification (4) in Section II.B.3 of NUREG-0737, if the chloride concentration in the reactor coolant samples exceeds the limit in the Technical Specification, oxygen analysis will be mandatory. Provide also either (a) a summary description of procedures for sample collection, sample transfer or transport, and sample analysis, or (b) copies of procedures for sample collection, sample transfer or transport, and sample analysis.

281.4 (6.1.2) Indicate the total amount of protective coatings, paints, and organic materials (including uncovered cable insulation) used inside the containment that do not meet ANSI N101.2 (1972) and Regulatory Guide 1.54.

282.0 CHEMICAL ENGINEERING BRANCH

282.1 (9.1.2.3) Provide fabrication details of the Boral tube inserts to be used in the spent fuel storage pool. Provide details of the kind and thickness of the cladding of the Boral. Explain how exposed Boral matrix (Boron carbide) is protected from the borated pool water. Describe the corrosion protection of the Boral tube.

282.0

282.2 (10.3.5) Provide the steam generator secondary water chemistry control and monitoring program, addressing the following:

1. Sampling schedule for the critical parameters and of control points for these parameters for each mode of operation: normal operation, hot startup, cold startup, hot shutdown, cold wet layup;

2. Procedures used to measure the values of the critical parameters;

3. Process sampling points;

4. Procedure for the recording and management of data;

5. Procedures defining corrective actions* for off-control point chemistry conditions; and

6. The procedure identifying (a) the authority responsible for the interpretation of the data and (b) the sequence and timing of administrative events required to initiate corrective action.

Verify that the steam generator secondary water chemistry control program incorporates technical recommendations of the NSSS. Any significant deviations from NSSS recommendations should be noted and justified technically.

In addition to the secondary water chemistry monitoring and control program, we require monitoring of the steam condensate at the effluent of the condensate pump. The monitoring of the condensate is for the purpose of detecting condenser leakage.

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*Branch Technical Position MTEB 5-3 describes the acceptable means for monitoring secondary side water chemistry in PWR steam generators, including corrective actions for off-control point chemistry conditions. However, the staff is amenable to alternatives, particularly to Branch Technical Position B.3.b(9) of MTEB 5-3 (96-hour time limit to repair or plug confirmed condenser tube leaks).

430.0 POWER SYSTEMS BRANCH

430.1 (8.3) Provide a detailed discussion (or plan) of the level of training proposed for your operators, maintenance crew, quality assurance, and supervisory personnel responsible for the operation and maintenance of the emergency diesel generators. Identify the number and type of personnel that will be dedicated to the operations and maintenance of the emergency diesel generators and the number and type that will be assigned from your general plant operations and maintenance groups to assist when needed.

In your discussion identify the amount and kind of training that will be received by each of the above categories and the type of ongoing training program planned to assure optimum availability of the emergency generators.

Also discuss the level of education and minimum experience requirements for the various categories of operations and maintenance personnel associated with the emergency diesel generators.

430.2 (8.3) (RSP) Periodic testing and test loading of an emergency diesel generator in a nuclear power plant is a necessary function to demonstrate the operability, capability and availability of the unit on demand Periodic testing coupled with good preventive maintenance practices will assure optimum equipment readiness and availability on demand. This is the desired goal.

To achieve this optimum equipment readiness status the the following requirements should be met:

1. The equipment should be tested with a minimum loading of 25 percent of rated load. No load or light load operation will cause incomplete combustion of fuel resulting in the formation of gum and varnish deposits on the cylinder walls, intake and exhaust valves, pistons and piston rings, etc., and accumulation of unburned fuel in the turbocharger and exhaust system. The consequences of no load or light load operation are potential equipment failure due to the gum and varnish deposits and fire in the engine exhaust system.

2. Periodic surveillance testing should be performed in accordance with the applicable NRC guidelines (R.G. 1.108), and with the recommendations of the engine manufacturer. Conflicts between any such recommendations and the NRC guidelines, particularly with respect to test frequency, loading and duration, should be identified and justified.

3. Preventive maintenance should go beyond the normal routine adjustments, servicing and repair of components when a malfunction occurs. Preventive maintenance should encompass investigative testing of components which have a history of repeated malfunctioning and require constant attention and repair. In such cases consideration should be given to replacement of those components with other products which have a record of demonstrated reliability, rather than repetitive repair and maintenance of the existing components. Testing of the unit after adjustments or repairs have been made only confirms that the equipment is operable and does not necessarily mean that the root cause of the problem has been eliminated or alleviated.

4. Upon completion of repairs or maintenance and prior to an actual start, run, and load test a final equipment check should be made to assure that all electrical circuits are functional, i.e., fuses are in place, switches and circuit breakers are in their proper position, no loose wires, all test leads have been removed, and all valves are in the proper position to permit a manual start of the equipment. After the unit has been satisfactorily started and load tested, return the unit to ready automatic standby service and under the control of the control room operator.

Provide a discussion of how the above requirements have been implemented in the emergency diesel generator system design and how they will be considered when the plant is in commercial operation, i.e., by what means will the above requirements be enforced.

430.3 (8.3) RSP The availability on demand of an emergency diesel generator is dependent upon, among other things, the proper functioning of its controls and monitoring instrumentation. This equipment is generally panel mounted and in some instances the panels are mounted directly on the diesel generator skid. Major diesel engine damage has occurred at some operating plants from vibration induced wear on skid mounted control and monitoring instrumentation. This sensitive instrumentation is not made to withstand and function accurately for prolonged periods under continuous vibrational stresses normally encountered with internal combustion engines. Operation of senstive instrumentation under this environment rapidly deteriorates calibration, accuracy and control signal output.

Therefore, except for sensors and other equipment that must be directly mounted on the engine or associated piping, the controls and monitoring instrumentation should be installed on a free standing floor mounted panel separate from the engine skids, and located on a vibration free floor area. If the floor is not vibration free, the panel shall be equipped with vibration mounts.

Confirm your compliance with the above requirement or provide justification for noncompliance.

430.4 (9.5.2) The information regarding the onsite communications system (Section 9.5.2) does not adequately cover the system capabilities during transients and accidents. Provide the following information:

(a) Identify all working stations on the plant site where it may be necessary for plant personnel to communicate with the control room or the emergency shutdown panel during and/or following transients and/or accidents (including fires) in order to mitigate the consequences of the event and to attain a safe cold plant shutdown.

(b) Indicate the maximum sound levels that could exist at each of the above identified working stations for all transients and accident conditions.

(c) Indicate the types of communication systems available at each of the above identified working stations.

(d) Indicate the maximum background noise level that could exist at each working station and yet reliably expect effective communication with the control room using:

1. the page party communications systems, and
2. any other additional communication system provided that working station.

(e) Describe the performance requirements and tests that the above onsite working stations communication systems will be required to pass in order to be assured that effective communication with the control room or emergency shutdown panel is possible under all conditions.

(f) Identify and describe the power source(s) provided for each of the communications systems.

(g) Discuss the protective measures taken to assure a functionally operable onsite communication system. The discussion should include the considerations given to component failures, loss of power, and the severing of a communication line or trunk as a result of an accident or fire.

430.5 (9.5.3) Identify the vital areas and hazardous areas where emergency lighting is needed for safe shutdown of the reactor and the evacuation of personnel in the event of an accident. Tabulate the lighting system provided in your design to accommodate those areas so identified. Include the degree of compliance to Standard Review Plan 9.5.1 regarding emergency lighting requirements in the event of a fire.

430.6 (9.5.4) Describe the instruments, controls, sensors and alarms provided for monitoring the diesel engine fuel oil storage and transfer system and describe their function. Discuss the testing necessary to maintain and assure a highly reliable instrumentation, controls, sensors and alarm system and where the alarms are annunciated. Identify the temperature, pressure and level sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe what operator actions are required during alarm conditions to prevent harmful effects to the diesel engine. Discuss the system interlocks provided. (SRP 9.5.4, Part III, item 1).

430.7 (9.5.4) The diesel generator structures are designed to seismic and tornado criteria and are isolated from one another by a reinforced concrete wall barrier. Describe the barrier (including openings) in more detail and its capability to withstand the effects of internally generated missiles resulting from a crankcase explosion, failure of one or all of the starting air receivers, or failure of any high or moderate energy line and initial flooding from the cooling system so that the assumed effects will not result in loss of an additional generator. (SRP 9.5.4, Part III, Item 2).

430.8 (9.5.4) Describe your design provisions made to protect the fuel oil storage tank fill and vent lines from damage by tornado missiles. (SRP 9.5.4, Part II).

430.9 (9.5.4) Discuss the means for detecting or preventing growth of algae in the diesel fuel storage tank. If it were detected, describe the methods to be provided for cleaning the affected storage tank. (SRP 9.5.4, Part III, Item 4).

430.10 (9.5.4) In section 9.5.4.2.1 you state that the diesel fuel oil storage tanks are protected from corrosion in accordance with recommended practice "Control of External Corrosion on Underground or Submerged Piping Systems," RP-01-69 as published by the National Association of Corrosion Engineers. This statement is incomplete; it does not discuss the buried piping or internal corrosion of the storage tanks due to water in the fuel oil. Expand the FSAR to include a more explicit description of proposed protection of underground piping. Where corrosion protective coatings are being considered (piping and tanks) include additional industry standards which will be used in their application. Also discuss what provisions will be made in the design of the fuel oil storage and transfer system in the use of a impressed current type cathodic protection system, in addition to waterproof protective coatings, to minimize corrosion of buried piping or equipment. If cathodic protection is not being considered, provide your justification. (SRP 9.5.4, Part II, and Part III, item 4).

430.11 (3.2) (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8) The FSAR text and Table 3.2-1 states that the components and piping systems for the diesel generator auxiliaries (fuel oil system, cooling water, lubrication, air starting, and intake and combustion system) that are mounted on the auxiliary skids are designed seismic Category I and are ASME Section III Class 3 quality. The engine mounted components and piping are designed and manufactured to DEMA standards, and are seismic Category I. This is not in accordance with Regulatory Guide 1.26 which requires the entire diesel generator auxiliary systems be designed to ASME Section III Class 3 or Quality Group C. Provide the industry standards that were used in the design, manufacture, and inspection of the engine mounted piping and components. Also show on the appropriate P&ID's where the Quality Group Classification changes from Quality Group C.

430.12 (9.5.4) Section 9.5.4.2 emergency diesel engine fuel oil storage and transfer system (EDEFSS) does not specifically reference Regulatory Guide 1.137 and ANSI Standard N195 "Fuel Oil Systems for Standby Diesel Generators." Indicate if you intend to comply with this regulatory guide and standard in your design of the EDEFSS; otherwise provide justification for noncompliance. (SRP 9.5.4, Rev. 1, Part II, item 12).

430.13 (9.5.4) Discuss what precautions have been taken in the design of the fuel oil system in locating the fuel oil day tank and connecting fuel oil piping in the diesel generator room with regard to possible exposure to ignition sources such as open flames and hot surfaces. (SRP 9.5.4, Part III, Item 6).

430.14 (9.5.4) Discuss the precautionary measures that will be taken to assure the quality and reliability of the fuel oil supply for emergency diesel generator operation. Include the type of fuel oil, impurity and quality limitations as well as diesel index number or its equivalent, cloud point, entrained moisture, sulfur, particulates and other deliterious insoluble substances; procedure for testing newly delivered fuel, periodic sampling and testing of on-site fuel oil (including interval between tests), interval of time between periodic removal of condensate from fuel tanks and periodic system inspection. In your discussion include reference to industry (or other) standard which will be followed to assure a reliable fuel oil supply to the emergency generators. (SRP 9.5.4, Part III, items 3 and 4).

430.15 (9.5.4) Provide additional justification to support your statement in section 9.5.4.4 that sufficient additional fuel can be delivered to the plant site by truck, rail or helicopter. In your discussion include sources where diesel quality fuel oil is available and distances travelled from the source to the plant. Also discuss how fuel oil will be delivered onsite under extremely unfavorable environmental conditions, including probable maximum flood conditions.

430.16 (9.5.4) You state in section 9.5.4.2 that the diesel generator fuel oil storage tank is provided with an individual fill and vent line. Indicate where these lines are located (indoor or outdoor) and the height these lines are terminated above finished ground grade. If these lines are located outdoors discuss the provisions made in your design to prevent entrance of water into the storage tank during adverse environmental conditions.

430.17 (9.5.5) Section 9.5.5 indicates that the function of the diesel generator cooling water system is to dissipate the heat transferred through the: 1) engine water jacket, 2) combustion air (intake) cooler, and 3) engine turbo charger. Provide information on the individual component heat removal rates (but/hr), flow (lbs/hr) and temperature differential (°F) and the total heat removal rate required. Also provide the design margin (excess heat removal capacity) included in the design of major components and subsystems. (SRP 9.5.5, Part III, Item 1).

430.18 (9.5.5) Provide the results of a failure mode and effects analysis to show that failure of a piping connection between subsystems (engine water jacket, lube oil cooler, service water system, combustion air (intake) cooler, and engine turbocharger cooler) does not cause total degradation of the diesel generator cooling water system. (SRP 9.5.5, Part III, Item 1a).

430.19 (9.5.5) You state in section 9.5.5.1 the diesel engine cooling water is treated as appropriate to minimize corrosion. Provide additional details of your proposed diesel engine cooling water system chemical treatment with regards to corrosion and organic fouling, and discuss how your proposed treatment complies with the engine manufacturers recommendations. (SRP 9.5.5, Part III, Item 1c)..

430.20 (9.5.5) Describe the instrumentation, controls, sensors and alarms provided for monitoring of the diesel engine cooling water system and describe their function. Discuss the testing necessary to maintain and assure a highly reliable instrumentation, controls, sensors, and alarm system, and where the alarms are annunciated. Identify the temperature, pressure, level, and flow (where applicable) sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe what operator actions are required during alarm conditions to prevent harmful effects to the diesel engine. Discuss the systems interlocks provided. (SRP 9.5.6, Part III, item 1c).

430.21 (9.5.5) The diesel generators are required to start automatically on loss of all offsite power and in the event of a LOCA. The diesel generator sets should be capable of operation at less than full load for extended periods without degradation of performance or reliability. Should a LOCA occur with availability of offsite power, discuss the design provisions and other parameters that have been considered in the selection of the diesel generators to enable them to run unloaded (on standby) for extended periods without degradation of engine performance or reliability. Expand your PSAR/FSAR to include and explicitly define the capability of your design with regard to this requirement. (SRP 9.5.5, Part III, Item 7).

430.22 (9.5.5) You state in section 9.5.5.2 each diesel engine cooling water system is provided with a surge tank to provide for system expansion and for venting air from the system. In addition to the items mentioned, the surge tank is to provide for minor system leaks at pump shafts seals, valve stems and other components, and to maintain required NPSH on the system circulating pump. Provide the size of the expansion tank and location. Demonstrate by analysis that the expansion tank size will be adequate to maintain required pump NPSG and make up water for seven days continuous operation of the diesel engine at full rated load without makeup, or provide a seismic Category I, safety Class 3 make up water supply to the expansion tank.

430.23 (9.5.5) Provide the source of power for the diesel engine motor driven recirculation jacket water pump and electric jacket water heater. Provide the motor and electric heater characteristics, i.e., motor hp., operating voltage, phase(s), frequency and kw output as applicable. Also include the pump capacity and discharge head. Revise the FSAR accordingly.

430.24 (9.5.6) Provide a discussion of the measures that have been taken in the design of the standby diesel generator air starting system to preclude the fouling of the air start valve or filter with moisture and contaminants such as oil carryover and rust. (SRP 9.5.6, Part III, item 1).

430.25 (9.5.6) Describe the instrumentation, controls, sensors and alarms provided for monitoring the diesel engine air starting system, and describe their function. Describe the testing necessary to maintain a highly reliable instrumentation, control, sensors and alarm system and where the alarms are annunciated. Identify the temperature, pressure and level sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe any operator actions required during alarm conditions to prevent harmful effects to the diesel engine. Discuss system interlocks provided. Revise your FSAR accordingly. (SRP 9.5.6, Part III, item 1).

430.26 (9.5.6) Provide the source of power for the diesel engine air starting system compressors and motor characteristics, i.e., motor hp, operating voltage, phase(s), and frequency. Revise your FSAR accordingly.

430.27 (9.5.7) For the diesel engine lubrication system in Section 9.5.7 provide the following information: 1) define the temperature differentials, flow rate, and heat removal rate of the interface cooling system external to the engine and verify that these are in accordance with recommendations of the engine manufacturer; 2) discuss the measures that will be taken to maintain the required quality of the oil, including the inspection and replacement when oil quality is degraded; 3) describe the protective features (such as blowout panels) provided to prevent unacceptable crankcase explosion and to mitigate the consequences of such an event; and 4) describe the capability for detection and control of system leakage. (SRP 9.5.7, Part II, Items 8a, 8b, 8c, Part III, Item 1.)

430.28 (9.5.7) What measures have been taken to prevent entry of deliterious materials into the engine lubrication oil system due to operator error during recharging of lubricating oil or normal operation. (SRP 9.5.7, Part III, Item 1c).

430.29 (9.5.7) Describe the instrumentation, controls, sensors and alarms provided for monitoring the diesel engine lubrication oil system and describe their function. Describe the testing necessary to maintain a highly reliable instrumentation, control, sensors and alarm system and where the alarms are annunicated. Identify the temperature, pressure and level sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe any operator action required during alarm conditions to prevent harmful effects to the diesel engine. Discuss systems interlocks provided. Revise your FSAR accordingly. (SRP 9.5.7, Part III, item 1e).

430.30 (9.5.7) Provide the source of power for the diesel engine prelube oil pump, and lube oil circulation heater and used lube oil tank transfer pump, and motor characteristics, i.e., motor hp, operating voltage, phase(s) and frequency. Also provide the pump capacity and discharge head. Revise your FSAR accordingly.

430.31 (9.5.7) RSP Several fires have occurred at some operating plants in the area of the diesel engine exhaust manifold and inside the turbocharger housing which have resulted in equipment unavailability. The fires were started from lube oil leaking and accumulating on the engine exhaust manifold and accumulating and igniting inside the turbocharger housing. Accumulation of lube oil in these areas, on some engines, is apparently caused from an excessively long prelube period, generally longer than five minutes, prior to manual starting of a diesel generator. This condition does not occur on an emergency start since the prelube period is minimal.

When manually starting the diesel generators for any reason, to minimize the potential fire hazard and to improve equipment availability, the prelube period should be limited to a maximum of three to five minutes unless otherwise recommended by the diesel engine manufacturer. Confirm your compliance with this requirement or provide your justification for requiring a longer prelube time interval prior to manual starting of the diesel generators. Provide the prelube time interval your diesel engine will be exposed to prior to manual start.

430.32 (9.5.8) Describe the instrumentation, controls, sensors and alarms provided in the design of the diesel engine combustion air intake and exhaust system which alert the operator when parameters exceed ranges recommended by the engine manufacturer and describe any operator action required during alarm conditions to prevent harmful effects to the diesel engine. Discuss systems interlocks provided. Revise your FSAR accordingly. (SRP 9.5.8, Part III, item 1 & 4).

430.33 (9.5.8) Provide the results of an analysis that demonstrates that the function of your diesel engine air intake and exhaust system design will not be degraded to an extent which prevents developing full engine rated power or cause engine shutdown as a consequence of any meteorological or accident condition. Include in your discussion the potential and effect of fire extinguishing (gaseous) medium, recirculation of diesel combustion products, or other gases that may intentionally or accidentally be released on site, on the performance of the diesel generator. (SRP 9.5.8, Part III, item 3).

430.34 (9.5.8) Discuss the provisions made in your design of the diesel engine combustion air intake and exhaust system to prevent possible clogging, during standby and in operation, from abnormal climatic conditions (heavy rain, freezing rain, dust storms, ice and snow) that could prevent operation of the diesel generator on demand. (SRP 9.5.8, Part III, item 5).

430.35 (9.5.8) Show by analysis that a potential fire in the diesel generator building together with a single failure of the fire protection system will not degrade the quality of the diesel combustion air so that the remaining diesel will be able to provide full rated power.

430.36 (9.5.8) Experience at some operating plants has shown that diesel engines have failed to start due to accumulation of dust and other deliterious material on electrical equipment associated with starting of the diesel generators (e.g., auxiliary relay contacts, control switches - etc.). Describe the provisions that have been made in your diesel generator building design, electrical starting system, and combustion air and ventilation air intake design(s) to preclude this condition to assure availability of the diesel generator on demand.

Also describe under normal plant operation what procedure(s) will be used to minimize accumulation of dust in the diesel generator room; specifically address concrete dust control. In your response also consider the condition when Unit 1 is in operation and Unit 2 is under construction (abnormal generation of dust).

430.37 (10.1) Provide a general discussion of the criteria and bases of the various steam and condensate instrumentation systems in section 10.1 of the FSAR. The FSAR should differentiate between normal operation instrumentation and required safety instrumentation.

430.38 (10.2) Expand your discussion of the turbine speed control and overspeed protection system. Provide additional explanation of the turbine and generator electrical load following capability for the turbine speed control system with the aid of system schematics (including turbine control and extraction steam valves to the heaters). Tabulate the individual speed control protection devices (normal emergency and backup), the design speed (or range of speed) at which each device begins operation to perform its protective function (in terms of percent of normal turbine operating speed). In order to evaluate the adequacy of the control and overspeed protection system provide schematics and include identifying numbers to valves and mechanisms (mechanical and electrical) on the schematics. Describe in detail, with references to the identifying numbers, the sequence of events in a turbine trip including response times, and show that the turbine stabilizes. Provide the results of a failure mode and effects analysis for the overspeed protection systems. Show that a single steam valve failure cannot disable the turbine overspeed trip from functioning. (SRP 10.2, Part III, items 1, 2, 3 and 4).

430.39 (10.2) The FSAR discusses the main steam stop and control, and reheat stop and intercept valves. Show that a single failure of any of the above valves cannot disable the turbine overspeed trip functions. (SRP 10.2, Part III, Item 3).

430.40 (10.2) Expand your discussion of the inservice inspection program for throttle-stop, control, reheat stop and interceptor steam valves to include inspection times and the capability for testing essential components during turbine generator system operation. (SRP 10.2, Part III, items 5 and 6).

430.41 (10.2) Discuss the effects of a high and moderate energy piping failure or failure of the connection from the low pressure turbine to condenser on nearby safety related equipment or systems. Discuss what protection will be provided the turbine overspeed control system equipment, electrical wiring and hydraulic lines from the effects of a high or moderate energy pipe failure so that the turbine overspeed protection system will not be damaged to preclude its safety function. (SRP 10.2, Part III, Item 8).

430.42 (10.2) In section 10.2.3.6 you discuss in-service inspection and exercising of the main steam turbine stop and control and reheater stop and intercept valves. You do not discuss the in-service inspection, testing and exercising of the extraction steam valves. Provide a detail description of: 1) the extraction steam valves, and 2) your inservice inspection and testing program for these valves. Also provide the time interval between periodic valve exercising to assure the extraction steam valves will close on turbine trip.

430.43 (10.2) Describe with the aid of drawings, the bulk hydrogen storage facility including its location and distribution system. Include the protective measures considered in the design to prevent fires and explosions during operations such as filling and purging the generator, as well as during normal operations.

430.44 (10.2) Section 10.2.1.3 references the CESSAR turbine generator interface requirements of section 5.1.4 and 7.2.3. The CESSAR FSAR sections 5.1.4 and 7.2.3 do not contain any turbine generator interface requirements. Clarify this inconsistency, provide the CESSAR interface requirements and an evaluation of how you are meeting those requirements.

430.45 (10.3) As explained in issue No. 1 of NUREG of 0138, credit is taken for all valves downstream of the Main Steam Isolation Valve (MSIV) to limit blowdown of a second steam generator in the event of a steam line break upstream of the MSIV. In order to confirm satisfactory performance following such a steam line break provide a tabulation and descriptive text (as appropriate) in the PSAR of all flow paths that branch off the main steam lines between the MSIV's and the turbine stop valves. For each flow path originating at the main steam lines, provide the following information:

a) System identification
b) Maximum steam flow in pounds per hour.
c) Type of shut-off valve(s)
d) Size of valve(s)

e) Quality of the valve(s)

f) Design code of the valve(s)

g) Closure time of the valve(s)

h) Actuation mechanism of the valve(s) (i.e., Solenoid operated, motor operated, air operated diagram valve, etc.)

i) Motive or power source for the valve actuating mechanism

In the event of the postulated accident, termination of steam flow from all systems identified above, except those that can be used for mitigation of the accident, is required to bring the reactor to a safe cold shut-down. For these systems describe what design features have been incorporated to assure closure of the steam shut-off valve(s). Describe what operator actions (if any) are required.

If the systems that can be used for mitigation of the accident are not available or de.ision is made to use other means to shut down the reactor describe how these systems are secured to assure positive steam shut-off. Describe what operator actions (if any) are required.

If any of the requested information is presently included in the FSAR text, provide only the references where the information may be found.

430.46 (10.4.1) Provide a tabulation in your FSAR showing the physical characteristics and performance requirements of the main condensers. In your tabulation include such items as; 1) the number of condenser tubes, material and total heat transfer surface, 2) overall dimensions of the condenser, 3) number of pauses, 4) hot well capacity, 5) special design features, 6) minimum heat transfer, 7) normal and maximum steam flows, 8) normal and maximum cooling water temperature, 9) normal and maximum exhaust steam temperature with no turbine by-pass flow and with maximum turbine by-pass flow, 10) limiting oxygen content in the condensate in cc per liter, and 11) other pertinent data. (SRP 10.4.1, Part III, item 1).

430.47 (10.4.1) Discuss the measures taken; 1) to prevent loss of vacuum, and 2) to prevent corrosion/errosion of condensertubes and components. (SRP 10.4.1, Part III, item 1).

430.48 (10.4.1) Indicate and describe the means of detecting and controlling radioactive leakage into and out of the condenser and the means for processing excessive amounts. (SRP 10.4.1, Part III, item 2).

430.49 (10.4.1) Discuss the measures taken for detecting, controlling and correcting condenser cooling water leakage into the condensate stream, (SRP 10.4.1, Part III, item 2)

430.50 (10.4.1) In section 10.4.1.4 you have discussed tests and initial field inspection but not the frequency and extent of inservice inspection of the main condenser. Provide this information in the FSAR. (SRP 10.4.1, Part II).

430.51 (10.4.1) Indicate what design provisions have been made to preclude failures of condenser tubes or components from turbine by-pass blowdown or other high temperature drains into the condenser shell. (SRP 10.4.1, Part III, item 3).

430.52 (10.4.1) Discuss the effect of loss of main condenser vacuum on the operation of the main steam isolation valves (SRP 10.4.1, Part III, item 3).

430.53 (10.4.4) Provide additional description (with the aid of drawings) of the turbine by-pass valves and associated instrumentation and controls. In your discussion include the number, size, principle of operation, construction, set points, and capacity of each valve and the malfunctions and/or modes of failure considered in the design of the turbine by-pass system. (SRP 10.4.4, Part III, Item 1.)

430.54 (10.4.4) Provide the results of an analysis indicating that failure of the turbine by-pass system high energy line will not have an adverse effect or preclude operation of the turbine speed control system or any safety related components or systems located close to the turbine by-pass system. (SRP 10.4.4, Part III, item 4).

430.55 (10.4.4) In section 10.4.4.4 you have discussed tests and initial field inspection but not the frequency and extent of inservice testing and inspection of the turbine by-pass system. Provide this information in the FSAR. (SRP 10.4.4, Part II).

430.56 (10.4.4) Section 10.4.4 of your FSAR refers to section 10.4.4 of CESSAR for additional discussion of the turbine bypass system. Your turbine bypass system differs from the one discussed in CESSAR, in that two of your bypass valves dump to atmosphere while in CESSAR they do not. Provide a discussion to show that your system meets the eleven (11) design bases stated in section 10.4.4.1 of CESSAR.

450.0 ACCIDENT EVALUATION BRANCH

450.1 (3.5.1.4, PVNGS) Provide the locations of all safety-related equipment not contained within reinforced concrete buildings or structures. Provide the structural composition of all walls and roofs of buildings housing safety-related equipment, as well as the building locations. Discuss the sizes and directional orientations of any openings in these buildings.

450.2 (3.5.1.4, PVNGS) Describe the protection of the control room air intakes and diesel generator exhaust pipes from tornado-generated missiles.

450.3 (6.4, PVNGS) In your description of the control room's protective features, provide the time interval between the time the chlorine concentration exceeds 5 ppm at the isolation dampers and the time the dampers are completely closed.

450.4 (6.4, PVNGS) List the areas, equipment and materials to which the control room operator has access during emergency operation, i.e., during the time the control room is serviced by the emergency ventilation system.

450.5 (6.4, PVNGS) In your analysis of toxic gas protection for control room personnel, provide the number and type of respiratory devices, the type of operator training for respiratory use, the estimated time for donning or deploying the equipment, the length of time the equipment can be used, and the equipment testing and maintenance procedures.

450.6 (6.5.2, PVNGS) On page 6.5-27 of the PVNGS FSAR, it is stated that the post-LOCA sump pH shall be raised to a minimum of 7.0. It is not clear that the pH, by itself, is high enough to prevent iodine evolution from the sump. Explain how evolution of iodine from the post-LOCA sump will be prevented, or kept to a very low level.

450.7 (6.5.2, PVNGS) Please provide spray nozzle performance data (spray droplet pattern, drop size distribution) for Spraco 17071417 and 17651308 nozzles.

450.8 (6.5.2, PVNGS) The discussion on pages 6.5-8 and 6.5-9 implies that 100% of the containment net free volume (above 100 ft. elev.) is sprayed. State whether this implication is true and provide justification for the spray coverages assumed in your analysis.

450.9 (15.1.5(A), PVNGS; and 15.1.5 CESSAR)

Justify your conclusion that the radiological releases from main steam line failure outside containment are no more adverse than the releases from small steam line breaks outside containment and upstream of the main steam isolation valves (CESSAR Section 15.1.4.2). Also, provide the assumptions and dose calculations for both the main steam line failure outside containment and the small steam line break outside containment upstream of the main steam isolation valves.

450.10 (15.6.5, PVNGS ; 15.6.4, and 15.6.5 CESSAR)

In evaluating the double-ended break of the letdown line outside containment, provide the following:

(1) summary of primary system's iodine activity, including the potential increase in iodine release rate (iodine spiking) above the equilibrium value during the accident and its effect on the accident doses; and

(2) valve closure time and maximum permissible leakage rate of the letdown line isolation valve.

450.11 (15.7.3.3 and 15.7.3.4; PVNGS)

In evaluating the radioactive liquid waste system leak or failure, provide data, assumptions and methodology used in analyzing the radiological consequences of fission gases released to the atmosphere.

451.0 ACCIDENT EVALUATION BRANCH

451.2 Appendix E to 10 CFR Part 50 outlines requirements for Emergency Planning and Preparedness. NUREG-0737 and NUREG-0654 provide further guidance on the requirements which include an upgraded meteorological measurements program. Provide a description of your upgraded program to meet these requirements. Include details about any new instrumentation to be installed, the atmospheric transport and diffusion model used in the dose assessment methodology, and data availability to emergency response organizations.

460.0 EFFLUENT TREATMENT SYSTEMS BRANCH

460-1 (1.8) (11.2) (11.3) (11.4) Provide a table under Section 1.8 comparing the design features of the liquid, gaseous and solid radwaste systems with the positions of Regulatory Guide 1.143 (July 1978), "Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants." For each item for which an exception is taken, the applicability of the proposed exception should be justified. If sufficient justification is provided in other sections for the individual items, cross references to those sections will be adequate.

460.2 (3.2) Include Sections for Effluent Radiation Monitors and Process Radiation Monitors in Table 3.2-1 of the Final Safety Analysis Report (FSAR), which lists Quality Classification of Structures, Systems and Components.

460.3 (1.8, 6.5) In Section 1.8 of the FSAR which deals with 'Conformance to NRC Regulatory Guides', reference is made to Regulatory Guide 1.52, Rev. 0 (June 1973) and Rev. 1 (July 1976) versions. Since Regulatory Guide 1.52, Revision 2, (March 1978), "Design, Testing and Maintenance Criteria for Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants" has replaced the earlier versions, comparison should be made of the design features and fission product removal capability of each ESF filter system to applicable positions detailed in Regulatory Guide 1.52,

Rev. 2. For each item for which an exception is taken, the acceptability of the proposed design should be justified. For example, if as stated under Section 1.8, demisters are not provided for the fuel building ESF Ventilation System, explain how relative humidity will be controlled so as not to exceed 70%. Likewise, if as stated under Section 1.8, IE alarms or recorders for pressure drops or flow rates for the ESF Ventilation Systems are not provided, describe the form in which this information is available in the control room, e.g., digital readout of pressure drop and/or flow rate, type of alarm, such as 'high' or 'low', visual or audible, etc.

460.4 (9.2) Describe provisions for ensuring that the limits for radioactive concentrations are not exceeded in the demineralized water system and condensate storage facilities.

460.5 (9.3) (11.5) Address the Followinq concerns on Sections 9.3 and 11.5 of the FSAR:

1) Provide continuous process monitoring capability for the Spent Fuel Pool and Refueling Pool Treatment Systems.
2) Clarify whether discrete sample analyses provisions are available for both the high and low TDS holdup and monitor tanks.
3) Describe the provisions for monitoring concentrate monitor tank activities.
4) Describe the process sampling provisions for grab sampling iodine in fuel storage area vent system, radwaste area vent system and

the evaporator vent system (these are required by Standard Review Plan, Section 11.5, Rev. 2, "Process and Effluent Radiological Monitoring and Sample Systems", See Table 1A).

460.6 (9.4) (11.3) Provide a table comparing the design features and radioactivity removal capability of each normal ventilation filter system to each position detailed in Regulatory Guide 1.140, Rev. 1 (October 1979), "Design, Testing and Maintenance Criteria for Normal Ventilation Exhaust System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants". For each item for which a exception is taken, the applicability of the proposed exception should be justified.

460.7 (11.1) Provide the data required for radioactive source term calculations for PWRs using the format given in Chapter 4 of NUREG-0017, April 1976, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Pressurized Water Reactors."

460.8 (11.2) (9.3) Section 9.3 of the FSAR states that the turbine building liquid wastes will be pumped to the evaporation pond if the effluent quality will meet the standards for pH, conductivity and radioactivity. Explain how tests will be conducted for the radioactivity of these wastes, and also give information on the ultimate disposal of the wastes that get collected in the evaporation pond.

460.9 (11.2) Describe the provisions for preventing overflow and/or containing the tank contents in the event of failure of the reactor makeup water tank.

460.10 (11.3) Information on hydrogen and oxygen gas analyzers is inadequate. Since the system is not designed to withstand a hydrogen explosion, at least one gas analyzer should be provided, operating continuously between the compressor and the storage tanks, with automatic control functions to prevent the formation or buildup of explosive hydrogen-oxygen mixtures in the storage tanks. Annunciating alarms should be provided locally and in the control room (see the acceptance criteria of the Standard Review Plan, Section 11.3, Rev. 1, "Gaseous Waste Management Systems"). Also, provide information such as the number of sample points, sampling frequency at each point, alarm provisions and control features for the described sequential monitoring system.

460.11 (11.3) In Table 11.3-5, Krypton-89 estimated input concentration to the gaseous radwaste system from the reactor drain tank is shown as $4.5 \times 10^{+3}$ uCi/cm^3. This appears to be too high when compared to values contained in NUREG-0017, and should be confirmed or corrected.

460.12 (11.3) Describe the provisions included in the design of the gaseous waste treatment system to stop continuous leakage paths (see the requirement stated under Acceptance Criteria II.3 of SRP Section 11.3, Rev. 1).

460.13 (11.3) Comparison with NUREG-0017 sugests that Table 11.3-6 of the FSAR on annual releases of gaseous effluents containes some errors. For example, estimates of noble gas to be released from the containment building and Xe-133 to be released from the auxiliary/ radwaste buildings are lower than would be expected. This table should be reevaluated and corrected if appropriate.

460.14 (11.3) The system design provides for the return of the flashed steam from the blowdown flash tank to the secondary system via the No. 4 feedwater heaters (see Section 10.4.6.2.2 of the FSAR). Also, a charcoal/HEPA filtration system is provided for the main condenser air removal system exhausts (see Table 11.3-7 of FSAR). Since these two augments have already been included in the system design, they should be excluded from the cost-benefit analysis (see Tables 5B-8 through 5B-11 of the Environmental Report) as per I.d of Appendix I to 10 CFR Part 50.

460.15 (11.4) Clarify whether wastes collected in the evaporation pond will be an additional input to the Solid Radwaste System (SRS) input volumes. If so, provide estimates of the volumes and activities of these wastes.

460.16 (11.4) Explain how the SRS output activities provided in Table 11.4-6 for evaporator concentrates, spent resin beads, cartridge filters and disposable crud filters are related to their corresponding input activities provided in Table 11.4-2.

460.17 (12.2) Provide radionuclide inventories of the refueling water tank and the reactor makeup water tank referred to in FSAR Section 12.2.1.7 (Section 12.2.1.7 states that these tank inventories are described in Section 12.2.1.1.5.1; however, these are not described in Section 12.2.1.1.5.1).

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