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INFORMAL REPORT

EVALUATION OF PALO VERDE NUCLEAR GENERATING STATION UNIT 3 TECHNICAL SPECIFICATION

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EG&G Idaho

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ABSTRACT

This document was prepared for the Nuclear Regulatory Commission (NRC) to assist them in determining whether the Palo Verde Nuclear Generating Station Unit 3 Technical Specifications (T/S), which govern plant systems configurations and operations, are in conformance with the assumption of the Final Safety Analysis Report (FSAR) as amended, and the requirements of the Safety Evaluation Report (SER) as supplemented. A comparative audit of the FSAR as amended, and the SER as supplemented was performed with the Palo Verde T/S. Several discrepancies were identified and are as yet unresolved.

FOREWORD

This report is supplied as part of the Power Reactor Technical Specifications Evaluations being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Licensing by EG&G Idaho, Inc., NRR and I&E Support Branch.

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EVALUATION OF PALO VERDE NUCLEAR GENERATING STATION UNIT NO. 3 TECHNICAL SPECIFICATIONS

1. INTRODUCTION

The Palo Verde Unit 3 is a Combustion Engineering (CE) pressurized water reactor (PWR) plant. It has been selected for an audit to determine if the Palo Verde Unit No. 3 Technical Specifications (T/S) are CONSISTENT with the Palo Verde Final Safety Analysis Report (FSAR) up to and including Amendment 16 and the Palo Verde Safety Evaluation Report (SER) up to and including Supplement No. 10. The specific sections of the T/S which were audited are listed in Part 2. Differences between these sections of the T/S and the FSAR and SER are identified in Part 4 of this report.

2. REVIEW CRITERIA

The following T/S sections were reviewed for this evaluation:

1. Safety Limits
2. Reactor Protection System (RPS) Setpoints
3. Engineered Safety Features Actuation System (ESFAS) Setpoints
4. Pressure Boundary Isolation Valves (PIVs)
5. Containment Isolation Valves (CIVs)
6. Containment Depressurization and Cooling System Limiting Conditions for Operation (LCO)
7. Combustible Gas Control System LCOs
8. Technical Specification Requirements Contained in the Safety Evaluation Report (SER)

The sections of the T/S listed in Part 4 were compared to the FSAR and SER to determine if the T/S are CONSISTENT, CONSERVATIVE or DIFFERENT than the FSAR and SER. Setpoints and lists of valves and instruments in the T/S were checked against tables in the FSAR and SER.

The SER was reviewed to ensure that T/S requirements in the SER were addressed in the T/S.

3. SUMMARY

During the performance of this audit, several differences between the T/S, SER and FSAR were noted. The items are listed below and have been assigned a status code which indicates the status of the item. These items are discussed in detail in Part 4 of this report. All other sections evaluated were found to be consistent.

Section	Item	Title	Page	Status*
V		Containment Isolation Valves	4	1
VIII	7.	Reactor Protection System	10	1

* Status Code

1. Unresolved, awaiting NRC/Utility action
2. Resolved pending issuance of T/S revision
3. Resolved pending issuance of SER Supplement
4. Resolved pending issuance of FSAR Amendment
5. Resolved, NRC accepts as-is
6. Resolved, item clarified and accepted

4. PALO VERDE NUCLEAR GENERATING STATION UNIT 3
TECHNICAL SPECIFICATION, FSAR, SER CONSISTENCY SUMMARY

Section I. Safety Limits

This section covers the review of the safety limits as defined in Section 2.1 of the Standard Technical Specification. It includes DNBR, Peak Linear Heat Rate, and Reactor Coolant System Pressure.

Technical Specification	FSAR Section	SER Section	Evaluation
2.1.1.1 DNBR	4. (CESSAR Referenced)	4. (CESSAR Referenced)	Not evaluated
2.1.1.2 Peak Linear Heat Rate	4. (CESSAR Referenced)	4. (CESSAR Referenced)	Not evaluated
2.1.2 Reactor Coolant System Pressure	5.2 (CESSAR Referenced)	5.2 (CESSAR Referenced)	Not evaluated

Section II. Reactor Protection System Setpoints

This section covers the review of the Reactor Protection System Setpoints to insure the T/S valves agree with or are conservative to the valves assumed in the safety analyses or defined in the SER.

Technical Specification	FSAR Section	SER Section	Evaluation
2.2 Reactor Trip Setpoints	7.1, 7.2, 15.0	7.2	CONSISTENT

Section III. Engineered Safety Features Actuation System Setpoints

This section covers the review of the ESFAS Setpoints to insure the T/S valves agree with or are conservative to the valves identified in the FSAR sections or as defined in the SER as required values.

Technical Specification	FSAR Section	SER Section	Evaluation
Table 3.3-4 pg. 3/4 3-25	7.3	7.3	CONSISTENT No listing of specific setpoints are contained in the FSAR or SER.

Section IV. Pressure Boundary Isolation Valves (PIVs)

This review determines if all the PIVs identified through the FSAR and SER are included in the T/S.

Technical Specification	FSAR Section	SER Section	Evaluation
Table 3.4-1 pg. 3/4 4-21	5.2.4 5.2.5.1.5 6.6 5A pg. 5A-11	3.9.7	CONSISTENT

Section V. Containment Isolation Valves (CIVs)

This review determines if all the CIVs identified through the FSAR and SER are included in the T/S.

Technical Specification	FSAR Section	SER Section	Evaluation
3.6.3 pg. 3/4 6-19 Table 3.6-1	Table 6.2.4-1	6.2.4	DIFFERENT

FSAR Table 6.2.4-1 identifies the following valves as CIVs that receive type C leak testing and T/S Table 3.6-1 identifies them as VICs that are not type C leak tested.

SIA-PSV151	SIA-UV682
SIA-UV708	SIB-PSV140

NOTE: Although not in the scope of this review, it was noted that the closure times specified for a large number of valves in T/S Table 3.6-1 are not consistent with the closure times listed in FSAR Table 6.2.4-2.

The following valves are listed in FSAR Table 6.2.4-1 and are not listed in Table 3.6-1 of the Technical Specifications, however, T/S Bases Section B 3/4.6.3 pg. B 3/4 6-4 provides the justification for not including main steam safety valves and the atmospheric dump valves.

SGE-PSV 691	SGE-PSV 573
SGE-PSV 692	SGE-PSV 578
SGE-PSV 694	SGE-PSV 555
SGE-PSV 695	SGE-PSV 560
SGE-PSV 575	SGE-PSV 572
SGE-PSV 576	SGE-PSV 579
SGE-PSV 557	SGE-PSV 554
SGE-PSV 558	SGE-PSV 561
SGE-PSV 574	SGE-PSV 577
SGE-PSV 556	SGE-PSV 559
SGA-HV 184	SGB-HV 178
SGB-HV 185	SGA-HV 179

Section VI. Containment Depressurization and Cooling System (CDCS) Limiting Conditions for Operation (LCO)

This section reviews the LCOs for the CDCS to insure they adequately cover the operation of the CDCS during all required modes of plant operation.

Technical Specification	FSAR Section	SER Section	Evaluation
3/4.6.2 Page 3/4 6-15 LCO 3.6.2.1 S/R 4.6.2.1 LCO 3.6.2.2 S/R 4.6.2.2	6.2.2	6.2.2	CONSISTENT

The LCOs and Surveillance Requirements (S/R) for these systems are effective during Modes 1, 2, and 3 and require all CDCS systems be operable.

Section VII. Combustible Gas Control System (CGCS) Limiting Conditions for Operation

This section reviews the LCOs for the CGCS to insure they adequately cover the operation of the CGCS during all required modes of plant operations.

Technical Specification	FSAR Section	SER Section	Evaluation
3/4.6.4 Page 3/4 6-36 LCO 3.6.4.1 S/R 4.6.4.1 LCO 3.6.4.2 S/R 4.6.4.2 LCO 3.6.4.3 S/R 4.6.4.3	6.2.5	6.2.5	CONSISTENT

The LCOs and Surveillance Requirements (S/R) for these systems are effective during Modes 1 and 2 and require all CGCS be operable.

Section VIII. Technical Specification Requirements Contained in the Safety Evaluation Report

This section covers the review of all the items identified in the SER and Supplements as T/S required items and whether they have or have not been adequately addressed in the T/S.

1. SER Section: 3.9.7, Testing of Pressure Isolation Valves
   Pg. 3-32 states:

   The applicant has committed to perform leak testing of the pressure isolation valves in accordance with NUREG-0212, Revision 2 (CE Standard Technical Specifications) with certain modifications. These modifications allow more flexibility in testing during downtime, but still require leak testing prior to entering startup, within 24 hours following valve actuation, or prior to returning a repaired valve to service depending on the reactor operational mode. The staff finds these modifications acceptable and they will be included in the PVNGS Technical Specifications. The Technical Specifications will also contain limiting conditions for operation which will require plant shutdown or system isolation when the T/S leakage limits are not met.

   T/S Section: 3/4.4.5 Pg. 3/4 4-19 and 20

   T/S 3.4.5.2 includes limiting conditions for operation, action statements and surveillance requirements compatible with these requirements.

   This item is CONSISTENT

2. SER Section: 4.2.2, Control Material Leaching Pg. 4-2 states:

   Section 14.2.12.4 of the PVNGS FSAR discusses the CEA Symmetry Test that can detect CEA failures. The test is sensitive enough to detect the loss of substantial reactivity from any single element of a standard five-element CEA. In response to a staff request, the applicant stated that the CEA Symmetry Test will be performed at the beginning of each cycle during startup physics testing. The staff will ensure that the PVNGS Technical Specifications reflect this commitment.

   T/S Section: 6.8 Pg. 6-14

   T/S 6.8.1o specifies the required symmetry test program implementation.

   This item is CONSISTENT

3. SER Section: 4.2.4, Fuel Assembly Surveillance Pg. 4-2 states:

In response to a staff request for information on the PVNGS 1-3 fuel assembly surveillance program, the applicant stated that the PVNGS program will consist of a visual inspection of randomly selected assemblies (ten to fifteen) during or following each unit's refueling. The inspections will be performed with underwater viewing equipment provided on the refueling machines or in the spent fuel pools. All four sides of each inspected fuel assembly will be examined for the purpose of identifying gross problems as discussed above. The applicant will notify NRC in the event that major abnormalities should be determined. The staff will ensure that the PVNGS Technical Specifications reflect these commitments.

T/S Section: 6.8 Pg. 6-14

T/S 6.8.1p specifies the required fuel assembly surveillance program implementation.

This item is CONSISTENT

4. SER Section: 5.2.5, Reactor Coolant Pressure Boundary Leakage Pg. 5-6 states:

High nuclear cooling water radiation and high surge tank level are alarmed in the control room. In the event that leakage is alarmed and confirmed in a flow path with no indicators, the staff will ensure that the PVNGS Technical Specifications include the requirement that a water inventory material balance be begun within one hour to determine the extent of the leakage.

T/S Section: 3/4.4.5 Pg. 3/4 4-19

T/S 3.4.5.2 action d. specifies an inventory balance be performed within one hour of an alarm receipt and confirmation.

This item is CONSISTENT

5. SER Section: 6.2.4, Containment Isolation System Pg. 5-6 states:

Furthermore, as a result of staff study of valve leakage due to seal deterioration, leakage integrity tests must be conducted periodically. This requirement, together with testing frequency, will be included in the plant technical specifications.

T/S Section: 3/4.6.1 Pg. 3/4 6-14

S/R 4.6.1.7.2 and 4.6.1.7.3 specify leak testing of valves and the frequency.

This item is CONSISTENT

6. SER Section: 6.3.2, ECCS Performance Degradation Pg. 6-23 states:

The applicant has committed to establish a containment inspection procedure. The purpose of the inspection will be to identify any materials which might have the potential for becoming debris capable of blocking the SIS sump. This will ensure that the sump is available when required for recirculation of coolant flow. The inspection of the containment emergency sump is included in his procedure. This inspection is performed prior to establishing containment integrity. The applicant has made a commitment to develop inspection procedures which meet the guidelines of RG 1.82, Item 14. The staff concludes that the above commitment by the applicant is acceptable. The staff will ensure that the PVNGS Technical Specifications reflect this commitment.

T/S Section: 3/4.5.2 Pg. 3/4 5-4

S/R 4.5.2 includes surveillance requirements for containment and sump inspections as specified.

This item is CONSISTENT

7. SER Section: 7.2, Reactor Protection System, Subsection 7.2.5 Pg. 7-5 states:

7.2.5 Technical Specification Items

(1) APS should propose technical specifications requiring CPC functional testing should the temperature within the auxiliary protective cabinets exceed the qualification temperature of the CPC.

(2) APS should propose technical specifications providing bounding values of addressable constants of the core protective calculators.

(3) APS should propose technical specifications requiring periodic testing of the supplementary protective system, and restricting plant operation with more than one SPS channel inoperable.

(4) APS should propose technical specifications requiring independent testing of the undervoltage and shunt trip coils of the reactor trip switchgear system circuit breakers at a minimum frequency of once each 18 months.

(5) APS should propose technical specifications permitting bypass of one of the four process parameter channels of the RPS or ESFAS. When a protective channel of a given process variable becomes inoperable, the defective channel may be placed in bypass until the next "safety committee" meeting at which time the "safety committee" will be required by the technical specifications to review and document their judgment concerning prolonged operation in bypass, channel trip, and/or repair. The goal should be to return the channel to its operable state as soon as practical. In any case, the technical specifications will require any inoperable protection channel to be repaired and restored to an operable state upon obtaining the first cold shutdown operational mode following channel malfunction.

(1) S/R 4.3.1.6 pg. 3/4 3-2 requires functional testing of the CPC within 12 hours of a cabinet temperature alarm.

This item is CONSISTENT

(2) No table was identified that specifies CPC addressable constants allowable values.

This item is DIFFERENT

(3) T/S Table 4.3-1 item I.D pg. 3/4 3-15 requires monthly testing and Action 8, Table 3.3-1 restricts operation.

This item is CONSISTENT

(4) T/S Table 4.3-1 Note 10, pg. 3/4 3-16 specifies the required test and frequency.

This item is CONSISTENT

(5) T/S Table 3.3-1 Action 2 pg. 3/4 3-5 covers all aspects of this ITEM.

This item is CONSISTENT

8. SER Section: 8.4.5, Power Lockout to Motor Operated Valves
Pg. 8-20 states:

In response to a staff request, the applicant, in a letter dated August 16, 1981, identified four safety injection tank valves (JSIAUV534, JSIAUV644, JSIAUV614, and JSIAUV624) that require power lockout in order to meet the single failure criterion in the fluid systems.

Based on the above, the staff concludes that the list of valves, their method of power lockout and the valve position indication are in accordance with BTP ICSB 18 (PSB) and are acceptable. In addition, the staff will ensure that the valves listed above are included in the PVNGS Technical Specifications.

T/S Section: 3/4.5.1 Pg. 3/4 5-1

T/S 3.5.1a specifies that these valves be opened with power to the valve removed.

This item is CONSISTENT

9. SER Section: 15.4.1, Main Steam Line Break Radiological Consequences Pg. 15-3 states:

Because this accident is part of the CESSAR System 80 design scope only the interface requirements have been examined. The PVNGS meteorological parameters are enveloped by the meteorological parameters specified in the CESSAR interface and the staff will ensure that the Technical Specification interface requirements for this accident are met. Specifically, these Technical Specification requirements are:

(1) primary-to-secondary leakage of 0.3 gpm;

(2) equilibrium primary coolant activities of 1 μCi/gm dose equivalent I-131 and 100 μCi/gm gross activity and 60 μCi/gm spiking limit for dose equivalent I-131; and

(3) secondary coolant activity limit of 0.1 μCi/gm, dose equivalent I-131.

T/S Section: 3/4.4.5 Pg. 3/4 4-19

(1) T/S 3.4.5.2c specifies 1 gpm total leakage with a limit of 720 gallons per day through any one steam generator. 720 gallons per day = 0.5 gpm. However, T/S Bases B3/4.4.5.2 addresses and justifies the 0.5 gpm limit vice the 0.3 gpm limit.

This item is CONSISTENT

T/S Section: 3/4.4.7 Pg. 3/4 4-25

(2,3) T/S 3.4.7 specifies the primary coolant activity limits.

This item is CONSISTENT

10. SER Section: 15.4.2, Reactor Coolant Pump Locked Rotor/Shaft Seizure Accident, states:

This accident is also part of the CESSAR System 80 design and the interface requirements with respect to the meteorological parameters have been met (see the previous section). In addition, the staff will ensure that the Technical Specifications for PVNGS 1-3 include a 1 gpm limit on the primary-to-secondary leakage.

T/S Section: 3/4.5 Pg. 3/4 4-19

T/S 3.4.5.2c specifies a 1 gpm leakage limit.

This item is CONSISTENT

11. SER Section: 15.4.4, Failure of Small Lines Carrying Primary Coolant Outside Containment Pg. 15-4 states:

For this accident, the PVNGS site meets the meteorological parameters specified in the CESSAR interface. The staff will ensure that the PVNGS Technical Specifications incorporate the limits on primary coolant activities specified in the CE Standard Technical Specifications.

T/S Section: 3/4.4.7 Pg. 3/4 4-25

T/S 3.4.7 specifies the activity limits consistent with the Standard Technical Specifications.

This item is CONSISTENT

12. SER Section: 15.4.6, Fuel Handling Accident Pg. 15-4 states:

Therefore, the staff requires that the applicant's Technical Specifications restrict fuel movement until 100 hours after reactor shutdown.

T/S Section: 3/4.9.3 Pg. 3/4 9-3

T/S 3.9.3 specifies that the reactor be subcritical for at least 100 hours prior to movement of irradiated fuel.

This item is CONSISTENT

13. SSER 7 Section: 2.5.4.3, Foundation Stability Pg. 2-4 states:

In the PVNGS 1-3 SER, the staff identified a condition for inclusion into the operating license for PVNGS 1-3 dealing with a settlement monitoring program. Upon further review, the staff has determined that this condition is more appropriate for, and has been inserted into, the Technical Specifications. Therefore, a license condition is not necessary.

T/S Section: 6.8.1 Pg. 6-14

T/S 6.8.1n specifies implementation of the Settlement Monitoring Program.

This item is CONSISTENT

14. SSER 7 Section: 5.3.1, Reactor Vessel Materials Pg. 5-1 states:

In the PVNGS 1-3 SER, the staff identified a condition for inclusion in the operating license for PVNGS 1-3 dealing with pressure-temperature limits for the reactor vessel. Upon further review, the staff has determined that this condition is more appropriate for, and has been inserted into, the Technical Specifications. Therefore, a license condition is not necessary.

T/S Section: 3/4.4.8 Pg. 3/4 4-28

T/S 3.4.8.1 specifies pressure and temperature limits as required.

This item is CONSISTENT

15. SSER 7 Section: 7.2, Reactor Protection System Pg. 7-2 states:

In the PVNGS 1-3 SER, the staff identified three conditions for inclusion in the operating license for PVNGS 1-3 dealing with (1) computer software modifications for the core protection calculator, (2) response time testing of resistance temperature devices, (3) protective system setpoints. Upon further review, the staff has determined that these conditions are more appropriate for, and have been inserted into, the Technical Specifications. Therefore, license conditions for the above items are not necessary.

T/S Section: 6.8, 3/4.3.1 and 2.2 Pg. 6-13, 3/4 3-11 and 2-2

1. T/S 6.8.1g prohibits modifications to the CPC software without prior approval.

2. T/S Table 3.3-2 items I.A.9.c and d specify response time testing of the resistance temperature devices.

3. T/S 2.2.1 specifies the reactor protection system setpoints as required.

These items are CONSISTENT

16. SSER 7 Section: 10.3.3, Secondary Water Chemistry Pg. 10-1 states:

In the PVNGS 1-3 SER, the staff identified a condition for inclusion in the operating license for PVNGS 1-3 dealing with the secondary water chemistry monitoring and control program. Upon further review, the staff has determined that this condition is more appropriate for, and has been inserted into, the Technical Specifications. Therefore, a license condition is not necessary.

T/S Section: 6.8 Pg. 6-13

T/S 6.8.11 specifies that the secondary water chemistry program be implemented as required.

T/S 6.8.4.c also describes what the secondary chemistry control program is to inhibit through its implementation.

This item is CONSISTENT

17. SSER 7 Section: 13.4, Operation Review Pg. 13-15 states:

The applicant has revised the FSAR to include a general description of the composition, responsibilities, and operations of the onsite review committee (the Plant Review Board). The description generally follows current regulatory guidance for such committees (e.g., Section 6.5.1, "Standard Technical Specification for C-E PWRs"). Final details concerning the composition and functioning of this committee will be defined in a manner acceptable to the staff during development of the facility Technical Specifications. Accordingly, the staff finds the applicant's proposed implementation of the onsite review function acceptable.

T/S Section: 6.5 Pg. 6-7

T/S 6.5.1 specifies the establishment, functioning, and responsibilities of this group.

This item is CONSISTENT

18. SSER 7 Section: 13.4, Operating Review Pg. 13-16 states:

Details concerning the composition and function of this group (Nuclear Safety-NSG) will be defined in a manner acceptable to staff during development of the facility Technical Specifications. Accordingly, the staff finds the applicant's currently proposed implementation of the independent review function acceptable.

T/S Section: 6.5 Pg. 6-10

T/S 6.5.3 specifies the organization, functions, and responsibilities of the NSG.

This item is CONSISTENT

19. SSER 7 Section: 13.4, Operation Review Pg. 13-16 states:

Final details concerning the composition and functioning of this group (Independent Safety Engineering Group-ISEG) will be defined in a manner acceptable to the staff during development of the facility Technical Specifications. Accordingly, the staff finds the applicant's currently proposed implementation of the ISEG function acceptable.

T/S Section: 6.2 Pg. 6-6

T/S 6.2.3 specifies the organization, functions, and responsibilities of the ISEG.

This item is CONSISTENT

20. SSER 9 Section: 5.3.2, Pressure Temperature Limits Pg. 5-5 states:

The following pressure-temperature limits imposed on the reactor coolant pressure boundary during operation and tests are reviewed to ensure that they provide adequate safety margins against non-ductile behavior or rapidly propagating failure of ferritic components as required by GDC 31.

(1) Preservice hydrostatic tests
(2) Inservice leak and hydrostatic tests
(3) Heatup and cooldown operations
(4) Core operation

The applicant has provided pressure-temperature limits for Unit 2 but not for Unit 3. The staff has reviewed the pressure-temperature limits for Unit 2 and has determined that they comply with the requirements of Appendix G, 10 CFR 50. The applicant indicates that the pressure-temperature limits for Unit 3 will be issued as part of that unit's Technical Specifications. Hence, the staff will review the pressure-temperature limits for Unit 3 together with the Technical Specifications for Unit 3.

The pressure-temperature limits to be imposed on the reactor coolant system for all operating and testing conditions must be in conformance with established criteria, codes, and standards. The use of operating limits based on these criteria, as defined by applicable regulations, codes and standards, will provide reasonable assurance that non-ductile or rapidly propagating failure will not occur, and will constitute an acceptable basis for satisfying the applicable requirements of GDC 31.

T/S Section: Pg.

This item requires staff review and approval.

This item is NOT EVALUATED

RESOLUTION:

The staff has reviewed this item and has approved its' use.

This item is CONSISTENT

21. SSER 9 Section: 5.4.3, Shutdown Cooling (Residual Heat Removal) System pg. 5-7 states:

Auxiliary Pressurizer Spray System

The Palo Verde Nuclear Generating Station was designed without power operated relief valves (PORVs) on the pressurizer. The plant design relies on the APSS as a means of rapidly depressurizing the primary coolant system for plant shutdown and, in the original design basis, for accident mitigation. Since the APSS performs safety-related functions, the applicant asserted that it has been designed to safety-grade standards.

On September 12, 1985, the applicant conducted a loss-of-load test on the Palo Verde Nuclear Generating Station Unit 1 from approximately 55% power. The plant did not perform as expected. The test resulted in an event involving loss of all offsite power to non-essential loads (including the reactor coolant pumps), turbine trip and reactor trip. The reactor and turbine trips were not expected. During the recovery phase of the event, overcooling of the reactor coolant system (RCS) occurred to the extent that the emergency core cooling systems were automatically initiated, followed by the automatic initiation of containment isolation.

The following two sequences occurred during the event that caused the loss of all three charging pumps:

(1) When the safety injection actuation signal (SIAS) occurred, power to certain suction valves for the charging pumps was lost since the motor control center for these valves was classified as non-essential; and, accordingly, was designed to be automatically shed from the safety related electric buses.

(2) Because of a malfunction of the single water level instrument channel for the volume control tank (VCT), automatic control action was lost which would have transferred the suction of the charging pumps from the VCT to other water sources, if power supplies had been available to realign the valves involved. Also, after the containment isolation signal was received, all makeup flow to the VCT was isolated.

Due to the above sequences, the VCT emptied, the charging pumps became bound on VCT hydrogen cover gas, and the pumps were tripped. This produced a potentially hazardous situation when, to re-establish charging pump flow, the vent lines from the pumps were locally opened by an operator in an attempt to vent the hydrogen gas. However, this

attempt was unsuccessful and the charging pumps remained gas bound. After non-class 1E power was restored, water supply from the refueling water tank (RWT) via the boric acid makeup pumps was delivered to the charging pumps, and charging flow to RCP seal injection and reactor coolant system were established. Subsequently, the RCS pressure and inventory reached stable conditions, and the unusual event was terminated.

The applicant's letter of September 18, 1985 (ANPP-33487), discussed the September 12, 1985 event and briefly addressed concerns relating to the APSS. At the conclusion of the September 20, 1985 meeting with the staff, the applicant committed to certain short-term compensatory measures which justified continued operation of the facility while the long-term corrective actions were developed. On October 2, 1985, a letter was issued to the applicant, pursuant to 10 CFR 50.54(f), requiring that the applicant furnish in writing, under oath or affirmation, its plans, program and schedule to bring Palo Verde Unit 1 into conformance with its licensing basis. A request for additional information was enclosed with this letter concerning the design of the APSS relative to safety-grade standards. In response to this staff request, by letters dated October 15, 1985 (ANPP-33713), October 22, 1985 (ANPP-33771), and November 4, 1985 (ANPP-33905), the applicant provided the following:

(1) Reanalyses of the steam generator tube rupture (SGTR) accidents were submitted. In one case, the APSS was assumed to be initiated at two hours following the event and, in another case, the APSS was assumed inoperable and the safety-grade gas vent system from the pressurizer was used for accident mitigation. In both cases, the reanalyses showed that the radiological consequences were within the limits of 10 CFR 100 guidelines.

(2) The applicant proposed four modifications to the Palo Verde design to improve the operator's ability to operate the charging/auxiliary spray system from the control room, to provide an automatic function to reduce the amount of required operator action, and to improve the reliability of control grade level instrumentation on the VCT. The proposed modifications are:

    (a) Provide power to Valves CH-501 and CH-536 from a 1E motor control center (MCC).

    (b) Enhance automatic realignment to the RWT. The modified design would allow automatic realignment to the RWT gravity feed line via Valve CH-536 on lo-lo VCT level when the non-class 1E powered Boric Acid Make-Up Pump flow path is unavailable due to a loss of off-site power.

    (c) Enhance VCT level instrumentation. The modified VCT level instrumentation design would include separate reference legs, one wet and one dry, one to each of the two existing level transmitters, LT-226 and LT-227. This diverse

redundancy minimizes the potential for incorrect level indication by eliminating the potential for a partially drained wet reference leg going undetected. A signal comparator will be added to the level transmitters, initiating an alarm in the control room when a level difference is indicated. This alarm will alert the operator to possible incorrect indication or malfunction of either transmitter.

(d) Lock open Valves CH-524 and CH-532 to ensure a flow path to the APSS.

The applicant proposed the following schedule for implementation of these modifications:

Unit 1: Following completion of engineering and procurement, currently in process, implementation will be during the first outage of sufficient duration but not later than the completion of the first refueling outage.

Unit 2: Prior to exceeding 5% power.

Unit 3: Prior to fuel load.

The applicant also committed to the following Technical Specification changes:

(1) Include both the pressurizer and the reactor head gas vent flow paths in the LCOs in Section 3.4.10.

(2) Clarify the bases of Section 3.1.2.2 to include Valve CH-501 as part of the required boron injection flow paths.

(3) RWT gravity feedline Valve HV 532 and charging flow path containment isolation Valve CH-524 will be locked to their open position to ensure a flow path to the APSS. Following the system modification of these valves (prior to exceeding 5% power at Palo Verde Unit 2), the Technical Specification will include these requirements in the LCOs.

T/S Section: 3.4.10 Pg. 3/4 4-35

(1) T/S 3.4.10 a and b includes both the pressurizer and the reactor vessel head vent paths.

This item is CONSISTENT

T/S Section: 3/4.1.2 Pg. B 3/4 1-2

(2) T/S B 3/4.1.2 includes valve CH-UV-501 as part of the required boron injection flow path.

This item is CONSISTENT

T/S Section: 3/4.4.3 Pg. 3/4 4-10

(3) S/R 4.4.3.2.2 specifies that valves CH-HV-524 and CH-HV-532 be verified locked open at least once per 31 days.

This item is CONSISTENT

NRC FORM 335 (2.84) NRCM 1102, 3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

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