FINAL REPORT

ON

PRESSURE-TEMPERATURE LIMITS FOR THE PALO VERDE

NUCLEAR GENERATING STATIONS

1669K/0059K

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1.0 INTRODUCTION

The following sections describe the basis for development of reactor vessel beltline pressure-temperature limitations and composite Reactor Coolant System (RCS) pressure-temperature limitations for the Palo Verde Nuclear Generating Station. These limits are calculated to meet the regulations of 10 CFR Part 50 Appendix A,[1] Design Criterion 14 and Design Criterion 31. These design criteria require that the reactor coolant pressure boundary be designed, fabricated, erected, and tested in order to have an extremely low probability of abnormal leakage, of rapid failure, and of gross rupture. The criteria also require that the reactor coolant pressure boundary be designed with sufficient margin to assure that when stressed under operating, maintenance, and testing the boundary behaves in a non-brittle manner and the probability of rapidly propagating fracture is minimized.

The pressure-temperature limits are developed using the requirements of 10 CFR 50 Appendix G[2]. This appendix describes the requirements for developing the pressure-temperature limits and provides the general basis for these limitations. The margins of safety against fracture provided by the pressure-temperature limits using the requirements of 10 CFR Part 50 Appendix G are equivalent to those recommended in the ASME Boiler and Pressure Vessel Code Section III, Appendix G, "Protection Against Nonductile Failure."[3] The general guidance provided in those procedures has been utilized to develop the Palo Verde pressure-temperature limits with the requisite margins of safety for the heatup and cooldown conditions.

The Reactor Pressure Vessel (RPV) beltline pressure-temperature limits are based upon the irradiation damage prediction methods of Regulatory Guide 1.99 Revision 02[4]. This methodology has been used to calculate the limiting material adjusted reference temperature (ART) values for Palo Verde Units 1, 2, and 3.

This report provides composite pressure-temperature limits for the reactor vessel in accordance with 10 CFR 50 Appendix G for two representative points in the RPV lifetime corresponding to 10 and 40 calendar years of full power operation. The events analyzed are the isothermal, 10°F/hr, and 100°F/hr cooldown conditions and the 10°F/hr, 20°F/hr, 40°F/hr, and 100°F/hr heatup conditions.

Based upon the pressure-temperature limit analyses provided within this report, no life limiting vessel integrity issues are anticipated to exist during the 40 calendar year design life of the reactor pressure vessel. However, heatup and cooldown rate or administrative restrictions may need to be examined to ensure compatibility between the pressure-temperature limits and the Low Temperature Overpressure Protection (LTOP) analyses.

2.0 ADJUSTED REFERENCE TEMPERATURES

In order to develop pressure-temperature limits over the design life of the reactor vessel, ART values for the controlling beltline material need to be determined. The ART values of reactor vessel beltline materials for Palo Verde Units 1, 2, and 3 have been calculated at the 1/4t and 3/4t locations after 10 and 40 calendar years operation. By comparing ART data for each material, the controlling material for each Palo Verde unit, as well as the controlling materials for all three Palo Verde units, have been determined.

The ART values have been calculated using the procedures in Regulatory Position 1.1 of Regulatory Guide 1.99 Revision 02. The calculative procedure for the ART values for each material in the beltline is given by the following expression:

$$ART = \text{Initial } RT_{NDT} + \quad RT_{NDT} + \text{Margin} \qquad (1)$$

Initial RT_{NDT} is the reference temperature for the unirradiated material. ΔRT_{NDT} is the mean value of the adjustment in the reference temperature caused by irradiation and is given by the following expression:

$$\Delta RT_{NDT} = (CF)\ f^{(0.28\ -\ 0.10\ \log f)}$$

CF is the chemistry factor for the beltline materials, which is a function of residual element content, i.e., weight percent copper and nickel. Regulatory Guide 1.99 Revision 02 provides values for the chemistry factors for welds and for base metal plates and forgings. The term f is the neutron fluence at any depth in the vessel. The neutron fluence at any depth is given by the following expression:

$$f = f_{surf}\ (e^{-0.24x})$$

The term f_{surf} is the calculated value of the neutron fluence (10^{19}n/cm^2, E> 1MeV) at the inner wetted surface of the vessel at the location of the postulated defect (1/4t or 3/4t), and x is the depth into the vessel wall from the inner wetted surface in inches.

Margin is the quantity that is added to obtain a conservative upper bound value of ART. The margin term is given by the following expression:

$$\text{Margin} = 2\sqrt{\sigma_I^2 + \sigma_\Delta^2}$$

The terms σ_I and σ_Δ represent the standard deviation for initial RT_{NDT} and the standard deviation of the mean value for reference temperature shift.

The following information provides the basis for the calculated ART values for Palo Verde Units 1, 2, and 3.

1. Plant capacity factor is assumed to be 80%.

2. Peak-end-of-life fluence was assumed to be 3.29 x 10^{19} n/cm^2 (E>1MeV) at 32 Effective Full Power Years (EFPY) for both the lower and intermediate shells. Peak fluence at 8 EFPY would therefore be 0.82 x 10^{19} n/cm^2 based on a linear fluence accumulation.

3. Shell course minimum reference thickness were assumed as 9.0625" for the lower shell and 11.190" for the intermediate shell.

4. Calculations were based on the procedures in Regulatory Position 1.1 of NRC Regulatory Guide 1.99, Revision 02 (May 1988).

ART values for all beltline materials at the 1/4t and 3/4t locations after 8 and 32 EFPY were calculated using Regulatory Guide 1.99 Revision 02 and the results of the calculation are listed in Tables 1, 2, and 3 for Palo Verde Units 1, 2, and 3. The controlling materials are shown in Table 4. Note that 8 and 32 EFPY correspond to 10 and 40 calendar years of full power operation given an 80% plant capacity factor.

Review of the calculated ART values identifies the controlling material for all three Palo Verde Units to be the Palo Verde Unit 1 intermediate shell plates M-6701-2 and M-6701-3. In all three Palo Verde Units, the welds always showed lower reference temperatures than the base metal, i.e., lower initial RT_{NDT} and lower ART after irradiation. Therefore, only the base metal and not the weldments is predicted to be controlling during design life. The limiting ART values based upon the Palo Verde Unit 1 intermediate shell plates are 102°F and 90°F for the 1/4t and 3/4t locations for 10 years of operation, and 116°F and 103°F for the 1/4t and 3/4t locations for 40 years of operation.

Note that two different sets of chemical content data were available for the reactor vessel beltline welds; one set being the weld metal certification tests, and the other being vessel weld seam sample analyses. The former set tended to be more limiting (i.e., produced a

slightly higher chemistry factor) and, therefore, was used in calculations of ART. Even with the more conservative weld chemistry factors, the plates remained as the controlling vessel beltline materials in each of the three Palo Verde units.

Table 5 provides a comparison of the ART values for Palo Verde Unit 1 using Regulatory Guide 1.99 Revision 02 and the previously calculated values using the C-E design curve (Figure 5.3-5 of the Palo Verde Final Safety Analysis Report) and radial flux attenuation factors without adjustment for flux spectrum variation through the wall thickness.

Two significant features are evident from Table 5. For the 1/4t location, the Regulatory Guide 1.99, Revision 02 predictions are more restrictive (higher) at 8 EFPY and less restrictive at 32 EFPY compared to the previously calculated values. For the 3/4t location, the Regulatory Guide yielded more restrictive values of ART at both 8 EFPY and 32 EFPY. These results are typical of the impact of the Regulatory Guide on reference temperature shift predictions.

3.0 REACTOR PRESSURE VESSEL BELTLINE PRESSURE - TEMPERATURE LIMITS

General Method

The analytical procedure for developing reactor vessel pressure-temperature limits utilizes the methods of Linear Elastic Fracture Mechanics (LEFM) found in the ASME Boiler and Pressure Vessel Code Section III, Appendix G, in accordance with the requirements of 10 CFR Part 50 Appendix G. For these analyses, the Mode I (opening mode) stress intensity factors are used for the solution basis.

The general method utilizes Linear Elastic Fracture Mechanics procedures. Linear Elastic Fracture Mechanics relates the size of a hypothetical flaw with the allowable loading which precludes crack initiation. This relation is based upon a mathematical stress analysis of the reactor vessel beltline and upon experimental measurements of general beltline material fracture toughness properties as described in Appendix G to Section III of the ASME Code.

The reactor vessel beltline region is analyzed assuming a semi-elliptical surface flaw oriented in the axial direction, with a depth of one quarter of the reactor vessel beltline thickness and with an aspect ratio of one to six. This postulated flaw is analyzed at both the inside diameter location (referred to as the 1/4t location) and the outside diameter location (referred to as the 3/4t location) to assure the most limiting condition is achieved. The above flaw geometry and orientation is the maximum postulated defect size (reference flaw) described in Appendix G to Section III of the ASME Code.

At each of the postulated flaw locations, the Mode I stress intensity factor, K_I, produced by each of the specified loadings is calculated and the summation of the K_I values is compared to a reference stress intensity, K_{IR}, which is the critical value of K_I for the material and temperature involved. The result of this method is a relation of pressure versus temperature for reactor vessel operating limits which preclude brittle fracture. K_{IR} is obtained from a reference fracture toughness curve for reactor pressure vessel low alloy steel as defined in Appendix G to Section III of the ASME Code. This governing curve is defined by the following expression:

$$K_{IR} = 26.78 + 1.223\, e^{[.0145(T - RT_{NDT} + 160)]}$$

where,

K_{IR} = reference stress intensity factor, Ksi$\sqrt{in}$

T = temperature at the postulated crack tip, °F

RT_{NDT} = adjusted reference nil ductility temperature at the postulated crack tip, °F.

For the postulated heatup and cooldown events, the pressure stress intensity factor K_{IM}, is calculated for the assumed reactor vessel beltline pressure (pressure is assumed as the independent variable in the analyses). Also, for the heatup or cooldown events the maximum temperature gradient across the reactor vessel wall is calculated and the

corresponding thermal stress intensity factor, K_{IT}, is determined. Through the use of superposition, the thermal stress intensity is added to the pressure stress intensity to determine the minimum temperature for the assumed pressure loading.

In accordance with the ASME Code Section III Appendix G requirements, the general equations for determining the minimum temperature for any assumed reactor vessel beltline pressure during Service Level A and B operation are:

$$2K_{IM} + K_{IT} < K_{IR}$$

$$1.5\ K_{IM} + K_{IT} < K_{IR} \text{ (Inservice Hydrostatic Test)}$$

where,

K_{IM} - Allowable pressure stress intensity factor, Ksi$\sqrt{in}$

K_{IT} - Thermal stress intensity factor, Ksi$\sqrt{in}$

K_{IR} - Reference stress intensity, Ksi$\sqrt{in}$

Uncertainties for instrumentation error, elevation, and flow induced differential pressure corrections are accounted for in the final limits, as are temperature instrument loop errors. Consequently, the pressure-temperature limits are provided on coordinates of indicated pressurizer pressure and indicated cold leg temperature.

The pressure correction factors and the temperature correction factors utilized in this analysis are as follows:

Pressure Correction Factor	Pressure Range
170 psia	P > 750 psia
120 psia	P ≤ 750 psia

Temperature Correction Factor = 8°F

The pressure correction factors are based upon flow differential pressures associated with three Reactor Coolant Pump operation.

Cooldown Limit Analysis

During cooldown, membrane and thermal bending stresses act together in tension at the reactor vessel inside wall. This results in the pressure stress intensity factor, K_{IM}, and the thermal stress intensity factor, K_{IT}, acting in unison to create a high stress intensity. At the reactor vessel outside wall the tensile pressure stress and the compressive thermal stress act in opposition resulting in a lower total stress than at the inside wall location. Also neutron embrittlement, the shift in RT_{NDT}, and the reduction in fracture toughness are less severe at the outside wall compared to the inside wall location. Consequently, the inside flaw location is more limiting and is analyzed for the cooldown event.

In general, the thermal stress intensity factors are found using the temperature difference through the wall. They are then added to the assumed pressure stress intensity to find the allowable K_{IR} value and consequently the minimum temperature.

The cooldown pressure-temperature curves are thus generated by calculating the minimum temperature at the reference flaw at the 1/4t location based upon,

$$2\ K_{IM} + K_{IT} \leq K_{IR}$$

where,

K_{IM} - Allowable pressure stress intensity, Ksi$\sqrt{in}$

K_{IR} - Reference stress intensity, Ksi$\sqrt{in}$

K_{IT} - Thermal stress intensity maximum Ksi$\sqrt{in}$

The pressure stress intensity factor K_{IM} is determined by:

$$K_{IM} = M_m \sigma_m$$

where,

M_m - Membrane stress influence coefficient

σ_m - Hoop stress, Ksi

The thermal stress intensity factor, K_{IT} is determined by:

$$K_{IT} = M_t \Delta T_W$$

where,

M_t - Thermal stress influence coefficient

ΔT_W - Reactor Vessel wall differential temperature, °F

To develop a composite pressure-temperature limit for the cooldown event, the isothermal pressure-temperature limit must be calculated. The isothermal pressure-temperature limit is then compared to the pressure-temperature limit associated with a cooling rate. Then the more restrictive allowable pressure-temperature limit is chosen resulting in a composite limit curve for the reactor vessel beltline.

Tables 6 through 11 provide the results of the isothermal, 10°F/hr, and 100°F/hr cooldown pressure-temperature limits. These tables provide the indicated RCS temperature versus the indicated pressurizer pressure for the various cooldown rates. The allowable pressure is in units of psia while temperature is in units of °F. Figures 1 and 3 provide a graphical presentation of the cooldown pressure-temperature limit results found in Tables 6 through 11. It is permissible to linearly interpolate between the cooldown pressure temperature limits.

Heatup Limit Analysis

During a heatup transient, the thermal bending stress is compressive at the reactor vessel inside wall and is tensile at the reactor vessel outside wall. Internal pressure creates a tensile stress at the inside wall as well as the outside wall locations. Consequently, the outside wall location has the larger total stress when compared to the inside wall. However, neutron embrittlement, shift in material RT_{NDT}, and reduction in fracture toughness are greater at the inside location than the outside. Therefore, both the inside and outside flaw locations must be analyzed to assure that the most limiting condition is achieved.

As described in the cooldown case, the reference stress intensity factor is calculated based upon the addition of the pressure stress intensity factor and the thermal stress intensity factor. For heatup, the thermal stress intensity is calculated for both the 1/4t and 3/4t locations based upon the temperature profile through the wall. The allowable temperature is then determined by superposition of the thermal stress intensity factor with the pressure stress intensity at the flaw locations. For calculation purposes, the allowable temperature is calculated using the same equation format as the cooldown case.

To develop composite pressure-temperature limits for the heatup transient, the isothermal, 1/4t heatup, and 3/4t heatup pressure temperature limits are compared for a given thermal rate. Then the most restrictive pressure-temperature limits are combined over the complete temperature interval resulting in a composite limit curve for the reactor vessel beltline for the heatup event.

Tables 12 through 21 provide the results for the 10°F/hr, 20°F/hr, 40°F/hr, and 100°F/hr heatup pressure-temperature limits. These Tables provide the indicated RCS temperature versus the indicated pressurizer pressure for the various heatup cases. The allowable pressure is in units of psia while temperature is in units of °F. Figures 2 and 4 provide a graphical presentation of the heatup pressure-temperature limit results found in Tables 12 through 21. It is permissible to linearly interpolate between the heatup pressure-temperature limits.

The inservice hydrostatic limits are provided in Tables 22 and 23 and in Figure 5.

Reactor Vessel Data		Reference (5)
Design Presure	-	2500 psia
Design Temperature	-	650°F
Operating Pressure	-	2250 psia
Beltline Thickness	-	11.19 in
Mean Beltine Radius	-	97.07

Material - SA 533 Grade B Class I		Reference (6)
Thermal Diffusivity	-	.399 ft^2/hr
Young's Modulus	-	29.2×10^6 psi
Coefficient of Thermal Expansion	-	7×10^{-6} in/in/°F
Yield Strength	-	44.5×10^3 psi
Poisson's Ratio	-	0.3

Adjusted RT_{NDT} Values

	10 Years	40 Years
1/4t	102°F	116°F
3/4t	90°F	103°F

4.0 COMPOSITE PRESSURE - TEMPERATURE LIMITATIONS

General Limitations

The previous sections focused upon the RPV beltline pressure-temperature limitations which are significantly affected by fast neutron fluence changes and the irradiation damage predictions of Regulatory Guide 1.99 Revision 02. However, these beltline pressure-temperature limitations are not the only pressure-temperature limits which can restrict operation

of the RCS in order to provide protection against non-ductile failure. Consequently, other locations of the RPV have been evaluated, specifically the flange and nozzle regions, to ensure the composite pressure-temperature limits are appropriate for fracture prevention.

The composite RCS pressure-temperature limits provided in Figures 6 and 7 are developed based upon the RPV beltline and flange regions. The RPV primary coolant nozzles were found to be non-limiting. Examination of the composite RCS pressure-temperature limits generally illustrates that the flange region is controlling for the 100°F/hr heatup condition, while the flange and beltline regions are controlling for the inservice hydrostatic test, the 10°F/hr heatup to 100°F/hr cooldown limit and the 40°F/hr heatup limit. The isothermal, 10°F/hr cooldown, and the 20°F/hr heatup limits at the lowest temperatures are controlled by the RPV beltline region.

A core critical limit is also included in the figure as referenced by 10 CFR 50 Appendix G. When the core is critical (other than for the purpose of low-power physics tests), the temperature of the RPV must be at least 40°F greater than the minimum permissible temperatures corresponding to the limiting heatup and cooldown curve, and greater than the minimum permissible temperature for the inservice hydrostatic test pressure. The core critical limits provided are based upon the 100°F/hr heatup and the minimum temperatures for the inservice hydrostatic test.

The minimum boltup temperature provided is based upon the recommendation of Appendix G to Section III of the ASME Code. It is recommended that when the flange and adjacent shell region are stressed by the full intended bolt preload and by pressure not exceeding 20% of the preoperational system hydrostatic test pressure, the minimum temperature in the stressed region should be at least the initial RT_{NDT}. The most limiting RT_{NDT} in the flange region for all three Palo Verde units is 60°F. Consequently, when instrumentation error is taken into account the minimum boltup temperature is 68°F.

The lowest service temperature is provided only as a reference point and does not impact operation since the RPV flange and beltline limits are more restrictive. The lowest service temperature is the minimum allowable temperature at pressures above 20% of the preoperational system hydrostatic test pressure. This temperature is defined by Article NB 2332 of Section III to the ASME Code as equal to the maximum (most limiting) RT_{NDT} for the balance of RCS components plus 100°F. The most limiting RT_{NDT} is associated with the fabrication material of the Reactor Coolant Pumps and is equal to 40°F. Consequently, when instrumentation error is taken into account the lowest service temperature is 148°F.

The composite RCS pressure-temperature limits have been corrected by the pressure and temperature correction factors identified in the previous section. These correction factors are used to correct the results to indicated pressurizer pressure and indicated RCS temperature.

LTOP Enable Temperatures

The LTOP enable temperature defines the RCS temperature at which LTOP is required in order to protect the composite pressure-temperature limits from being exceeded during a hypothetical transient. Above the LTOP enable temperature, the pressurizer safety valve with a setpoint of 2500 psia protects the composite pressure-temperature limits from violation. During the cooldown event, the LTOP enable temperature determines the RCS temperature at which the LTOP is initiated, while during the heatup event, the LTOP enable temperature determines the RCS temperature at which LTOP is no longer required. For the Palo Verde Units 1, 2, and 3, the LTOP enable temperatures correspond to the cold leg temperatures at which the Shutdown Cooling System (SCS) suction line relief valves must be aligned to the RCS to provide overpressure protection.

The LTOP enable temperature is also dependent upon the cooldown or heatup rate associated with the pressure-temperature limit which is protected. For consistency with previous analyses the LTOP enable temperatures presented within are based upon a 100°F/hr cooldown pressure-temperature limit, and upon a 40°F/hr heatup pressure-temperature limit.

The LTOP enable temperatures associated with the composite pressure-temperature limits of this report are as follows:

10 Calendar Years of Full Power Operation	40 Calendar Years of Full Power Operation
267°F for Cooldown	281°F for Cooldown
302°F for Heatup	315°F for Heatup

The present Technical Specification LTOP enable temperatures for 10 calendar years of full power operation are as follows:

255°F for Cooldown
295°F for Heatup

Consequently, there is a 12°F and 7°F change in the LTOP enable temperatures for cooldown and heatup, respectively, for the 10 year time period.

While the LTOP enable temperatures have changed, other LTOP considerations need to be evaluated to ensure protection of the composite pressure-temperature limits during hypothetical transients. These other considerations include heatup and cooldown rate limitations over specific RCS temperature intervals, primary to secondary system differential temperature limitation starts, and High Pressure Safety Injection (HPSI) pump power lockout requirements.

It is therefore required that a LTOP analysis be performed to determine the LTOP parameters associated with the pressure-temperature limits provided in this report.

5.0 CONCLUSIONS

RCS pressure-temperature limits have been developed for Palo Verde Units 1, 2, and 3 for 10 and 40 calendar years of full power operation. The reactor vessel beltline pressure-temperature limits have utilized the irradiation damage prediction methods of Regulatory Guide 1.99 Revision 02. The use of this new Regulatory Guide has caused the predicted irradiation damage in terms of ART to increase at the 3/4t wall location by 50°F and 55°F for 10 and 40 calendar years of full power operation, respectively, relative to the original values. The use of this Regulatory Guide has also caused the ART values at the 1/4t wall location to increase by 27°F for 10 calendar years of full power operation, and to decrease by 21°F for 40 calendar years of full power operation.

The impact of the Regulatory Guide 1.99 Revision 02 shift prediction methods, coupled with the fracture mechanics analysis, has caused the reactor vessel beltline limits to become more restrictive than those of the previous analysis. The increased ART values at the 3/4t location are significant since the magnitude of the change is large, and since the 3/4t location typically controls the heatup pressure-temperature limits. In addition, since the 1/4t location controls the cooldown pressure-temperature limits, more restrictive limits will exist earlier in life and slightly less restrictive limits will exist later in life when compared to previous analyses.

The LTOP enable temperatures have changed in response to the shift in the pressure-temperature limitations. The LTOP enable temperatures have increased to 267°F for cooldown and 302°F for heatup for the 10 calendar year time period. These temperatures represent a 12°F and 7°F change in the LTOP enable temperatures for cooldown and heatup. For 40 calendar years of operation, the LTOP enable temperatures have been identified as 281°F and 315°F for cooldown and heatup. The heatup LTOP enable temperature, which defines the minimum temperature at which shutdown

cooling can be isolated from the RCS, is quite large given it is approaching the shutdown cooling design temperature of 350°F. This may impact operations in the future, especially if an extended service life is pursued.

The increased shift in the pressure-temperature limits can have a significant impact on other LTOP parameters such as the heatup and cooldown rate limits over specified temperature intervals, and the administrative controls used to limit the effect of the mass and/or energy addition transients analyzed for LTOP.

Based upon the pressure-temperature limit analyses provided within this report, no life limiting vessel integrity issues are anticipated to exist during the 40 calendar year design life of the reactor pressure vessel. However, heatup and cooldown rate or administrative restrictions need to be examined to ensure compatibility between the pressure-temperature limits and the LTOP analyses.

6.0 REFERENCES

(1) Code of Federal Regulations, 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," January 1988.

(2) Code of Federal Regulations, 10 CFR Part 50, Appendix G, "Fracture Toughness Requirements," January 1988.

(3) ASME Boiler and Pressure Vessel Code Section III Appendix G "Protection Against Non-Ductile Failure," 1986 Edition.

(4) USNRC Regulatory Guide 1.99 Revision 02, "Radiation Embrittlement of Reactor Vessel Materials," May 1988.

(5) Instruction Manual for Reactor Vessel-Arizona Nuclear Power Project Palo Verde Units 1, 2, and 3, C-E Book No. 78173/79173/65173, dated August 1978.

(6) ASME Boiler and Pressure Vessel Code Section III Appendix I, "Design Stress Intensity Values, Allowable Stresses, Material Properties, and Design Fatigue Curves," 1986 Edition.

Table 1

PALO VERDE UNIT 1

MATERIALS

Location	ID No.	CF*	Cu,%	Ni,%	RT_{NDT},°F	ART, °F			
						8 EFPY		32 EFPY	
						1/4 T	3/4 T	1/4 T	3/4 T
Lower Shell Plate	M-4311-1	26	.04	.65	-10	35	28	55	47
	M-4311-2	20	.03	.62	-40	-5	-11	10	4
	M-4311-3	20	.03	.64	-20	15	9	30	24
Intermediate Shell Plate	M-6701-1	44	.07	.66	30	97	83	114	98
	M-6701-2	37	.06	.61	40	102	90	116	103
	M-6701-3	37	.06	.61	40	102	90	116	103
Intermediate Shell Long Seam Welds**	101-124	35	.07	.03	-50	10	-1	37	24
Lower Shell Long Seam Welds**	101-142	28	.04	.04	-80	-32	-39	-11	-19
Intermediate/Lower Girth Seam Weld**	101-171	34	.05	.07	-70	-11	-20	15	5

* CF = Chemistry Factor determined by Regulatory Guide 1.99 Rev. 2.

** Two sets of chemistry data were available for the welds. The more limiting set was used for conservatism.

Table 2

PALO VERDE UNIT 2

MATERIALS

Location	ID No.	CF*	Cu,%	Ni,%	RT_{NDT},°F	ART, °F 8 EFPY 1/4 T	ART, °F 8 EFPY 3/4 T	ART, °F 32 EFPY 1/4 T	ART, °F 32 EFPY 3/4 T
Lower Shell Plate Plate	F-773-1	20	.03	.67	10	45	39	60	54
	F-773-2	26	.04	.64	0	45	38	65	57
	F-773-3	31	.05	.66	-60	-6	-15	10	1
Intermediate Shell Plate	F-765-4	20	.03	.67	-20	14	8	29	22
	F-765-5	20	.03	.65	10	44	38	59	52
	F-765-6	26	.04	.67	10	54	46	74	64
Intermediate Shell Long Seam Welds**	101-124	34	.06	.04	-60	-3	-14	23	10
Lower Shell Long Seam Welds**	101-142	44	.09	.04	-80	-3	-15	28	15
Intermediate/Lower Girth Seam Weld**	101-171	27	.03	.07	-30	16	9	36	28

* CF = Chemistry Factor determined by Regulatory Guide 1.99 Rev. 2.
** Two sets of chemistry data were available for the welds. The more limiting set was used for conservatism.

Table 3

PALO VERDE UNIT 3

MATERIALS

Location	ID No.	CF*	Cu,%	Ni,%	RT_{NDT},°F	ART, °F			
						8 EFPY		32 EFPY	
						1/4 T	3/4 T	1/4 T	3/4 T
Lower Shell Plate Plate	F-6411-1	26	.04	.64	-40	5	-2	25	17
	F-6411-2	26	.04	.65	0	45	38	65	57
	F-6411-3	26	.04	.66	-60	-15	-22	5	-3
Intermediate Shell Plate	F-6407-4	26	.04	.62	-30	14	6	34	24
	F-6407-5	31	.05	.61	-20	33	23	49	38
	F-6407-6	26	.04	.61	-20	24	16	44	34
Intermediate Shell Long Seam Welds**	101-124	26	.03	.06	-50	-6	-14	14	4
Lower Shell Long Seam Welds**	101-142	31	.04	.07	-50	3	-5	26	17
Intermediate/Lower Girth Seam Weld**	101-171	34	.05	.07	-70	-11	-20	15	5

* CF = Chemistry Factor determined by Regulatory Guide 1.99 Rev. 2.
** Two sets of chemistry data were available for the welds. The more limiting set was used for conservatism.

Table 4

CONTROLLING MATERIALS AND THEIR ADJUSTED REFERENCE TEMPERATURES

Location	Location	ID No.	RT_{NDT}, °F	ART, °F			
				8 EFPY		32 EFPY	
				1/4 T	3/4 T	1/4 T	3/4 T
Palo Verde 1	Intermediate Shell	M-6701-2,3	40	102	90	116	103
Palo Verde 2	Intermediate Shell	F-765-6	10	54	46	74	64
Palo Verde 3	Lower Shell	F-6411-2	0	45	38	65	57

Table 5

COMPARISON OF CURRENT AND PREVIOUS ART PREDICTIONS FOR CONTROLLING MATERIALS

Plant	Material ID	Approach of Calculation*	ART, °F			
			8 EFPY		32 EFPY	
			1/4 T	3/4 T	1/4 T	3/4 T
Palo Verde 1	M-6701-3	RG 1.99 Rev. 2	102	90	116	103
		CE Design Curve	75	40	137	48

* Note that there was also a difference in assumed plate thickness, but the effect was only on the order of 2°F ART.

Table 6

RCS PRESSURE/TEMPERATURE CURVES
0 F C/D AT 1/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE	Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
0.399	0	0	3.251	3295	28583	0.642	92.93	185.9	175.19	3125	285.2
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	178.8	172.07	3000	282.1
11.190	N/A	0.00	3.214	2670	23161	0.520	74.45	148.9	156.96	2500	267.0
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	134.3	148.15	2250	258.2
44500	102	0.00	3.198	2170	18824	0.423	60.20	120.4	138.62	2000	248.6
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	114.8	134.41	1900	244.4
0.387	N/A	0.44	3.182	1970	17089	0.384	54.38	108.8	129.47	1800	239.5
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	103.2	124.66	1700	234.7
N/A	8.0	0.00	3.182	1770	15354	0.345	48.86	97.7	119.49	1600	229.5
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	92.2	113.91	1500	223.9
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	86.7	107.82	1400	217.8
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	78.0	97.01	1250	207.0
			3.165	1170	10149	0.228	32.13	64.3	75.48	1000	185.5
			3.165	1070	9282	0.209	29.38	58.8	64.55	900	174.5
			3.149	970	8414	0.189	26.49	53.0	50.82	800	160.8
			3.149	820	7113	0.160	22.40	44.8	24.96	700	135.0
			3.149	720	6246	0.140	19.67	39.3	0.04	600	110.0
			3.149	670	5812	0.131	18.30	36.6	-16.89	550	93.1
			3.149	645	5595	0.126	17.62	35.2	-27.22	525	82.8
			3.149	620	5378	0.121	16.93	33.9	-39.37	500	70.6
			3.149	608	5274	0.119	16.61	33.2	-46.06	488	63.9
			3.149	570	4945	0.111	15.57	31.1	-72.94	450	37.1
			3.149	545	4728	0.106	14.89	29.8	-93.88	425	11.1
			3.149	520	4511	0.101	14.20	28.4	-140.94	400	-30.9
			3.149	370	3210	0.072	10.11	20.2	ERR	250	ERR

Table 7

RCS PRESSURE/TEMPERATURE CURVES
10 F C/D AT 1/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE	Mm	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
0.399	0	10	3.251	3295	28583	0.642	92.93	190.1	177.00	3125	282.2
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	183.0	173.96	3000	279.2
11.190	N/A	10.90	3.214	2670	23161	0.520	74.45	153.1	159.31	2500	264.5
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	138.5	150.81	2250	256.0
44500	102	-4.79	3.198	2170	18824	0.423	60.20	124.6	141.67	2000	246.9
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	119.1	137.64	1900	242.8
0.387	N/A	0.44	3.182	1970	17089	0.384	54.38	113.0	132.93	1800	238.1
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	107.5	128.37	1700	233.6
N/A	8.0	4.22	3.182	1770	15354	0.345	48.86	101.9	123.48	1600	228.7
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	96.4	118.22	1500	223.4
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	90.9	112.52	1400	217.7
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	82.2	102.47	1250	207.7
			3.165	1170	10149	0.228	32.13	68.5	82.84	1000	188.0
			3.165	1070	9282	0.209	29.38	63.0	73.10	900	178.3
			3.149	970	8414	0.189	26.49	57.2	61.12	800	166.3
			3.149	820	7113	0.160	22.40	49.0	39.48	700	144.7
			3.149	720	6246	0.140	19.67	43.6	20.03	600	125.2
			3.149	670	5812	0.131	18.30	40.8	7.77	550	113.0
			3.149	645	5595	0.126	17.62	39.5	0.72	525	105.9
			3.149	620	5378	0.121	16.93	38.1	-7.15	500	98.1
			3.149	608	5274	0.119	16.61	37.4	-11.27	488	93.9
			3.149	570	4945	0.111	15.57	35.4	-26.21	450	79.0
			3.149	545	4728	0.106	14.89	34.0	-38.17	425	67.0
			3.149	520	4511	0.101	14.20	32.6	-52.65	400	52.6
			3.149	370	3210	0.072	10.11	24.4	ERR	250	ERR

Table 8

RCS PRESSURE/TEMPERATURE CURVES
100 F C/D AT 1/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	0	100
THICKNESS	RTndt 3/4t	dT(wall)
11.190	N/A	108.97
Sy	dT(flu.)1/4t	dTct
44500	102	-47.95
Mt 1/4t	dT(flu.)3/4t	%dT
0.387	N/A	0.44
Mt 3/4t	dT(inst.err)	Kit
N/A	8.0	42.21
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	<= 750 PSIA

Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	228.1	191.43	3125	253.5
3.251	3170	27499	0.618	89.40	221.0	188.97	3000	251.0
3.214	2670	23161	0.520	74.45	191.1	177.44	2500	239.5
3.198	2420	20993	0.472	67.13	176.5	171.00	2250	233.1
3.198	2170	18824	0.423	60.20	162.6	164.29	2000	226.3
3.198	2070	17957	0.404	57.42	157.1	161.42	1900	223.5
3.182	1970	17089	0.384	54.38	151.0	158.12	1800	220.2
3.182	1870	16222	0.365	51.62	145.4	154.98	1700	217.0
3.182	1770	15354	0.345	48.86	139.9	151.70	1600	213.8
3.182	1670	14487	0.326	46.10	134.4	148.25	1500	210.3
3.182	1570	13619	0.306	43.34	128.9	144.61	1400	206.7
3.165	1420	12318	0.277	38.99	120.2	138.48	1250	200.5
3.165	1170	10149	0.228	32.13	106.5	127.51	1000	189.6
3.165	1070	9282	0.209	29.38	101.0	122.59	900	184.6
3.149	970	8414	0.189	26.49	95.2	117.00	800	179.1
3.149	820	7113	0.160	22.40	87.0	108.20	700	170.3
3.149	720	6246	0.140	19.67	81.5	101.65	600	163.7
3.149	620	5378	0.121	16.93	76.1	94.40	500	156.5
3.149	608	5274	0.119	16.61	75.4	93.47	488	155.5
3.149	570	4945	0.111	15.57	73.3	90.47	450	152.5
3.149	520	4511	0.101	14.20	70.6	86.30	400	148.4
3.149	470	4077	0.092	12.84	67.9	81.86	350	143.9
3.149	370	3210	0.072	10.11	62.4	72.03	250	134.1
3.149	270	2342	0.053	7.37	57.0	60.55	150	122.6
3.149	120	1041	0.023	3.28	48.8	38.70	0	100.8

Table 9

RCS PRESSURE/TEMPERATURE CURVES
0 F C/D AT 1/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE	Mm	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
0.399	0	0	3.251	3295	28583	0.642	92.93	185.9	175.19	3125	299.2
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	178.8	172.07	3000	296.1
11.190	N/A	0.00	3.214	2670	23161	0.520	74.45	148.9	156.96	2500	281.0
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	134.3	148.15	2250	272.2
44500	116	0.00	3.198	2170	18824	0.423	60.20	120.4	138.62	2000	262.6
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	114.8	134.41	1900	258.4
0.387	N/A	0.44	3.182	1970	17089	0.384	54.38	108.8	129.47	1800	253.5
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	103.2	124.66	1700	248.7
N/A	8.0	0.00	3.182	1770	15354	0.345	48.86	97.7	119.49	1600	243.5
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	92.2	113.91	1500	237.9
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	86.7	107.82	1400	231.8
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	78.0	97.01	1250	221.0
			3.165	1170	10149	0.228	32.13	64.3	75.48	1000	199.5
			3.165	1070	9282	0.209	29.38	58.8	64.55	900	188.5
			3.149	970	8414	0.189	26.49	53.0	50.82	800	174.8
			3.149	820	7113	0.160	22.40	44.8	24.96	700	149.0
			3.149	720	6246	0.140	19.67	39.3	0.04	600	124.0
			3.149	620	5378	0.121	16.93	33.9	-39.37	500	84.6
			3.149	608	5274	0.119	16.61	33.2	-46.06	488	77.9
			3.149	570	4945	0.111	15.57	31.1	-72.94	450	51.1
			3.149	545	4728	0.106	14.89	29.8	-98.88	425	25.1
			3.149	520	4511	0.101	14.20	28.4	-140.94	400	-16.9
			3.149	495	4294	0.096	13.52	27.0	-267.44	375	-143.4
			3.149	420	3643	0.082	11.47	22.9	ERR	300	ERR
			3.149	395	3427	0.077	10.79	21.6	ERR	275	ERR

Table 10

RCS PRESSURE/TEMPERATURE CURVES
10 F C/D AT 1/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE	Mm	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
0.399	0	10	3.251	3295	28583	0.642	92.93	190.1	177.00	3125	296.2
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	183.0	173.96	3000	293.2
11.190	N/A	10.90	3.214	2670	23161	0.520	74.45	153.1	159.31	2500	273.5
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	138.5	150.81	2250	270.0
44500	116	-4.79	3.198	2170	18824	0.423	60.20	124.6	141.67	2000	260.9
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	119.1	137.64	1900	256.8
0.387	N/A	0.44	3.182	1970	17089	0.384	54.38	113.0	132.93	1800	252.1
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	107.5	128.37	1700	247.6
N/A	8.0	4.22	3.182	1770	15354	0.345	48.86	101.9	123.43	1600	242.7
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	96.4	118.22	1500	237.4
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	90.9	112.52	1400	231.7
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	82.2	102.47	1250	221.7
			3.165	1170	10149	0.228	32.13	68.5	82.84	1000	202.0
			3.165	1070	9282	0.209	29.38	63.0	73.10	900	192.3
			3.149	970	8414	0.189	26.49	57.2	61.12	800	180.3
			3.149	820	7113	0.160	22.40	49.0	39.48	700	158.7
			3.149	720	6246	0.140	19.67	43.6	20.03	600	139.2
			3.149	620	5378	0.121	16.93	38.1	-7.15	500	112.1
			3.149	608	5274	0.119	16.61	37.4	-11.27	488	107.9
			3.149	570	4945	0.111	15.57	35.4	-26.21	450	93.0
			3.149	545	4728	0.106	14.89	34.0	-38.17	425	81.0
			3.149	520	4511	0.101	14.20	32.6	-52.65	400	66.6
			3.149	495	4294	0.096	13.52	31.3	-71.00	375	48.2
			3.149	420	3643	0.082	11.47	27.2	-240.49	300	-121.3
			3.149	395	3427	0.077	10.79	25.8	ERR	275	ERR

Table 11

RCS PRESSURE/TEMPERATURE CURVES
100 F C/D AT 1/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE	Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
0.399	0	100	3.251	[illegible]	28583	0.642	92.93	228.1	191.43	3125	267.5
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	221.0	188.97	3000	265.0
11.190	N/A	108.97	3.214	2670	23161	0.520	74.45	191.1	177.44	2500	253.5
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	176.5	171.00	2250	247.1
44500	116	-47.95	3.198	2170	18824	0.423	60.20	162.6	164.29	2000	240.3
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	157.1	161.42	1900	237.5
0.387	N/A	0.44	3.182	1970	17089	0.384	54.38	151.0	158.12	1800	234.2
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	145.4	154.98	1700	231.0
N/A	8.0	42.21	3.182	1770	15354	0.345	48.86	139.9	151.70	1600	227.8
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	134.4	148.25	1500	224.3
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	128.9	144.61	1400	220.7
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	120.2	138.48	1250	214.5
			3.165	1170	10149	0.228	32.13	106.5	127.51	1000	203.6
			3.165	1070	9282	0.209	29.38	101.0	122.59	900	198.6
			3.149	970	8414	0.189	26.49	95.2	117.00	800	193.1
			3.149	820	7113	0.160	22.40	87.0	108.20	700	184.3
			3.149	720	6246	0.140	19.67	81.5	101.65	600	177.7
			3.149	620	5378	0.121	16.93	75.1	94.40	500	170.5
			3.149	608	5274	0.119	16.61	75.4	93.47	488	169.5
			3.149	570	4945	0.111	15.57	73.3	90.47	450	166.5
			3.149	520	4511	0.101	14.20	70.6	86.30	400	162.4
			3.149	470	4077	0.092	12.84	67.9	81.86	350	157.9
			3.149	370	3210	0.072	10.11	62.4	72.03	250	148.1
			3.149	270	2342	0.053	7.37	57.0	60.55	150	136.6
			3.149	120	1041	0.023	3.29	48.8	38.70	0	114.8

Table 12

RCS PRESSURE/TEMPERATURE CURVES
10 F H/U AT 1/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	0	10
THICKNESS	RTndt 3/4t	dT(wall)
11.190	N/A	10.90
Sy	dT(flu.)1/4t	dTct
44500	102	4.79
Mt 1/4t	dT(flu.)3/4t	%dT
0.387	N/A	0.44
Mt 3/4t	dT(inst.err)	Kit
N/A	8	-4.22
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Mm	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	181.6	173.34	3125	288.1
3.251	3170	27499	0.618	89.40	174.6	170.13	3000	284.9
3.214	2670	23161	0.520	74.45	144.7	154.54	2500	269.3
3.198	2420	20993	0.472	67.13	130.0	145.39	2250	260.2
3.198	2170	18824	0.423	60.20	116.2	135.44	2000	250.2
3.198	2070	17957	0.404	57.42	110.6	131.02	1900	245.8
3.182	1970	17089	0.384	54.38	104.5	125.82	1800	240.6
3.182	1870	16222	0.365	51.62	99.0	120.75	1700	235.5
3.182	1770	15354	0.345	48.86	93.5	115.26	1600	230.1
3.182	1670	14487	0.326	46.10	88.0	109.30	1500	224.1
3.182	1570	13619	0.306	43.34	82.5	102.78	1400	217.6
3.165	1420	12318	0.277	38.99	73.8	91.07	1250	205.9
3.165	1170	10149	0.228	32.13	60.0	67.24	1000	182.0
3.165	1070	9282	0.209	29.38	54.5	54.79	900	169.6
3.149	970	8414	0.189	26.49	48.8	38.70	800	155.5
3.149	820	7113	0.160	22.40	40.6	6.54	700	121.3
3.149	770	6680	0.150	21.03	37.8	-8.68	650	106.1
3.149	720	6246	0.140	19.67	35.1	-28.24	600	85.6
3.149	670	5812	0.131	18.30	32.4	-55.64	550	59.2
3.149	620	5378	0.121	16.93	29.6	-101.80	500	13.0
3.149	608	5274	0.119	16.61	29.0	-119.71	488	-4.9
3.149	570	4945	0.111	15.57	26.9	-312.27	450	-197.5
3.149	520	4511	0.101	14.20	24.2	ERR	400	ERR
3.149	470	4077	0.092	12.84	21.5	ERR	350	ERR
3.149	420	3643	0.082	11.47	18.7	ERR	300	ERR

Table 13

RCS PRESSURE/TEMPERATURE CURVES
10 F H/U AT 3/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE	Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
0.399	N/A	10	3.251	3295	28583	0.642	92.93	188.8	176.47	3125	284.6
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	181.8	173.41	3000	281.5
11.190	0	10.90	3.214	2670	23161	0.520	74.45	151.9	158.63	2500	266.8
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	137.2	150.04	2250	258.2
44500	N/A	10.13	3.198	2170	18824	0.423	60.20	123.4	140.78	2000	248.9
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	117.8	136.70	1900	244.8
N/A	90	0.93	3.182	1970	17089	0.384	54.38	111.7	131.93	1800	240.1
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	106.2	127.30	1700	235.4
0.273	8.0	2.98	3.182	1770	15354	0.345	48.86	100.7	122.33	1600	230.5
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	95.2	116.98	1500	225.1
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	89.7	111.17	1400	219.3
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	81.0	100.91	1250	209.0
			3.165	1170	10149	0.228	32.13	67.2	80.75	1000	188.9
			3.165	1070	9282	0.209	29.38	61.7	70.69	900	178.8
			3.149	970	8414	0.189	26.49	55.0	58.24	800	166.4
			3.149	820	7113	0.160	22.40	47.8	35.51	700	143.6
			3.149	720	6246	0.140	19.67	42.3	14.72	600	122.9
			3.149	670	5812	0.131	18.30	39.6	1.38	550	109.5
			3.149	645	5595	0.126	17.62	38.2	-6.40	525	101.7
			3.149	620	5378	0.121	16.93	36.8	-15.18	500	93.9
			3.149	608	5274	0.119	16.61	36.2	-19.82	488	88.3
			3.149	570	4945	0.111	15.57	34.1	-37.01	450	71.1
			3.149	520	4511	0.101	14.20	31.4	-69.14	400	39.0
			3.149	220	1908	0.043	6.01	15.0	ERR	100	ERR
			3.149	170	1475	0.033	4.64	12.3	ERR	50	ERR

Table 14

RCS PRESSURE/TEMPERATURE CURVES
20 F H/U AT 3/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	N/A	20
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	21.79
Sy	dT(flu.)1/4t	dTct
44500	N/A	20.27
Mt 1/4t	dT(flu.)3/4t	%dT
N/A	90	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	5.96
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	191.8	177.73	3125	295.0
3.251	3170	27499	0.618	89.40	184.8	174.72	3000	293.0
3.214	2670	23161	0.520	74.45	154.9	160.25	2500	278.5
3.198	2420	20993	0.472	67.13	140.2	151.87	2250	270.1
3.198	2170	18824	0.423	60.20	126.3	142.88	2000	261.1
3.198	2070	17957	0.404	57.42	120.8	138.92	1900	257.2
3.182	1970	17089	0.384	54.38	114.7	134.31	1800	252.6
3.182	1870	16222	0.365	51.62	109.2	129.84	1700	248.1
3.182	1770	15354	0.345	48.86	103.7	125.05	1600	243.3
3.182	1670	14487	0.326	46.10	98.2	119.92	1500	238.2
3.182	1570	13619	0.306	43.34	92.6	114.36	1400	232.6
3.165	1420	12318	0.277	39.99	83.9	104.60	1250	222.9
3.165	1170	10149	0.228	32.13	70.2	85.65	1000	203.9
3.165	1070	9282	0.209	29.38	64.7	76.33	900	194.6
3.149	970	8414	0.189	26.49	58.9	64.94	800	183.2
3.149	820	7113	0.160	22.40	50.7	44.66	700	162.9
3.149	720	6246	0.140	19.67	45.3	26.82	600	145.1
3.149	670	5812	0.131	18.30	42.6	15.81	550	134.1
3.149	620	5378	0.121	16.93	39.8	2.70	500	121.0
3.149	608	5274	0.119	16.61	39.2	-0.86	488	117.4
3.149	570	4945	0.111	15.57	37.1	-13.51	450	104.8
3.149	520	4511	0.101	14.20	34.4	-34.73	400	83.5
3.149	470	4077	0.092	12.84	31.6	-65.54	350	52.7
3.149	420	3643	0.082	11.47	28.9	-122.65	300	-4.4
3.149	370	3210	0.072	10.11	26.2	ERR	250	ERR

Table 15

RCS PRESSURE/TEMPERATURE CURVES
40 F H/U AT 3/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	N/A	40
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	43.59
Sy	dT(flu.)1/4t	dTct
44500	N/A	40.54
Mt 1/4t	dT(flu.)3/4t	XdT
N/A	90	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	11.91
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sa	Sm/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	197.8	180.17	3125	318.7
3.251	3170	27499	0.618	89.40	190.7	177.27	3000	315.8
3.214	2670	23161	0.520	74.45	160.8	163.38	2500	301.9
3.198	2420	20993	0.472	67.13	146.2	155.40	2250	293.9
3.198	2170	18824	0.423	60.20	132.3	146.89	2000	285.4
3.198	2070	17957	0.404	57.42	126.8	143.16	1900	281.7
3.182	1970	17089	0.384	54.38	120.7	138.83	1800	277.4
3.182	1870	16222	0.365	51.62	115.1	134.65	1700	273.2
3.182	1770	15354	0.345	48.86	109.6	130.20	1600	268.7
3.182	1670	14487	0.326	46.10	104.1	125.44	1500	264.0
3.182	1570	13619	0.306	43.34	98.6	120.34	1400	258.9
3.165	1420	12318	0.277	38.99	89.9	111.44	1250	250.0
3.165	1170	10149	0.228	32.13	76.2	94.52	1000	233.1
3.165	1070	9282	0.209	29.38	70.7	86.39	900	224.9
3.149	970	8414	0.189	26.49	64.9	76.66	800	215.2
3.149	820	7113	0.160	22.40	56.7	59.97	700	198.5
3.149	720	6246	0.140	19.67	51.2	46.07	600	184.6
3.149	620	5378	0.121	16.93	45.8	28.64	500	167.2
3.149	608	5274	0.119	16.61	45.1	26.22	488	164.8
3.149	520	4511	0.101	14.20	40.3	5.26	400	143.8
3.149	470	4077	0.092	12.84	37.6	-10.28	350	128.3
3.149	420	3643	0.082	11.47	34.9	-30.38	300	108.2
3.149	395	3427	0.077	10.79	33.5	-43.16	275	95.4
3.149	370	3210	0.072	10.11	32.1	-58.85	250	79.7
3.149	355	3080	0.069	9.70	31.3	-70.33	235	68.2

Table 16

RCS PRESSURE/TEMPERATURE CURVES
100 F H/U AT 3/4 T LOCATION (8 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	N/A	100
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	108.97
Sy	dT(flu.)1/4t	dTct
44500	N/A	101.34
Mt 1/4t	dT(flu.)3/4t	%dT
N/A	90	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	29.78
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	215.6	187.03	3125	386.4
3.251	3170	27499	0.618	89.40	208.6	184.41	3000	383.7
3.214	2670	23161	0.520	74.45	178.7	172.01	2500	371.4
3.198	2420	20993	0.472	67.13	164.0	165.02	2250	364.4
3.198	2170	18824	0.423	60.20	150.2	157.68	2000	357.0
3.198	2070	17957	0.404	57.42	144.6	154.50	1900	353.8
3.182	1970	17089	0.384	54.38	138.5	150.84	1800	350.2
3.182	1870	16222	0.365	51.62	133.0	147.35	1700	346.7
3.182	1770	15354	0.345	48.86	127.5	143.67	1600	343.0
3.182	1670	14487	0.326	46.10	122.0	139.78	1500	339.1
3.182	1570	13619	0.306	43.34	116.5	135.66	1400	335.0
3.165	1420	12318	0.277	38.99	107.8	128.63	1250	328.0
3.165	1170	10149	0.228	32.13	94.0	115.82	1000	315.2
3.165	1070	9282	0.209	29.38	88.5	109.94	900	309.3
3.149	970	8414	0.189	26.49	82.8	103.17	800	302.5
3.149	820	7113	0.160	22.40	74.6	92.26	700	291.6
3.149	720	6246	0.140	19.67	69.1	83.89	600	283.2
3.149	620	5378	0.121	16.93	63.6	74.36	500	273.7
3.149	608	5274	0.119	16.61	63.0	73.12	488	272.5
3.149	520	4511	0.101	14.20	58.2	63.30	400	262.6
3.149	420	3643	0.082	11.47	52.7	50.12	300	249.5
3.149	370	3210	0.072	10.11	50.0	42.45	250	241.8
3.149	320	2776	0.062	8.74	47.3	33.91	200	233.2
3.149	270	2342	0.053	7.37	44.5	23.94	150	223.3
3.149	220	1908	0.043	6.01	41.8	12.42	100	211.8

Table 17

RCS PRESSURE/TEMPERATURE CURVES
10 F H/U AT 1/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	0	10
THICKNESS	RTndt 3/4t	dT(wall)
11.190	N/A	10.90
Sy	dT(flu.)1/4t	dTct
44500	116	4.79
Mt 1/4t	dT(flu.)3/4t	%dT
0.387	N/A	0.44
Mt 3/4t	dT(inst.err)	Kit
N/A	8	-4.22
MEAN RADIUS	dP(inst.err)	
97.07	170.0 >	750 PSIA
	120.0 < =	750 PSIA

Mm	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	181.6	173.34	3125	302.1
3.251	3170	27499	0.618	89.40	174.6	170.13	3000	298.9
3.214	2670	23161	0.520	74.45	144.7	154.54	2500	283.3
3.198	2420	20993	0.472	67.13	130.0	145.39	2250	274.2
3.198	2170	18824	0.423	60.20	116.2	135.44	2000	264.2
3.198	2070	17957	0.404	57.42	110.6	131.02	1900	259.8
3.182	1970	17089	0.384	54.38	104.5	125.82	1800	254.6
3.182	1870	16222	0.365	51.62	99.0	120.75	1700	249.5
3.182	1770	15354	0.345	48.86	93.5	115.26	1600	244.1
3.182	1670	14487	0.326	46.10	88.0	109.30	1500	238.1
3.182	1570	13619	0.306	43.34	82.5	102.78	1400	231.6
3.165	1420	12318	0.277	38.99	73.8	91.07	1250	219.9
3.165	1170	10149	0.228	32.13	60.0	67.24	1000	196.0
3.165	1070	9282	0.209	29.38	54.5	54.79	900	183.6
3.149	970	8414	0.189	26.49	48.8	38.70	800	167.5
3.149	820	7113	0.160	22.40	40.6	6.54	700	135.3
3.149	800	6940	0.156	21.85	39.5	0.85	680	129.6
3.149	770	6680	0.150	21.03	37.8	-8.68	650	120.1
3.149	720	6246	0.140	19.67	35.1	-28.24	600	100.6
3.149	620	5378	0.121	16.93	29.6	-101.80	500	27.0
3.149	608	5274	0.119	16.61	29.0	-119.71	488	9.1
3.149	570	4945	0.111	15.57	26.9	-312.27	450	-183.5
3.149	520	4511	0.101	14.20	24.2	ERR	400	ERR
3.149	470	4077	0.092	12.84	21.5	ERR	350	ERR
3.149	420	3643	0.082	11.47	18.7	ERR	300	ERR

Table 18

RCS PRESSURE/TEMPERATURE CURVES
10 F H/U AT 3/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	N/A	10
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	10.90
Sy	dT(flu.)1/4t	dTct
44500	N/A	10.13
Mt 1/4t	dT(flu.)3/4t	%dT
N/A	103	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	2.98
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	188.8	176.47	3125	297.6
3.251	3170	27499	0.618	89.40	181.8	173.41	3000	294.5
3.214	2670	23161	0.520	74.45	151.9	158.63	2500	279.9
3.198	2420	20993	0.472	67.13	137.2	150.04	2250	271.2
3.198	2170	18824	0.423	60.20	123.4	140.78	2000	261.9
3.198	2070	17957	0.404	57.42	117.8	136.70	1900	257.8
3.182	1970	17089	0.384	54.38	111.7	131.93	1800	253.1
3.182	1870	16222	0.365	51.62	106.2	127.30	1700	248.4
3.182	1770	15354	0.345	48.86	100.7	122.33	1600	243.5
3.182	1670	14487	0.326	46.10	95.2	116.98	1500	238.1
3.182	1570	13619	0.306	43.34	89.7	111.17	1400	232.3
3.165	1420	12318	0.277	38.99	81.0	100.91	1250	222.0
3.165	1170	10149	0.228	32.13	67.2	80.75	1000	201.9
3.165	1070	9282	0.209	29.38	61.7	70.69	900	191.8
3.149	970	8414	0.189	26.49	56.0	58.24	800	179.4
3.149	820	7113	0.160	22.40	47.8	35.51	700	156.6
3.149	720	6246	0.140	19.67	42.3	14.72	600	135.9
3.149	620	5378	0.121	16.93	36.8	-15.18	500	106.0
3.149	608	5274	0.119	16.61	36.2	-19.82	488	101.3
3.149	580	5031	0.113	15.84	34.7	-32.06	460	89.1
3.149	560	4858	0.109	15.30	33.6	-42.35	440	78.8
3.149	550	4771	0.107	15.02	33.0	-48.13	430	73.0
3.149	540	4684	0.105	14.75	32.5	-54.45	420	66.7
3.149	520	4511	0.101	14.20	31.4	-69.14	400	52.0
3.149	470	4077	0.092	12.84	28.7	-131.19	350	-10.1

Table 19

RCS PRESSURE/TEMPERATURE CURVES
20 F H/U AT 3/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE	Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
0.399	N/A	20	3.251	3295	28583	0.642	92.93	191.8	177.73	3125	309.0
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	184.8	174.72	3000	306.0
11.190	0	21.79	3.214	2670	23161	0.520	74.45	154.9	160.25	2500	291.5
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	140.2	151.87	2250	283.1
44500	N/A	20.27	3.198	2170	18824	0.423	60.20	126.3	142.88	2000	274.1
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	120.8	138.92	1900	270.2
N/A	103	0.93	3.182	1970	17089	0.384	54.38	114.7	134.31	1800	265.6
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	109.2	129.84	1700	261.1
0.273	8.0	5.96	3.182	1770	15354	0.345	48.86	103.7	125.05	1600	256.3
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	98.2	119.92	1500	251.2
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	92.6	114.36	1400	245.6
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	83.9	104.60	1250	235.9
			3.165	1170	10149	0.228	32.13	70.2	85.65	1000	216.9
			3.165	1070	9282	0.209	29.38	64.7	76.33	900	207.6
			3.149	970	8414	0.189	26.49	58.9	64.94	800	196.2
			3.149	820	7113	0.160	22.40	50.7	44.66	700	175.9
			3.149	720	6246	0.140	19.67	45.3	26.82	600	158.1
			3.149	620	5378	0.121	16.93	39.8	2.70	500	134.0
			3.149	608	5274	0.119	16.61	39.2	-0.86	488	130.4
			3.149	570	4945	0.111	15.57	37.1	-13.51	450	117.8
			3.149	545	4728	0.106	14.89	35.7	-23.30	425	108.0
			3.149	520	4511	0.101	14.20	34.4	-34.73	400	96.5
			3.149	500	4337	0.097	13.66	33.3	-45.46	380	85.8
			3.149	480	4164	0.094	13.11	32.2	-58.18	360	73.1
			3.149	470	4077	0.092	12.84	31.6	-65.54	350	65.7

Table 20

RCS PRESSURE/TEMPERATURE CURVES
40 F H/U AT 3/4 T LOCATION (32 EFPY).

ALFA	RTndt 1/4t	RATE
0.399	N/A	40
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	43.59
Sy	dT(flu.)1/4t	dTct
44500	N/A	40.54
Mt 1/4t	dT(flu.)3/4t	%dT
N/A	103	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	11.91
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sa	Sa/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	197.8	180.17	3125	331.7
3.251	3170	27499	0.618	89.40	190.7	177.27	3000	328.8
3.214	2670	23161	0.520	74.45	160.8	163.38	2500	314.9
3.198	2420	20993	0.472	67.13	146.2	155.40	2250	306.9
3.198	2170	18824	0.423	60.20	132.3	146.89	2000	298.4
3.198	2070	17957	0.404	57.42	126.8	143.16	1900	294.7
3.182	1970	17089	0.384	54.38	120.7	138.83	1800	290.4
3.182	1870	16222	0.365	51.62	115.1	134.65	1700	286.2
3.182	1770	15354	0.345	48.86	109.6	130.20	1600	281.7
3.182	1670	14487	0.326	46.10	104.1	125.44	1500	277.0
3.182	1570	13619	0.306	43.34	98.6	120.34	1400	271.9
3.165	1420	12318	0.277	38.99	89.9	111.44	1250	263.0
3.165	1170	10149	0.228	32.13	76.2	94.52	1000	246.1
3.165	1070	9282	0.209	29.38	70.7	86.39	900	237.9
3.149	970	8414	0.189	26.49	64.9	76.66	800	228.2
3.149	820	7113	0.160	22.40	56.7	59.97	700	211.5
3.149	720	6246	0.140	19.67	51.2	46.07	600	197.6
3.149	620	5378	0.121	16.93	45.8	28.64	500	180.2
3.149	608	5274	0.119	16.61	45.1	26.22	488	177.8
3.149	570	4945	0.111	15.57	43.0	17.93	450	169.5
3.149	520	4511	0.101	14.20	40.3	5.26	400	156.8
3.149	470	4077	0.092	12.84	37.6	-10.28	350	141.3
3.149	420	3643	0.082	11.47	34.9	-30.38	300	121.2
3.149	370	3210	0.072	10.11	32.1	-58.85	250	92.7
3.149	340	2949	0.066	9.29	30.5	-84.11	220	67.4

Table 21

RCS PRESSURE/TEMPERATURE CURVES
100 F H/U AT 3/4 T LOCATION (32 EFPY)

ALFA	RTndt 1/4t	RATE
0.399	N/A	100
THICKNESS	RTndt 3/4t	dT(wall)
11.190	0	108.97
Sy	dT(flu.)1/4t	dTct
44500	N/A	101.34
Mt 1/4t	dT(flu.)3/4t	%dT
N/A	103	0.93
Mt 3/4t	dT(inst.err)	Kit
0.273	8.0	29.78
MEAN RADIUS	dP(inst.err)	
97.07	170.0	> 750 PSIA
	120.0	< = 750 PSIA

Ma	Pact	Sm	Sm/Sy	Kia	Kir	T-RTndt	Pind	Tind
3.251	3295	28583	0.642	92.93	215.6	187.03	3125	399.4
3.251	3170	27499	0.618	89.40	208.6	184.41	3000	396.7
3.214	2670	23161	0.520	74.45	178.7	172.01	2500	384.4
3.198	2420	20993	0.472	67.13	164.0	165.02	2250	377.4
3.198	2170	18824	0.423	60.20	150.2	157.68	2000	370.0
3.198	2070	17957	0.404	57.42	144.6	154.50	1900	366.8
3.182	1970	17089	0.384	54.38	138.5	150.84	1800	363.2
3.182	1870	16222	0.365	51.62	133.0	147.35	1700	359.7
3.182	1770	15354	0.345	48.86	127.5	143.67	1600	356.0
3.182	1670	14487	0.326	46.10	122.0	139.78	1500	352.1
3.182	1570	13619	0.306	43.34	116.5	135.66	1400	348.0
3.165	1420	12318	0.277	38.99	107.8	128.63	1250	341.0
3.165	1170	10149	0.228	32.13	94.0	115.82	1000	328.2
3.165	1070	9282	0.209	29.38	88.5	109.94	900	322.3
3.149	970	8414	0.189	26.49	82.8	103.17	800	315.5
3.149	820	7113	0.160	22.40	74.6	92.26	700	304.6
3.149	720	6246	0.140	19.67	69.1	83.39	600	296.2
3.149	620	5378	0.121	16.93	63.6	74.36	500	286.7
3.149	608	5274	0.119	16.61	63.0	73.12	488	285.5
3.149	520	4511	0.101	14.20	58.2	63.30	400	275.6
3.149	420	3643	0.082	11.47	52.7	50.12	300	262.5
3.149	370	3210	0.072	10.11	50.0	42.45	250	254.8
3.149	320	2776	0.062	8.74	47.3	33.81	200	246.2
3.149	270	2342	0.053	7.37	44.5	23.94	150	236.3
3.149	220	1908	0.043	6.01	41.8	12.42	100	224.8

Table 22

RCS PRESSURE/TEMPERATURE CURVES
INSERVICE & HYDROTEST (8 EFPY)

ALFA	RTndt 1/4t	RATE	Km	Pact	Sm	Sm/Sy	Kim	Kir	T-RTndt	Pind	Tind
N/A	0	0	3.251	3295	28583	0.642	92.93	139.4	151.37	3125	261.4
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	134.1	148.05	3000	258.1
11.190	N/A	N/A	3.214	2670	23161	0.520	74.45	111.7	131.89	2500	241.9
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	100.7	122.33	2250	232.3
44500	102	N/A	3.198	2170	18824	0.423	60.20	90.3	111.87	2000	221.9
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	86.1	107.20	1900	217.2
N/A	N/A	N/A	3.182	1970	17089	0.384	54.38	81.6	101.68	1800	211.7
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	77.4	96.26	1700	206.3
N/A	8.0	N/A	3.182	1770	15354	0.345	48.86	73.3	90.38	1600	200.4
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	69.1	83.94	1500	193.9
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	65.0	76.85	1400	186.9
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	58.5	63.95	1250	174.0
			3.165	1170	10149	0.228	32.13	48.2	36.87	1000	146.9
			3.165	1070	9282	0.209	29.38	44.1	22.13	900	132.1
			3.149	970	8414	0.189	26.49	39.7	2.25	800	112.3
			3.149	820	7113	0.160	22.40	33.6	-42.08	700	67.9
			3.149	720	6246	0.140	19.67	29.5	-105.48	600	4.5
			3.149	620	5378	0.121	16.93	25.4	ERR	500	ERR
			3.149	520	4511	0.101	14.20	21.3	ERR	400	ERR
			3.149	420	3643	0.082	11.47	17.2	ERR	300	ERR
			3.149	370	3210	0.072	10.11	15.2	ERR	250	ERR
			3.149	320	2776	0.062	8.74	13.1	ERR	200	ERR
			3.149	270	2342	0.053	7.37	11.1	ERR	150	ERR
			3.149	220	1908	0.043	6.01	9.0	ERR	100	ERR
			3.149	170	1475	0.033	4.64	7.0	ERR	50	ERR

Table 23

RCS PRESSURE/TEMPERATURE CURVES
INSERVICE & HYDROTEST (32 EFPY)

ALFA	RTndt 1/4t	RATE	Mm	Pact	Sm	Sm/Sy	Kia	Kir	T-RTndt	Pind	Tind
N/A	0	0	3.251	3295	28583	0.642	92.93	139.4	151.37	3125	275.4
THICKNESS	RTndt 3/4t	dT(wall)	3.251	3170	27499	0.618	89.40	134.1	148.05	3000	272.1
11.190	N/A	N/A	3.214	2670	23161	0.520	74.45	111.7	131.89	2500	255.9
Sy	dT(flu.)1/4t	dTct	3.198	2420	20993	0.472	67.13	100.7	122.33	2250	246.3
44500	116	N/A	3.198	2170	18824	0.423	60.20	90.3	111.87	2000	235.9
Mt 1/4t	dT(flu.)3/4t	%dT	3.198	2070	17957	0.404	57.42	86.1	107.20	1900	231.2
N/A	N/A	N/A	3.182	1970	17089	0.384	54.38	81.6	101.68	1800	225.7
Mt 3/4t	dT(inst.err)	Kit	3.182	1870	16222	0.365	51.62	77.4	96.26	1700	220.3
N/A	8.0	N/A	3.182	1770	15354	0.345	48.86	73.3	90.38	1600	214.4
MEAN RADIUS	dP(inst.err)		3.182	1670	14487	0.326	46.10	69.1	83.94	1500	207.9
97.07	170.0	> 750 PSIA	3.182	1570	13619	0.306	43.34	65.0	76.85	1400	200.9
	120.0	< = 750 PSIA	3.165	1420	12318	0.277	38.99	58.5	63.95	1250	188.0
			3.165	1170	10149	0.228	32.13	48.2	36.87	1000	160.9
			3.165	1070	9282	0.209	29.38	44.1	22.13	900	146.1
			3.149	970	8414	0.189	26.49	39.7	2.25	800	126.3
			3.149	820	7113	0.160	22.40	33.6	-42.08	700	81.9
			3.149	720	6246	0.140	19.67	29.5	-105.48	600	18.5
			3.149	620	5378	0.121	16.93	25.4	ERR	500	ERR
			3.149	520	4511	0.101	14.20	21.3	ERR	400	ERR
			3.149	420	3643	0.082	11.47	17.2	ERR	300	ERR
			3.149	370	3210	0.072	10.11	15.2	ERR	250	ERR
			3.149	320	2776	0.062	8.74	13.1	ERR	200	ERR
			3.149	270	2342	0.053	7.37	11.1	ERR	150	ERR
			3.149	220	1908	0.043	6.01	9.0	ERR	100	ERR
			3.149	170	1475	0.033	4.64	7.0	ERR	50	ERR

Figure 1

ANPP COOLDOWN P–T LIMITS (10 YEARS)

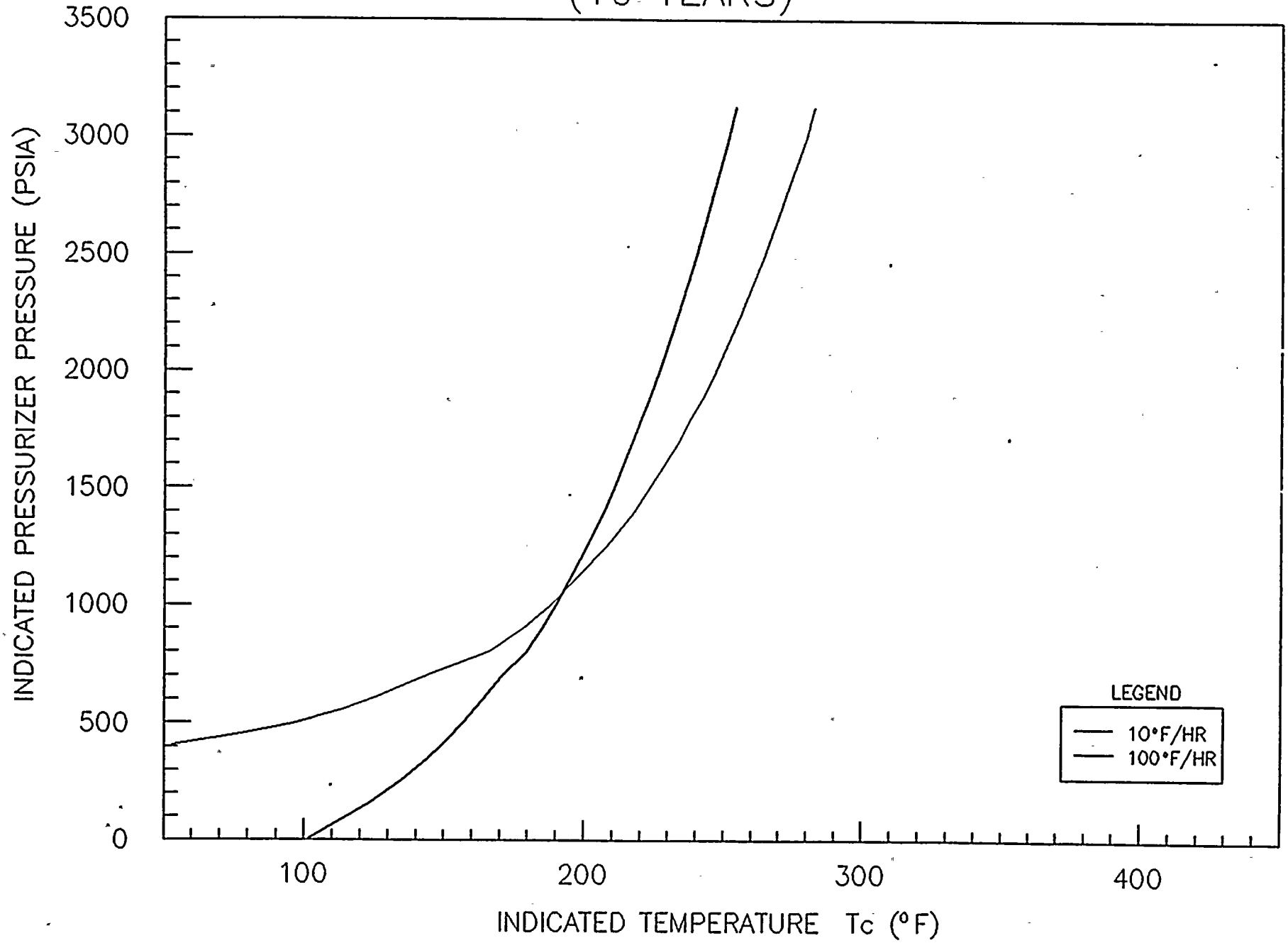
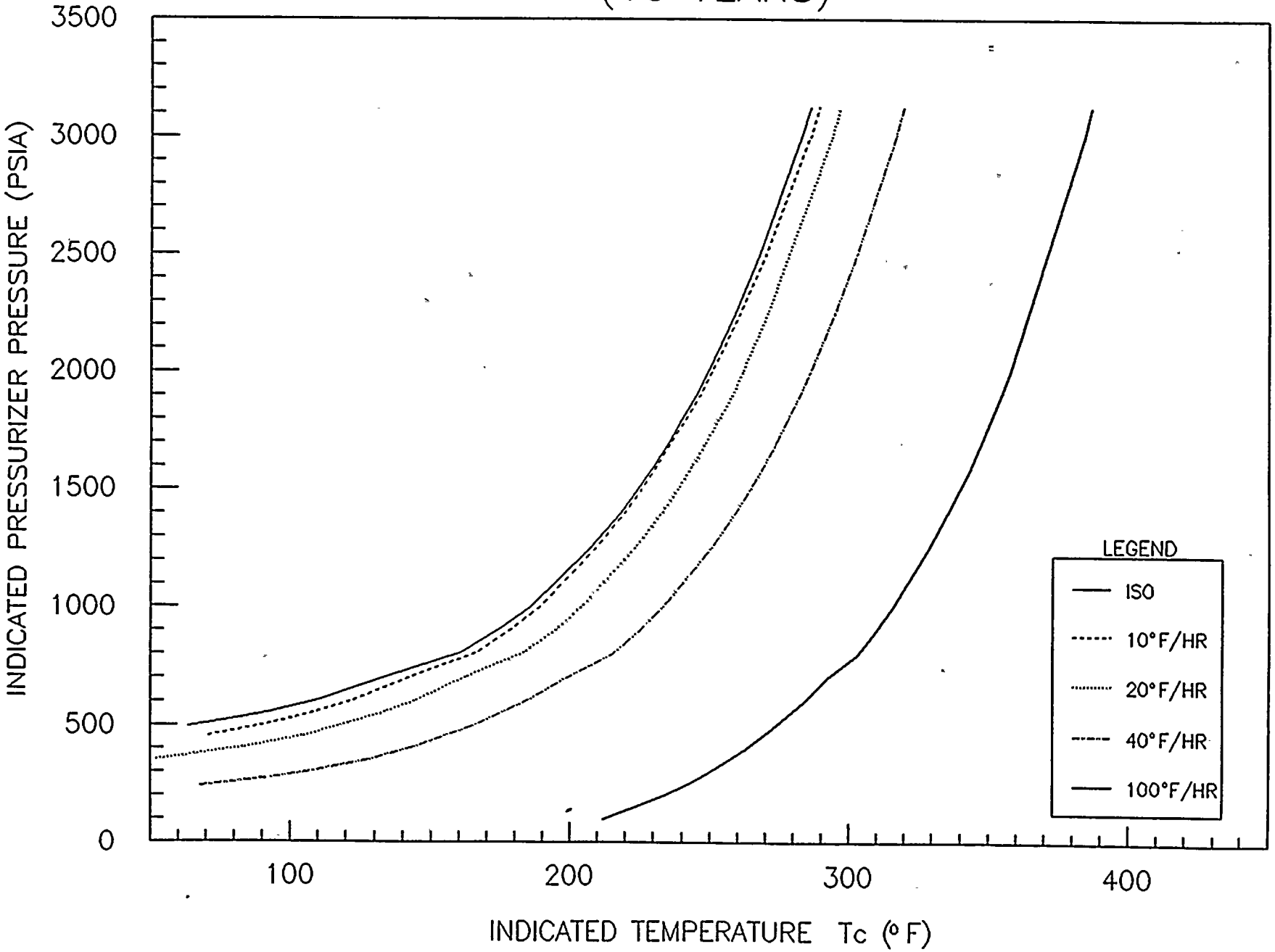


Figure 2

ANPP HEATUP P–T LIMITS (10 YEARS)



Figur

ANPP COOLDOWN P–T LIMITS (40 YEARS)

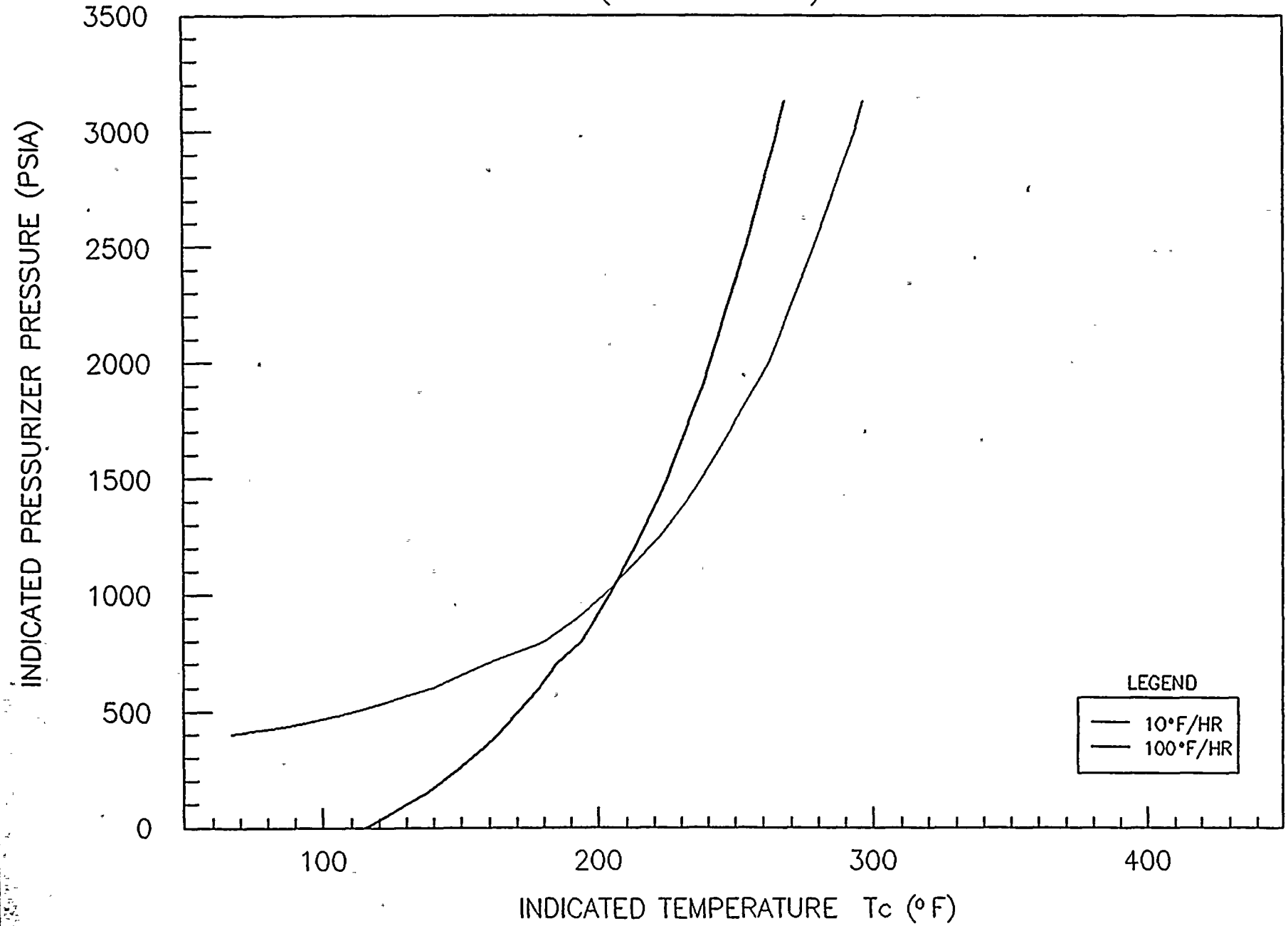


Figure 4

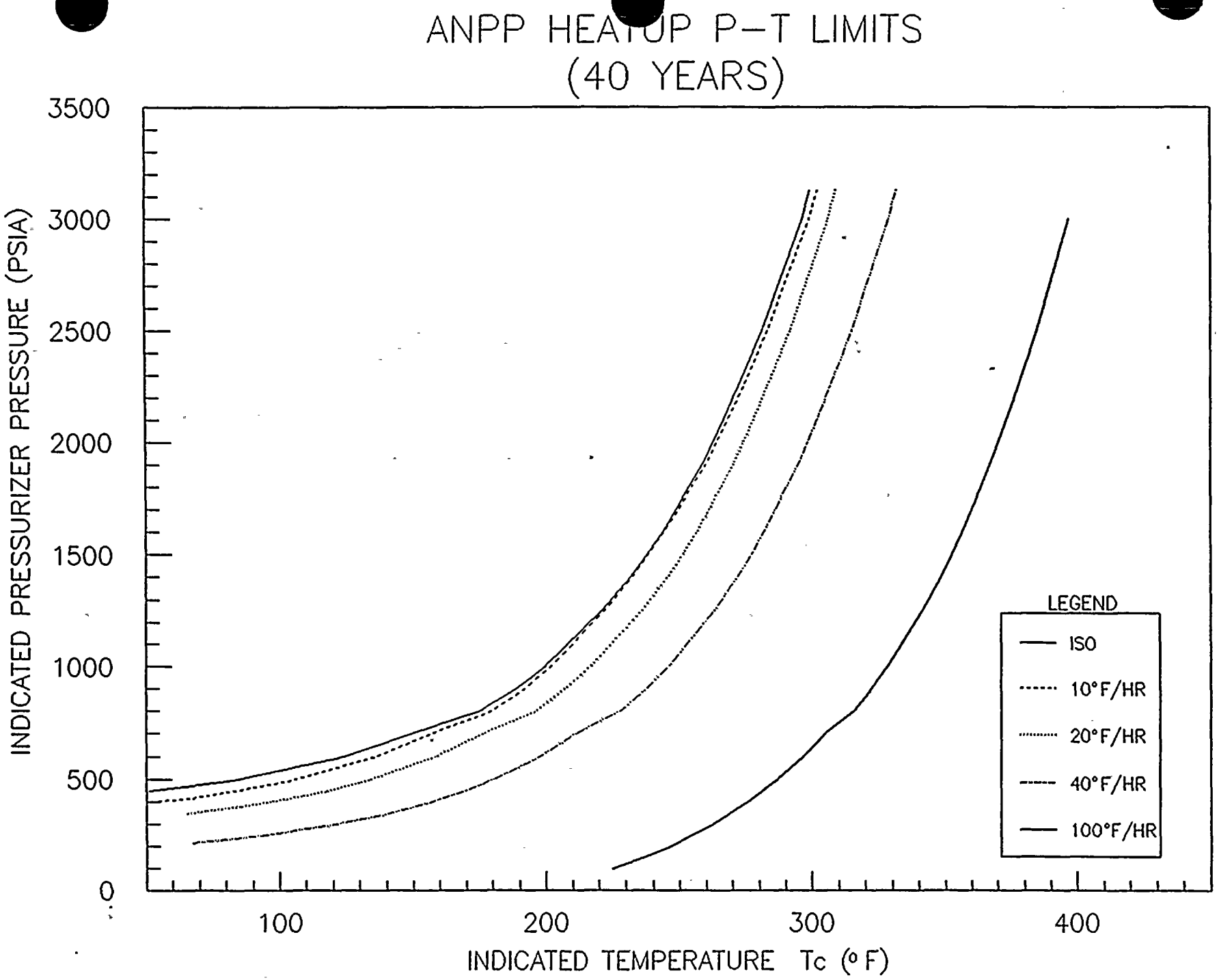

ANPP HEATUP P-T LIMITS
(40 YEARS)
INDICATED PRESSURIZER PRESSURE (PSIA)
3500
3000
2500
2000
1500
1000
500
0
100
200
300
400
INDICATED TEMPERATURE Tc (° F)
LEGEND
ISO
10°F/HR
20°F/HR
40°F/HR
100°F/HR

Figure 5

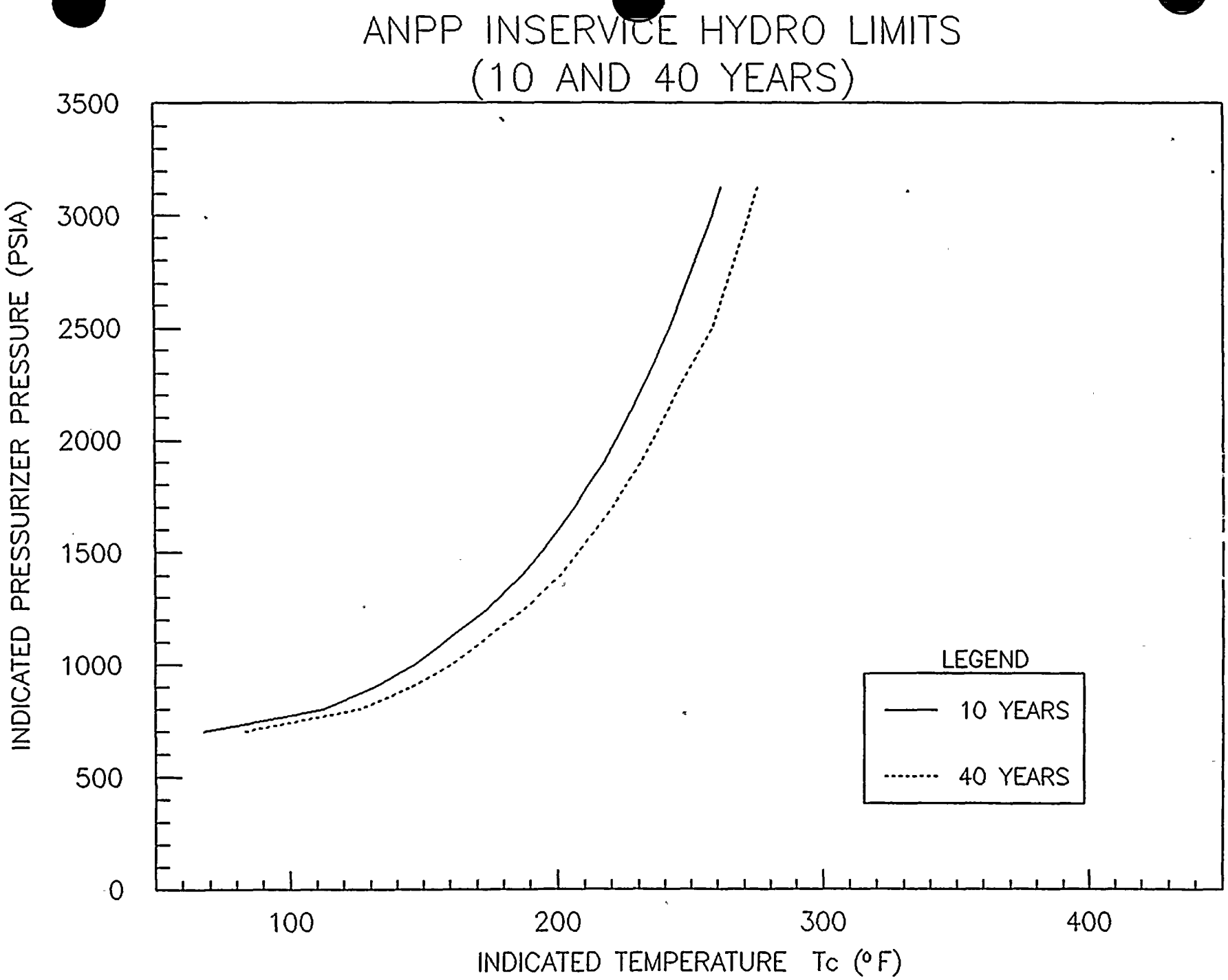

ANPP INSERVICE HYDRO LIMITS
(10 AND 40 YEARS)
INDICATED PRESSURIZER PRESSURE (PSIA)
3500
3000
2500
2000
1500
1000
500
0
100
200
300
400
INDICATED TEMPERATURE Tc (°F)
LEGEND
10 YEARS
40 YEARS

Figure 6

FIGURE 3.4-2a
REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITATIONS
FOR 0 TO 10 YEARS OF FULL POWER OPERATION

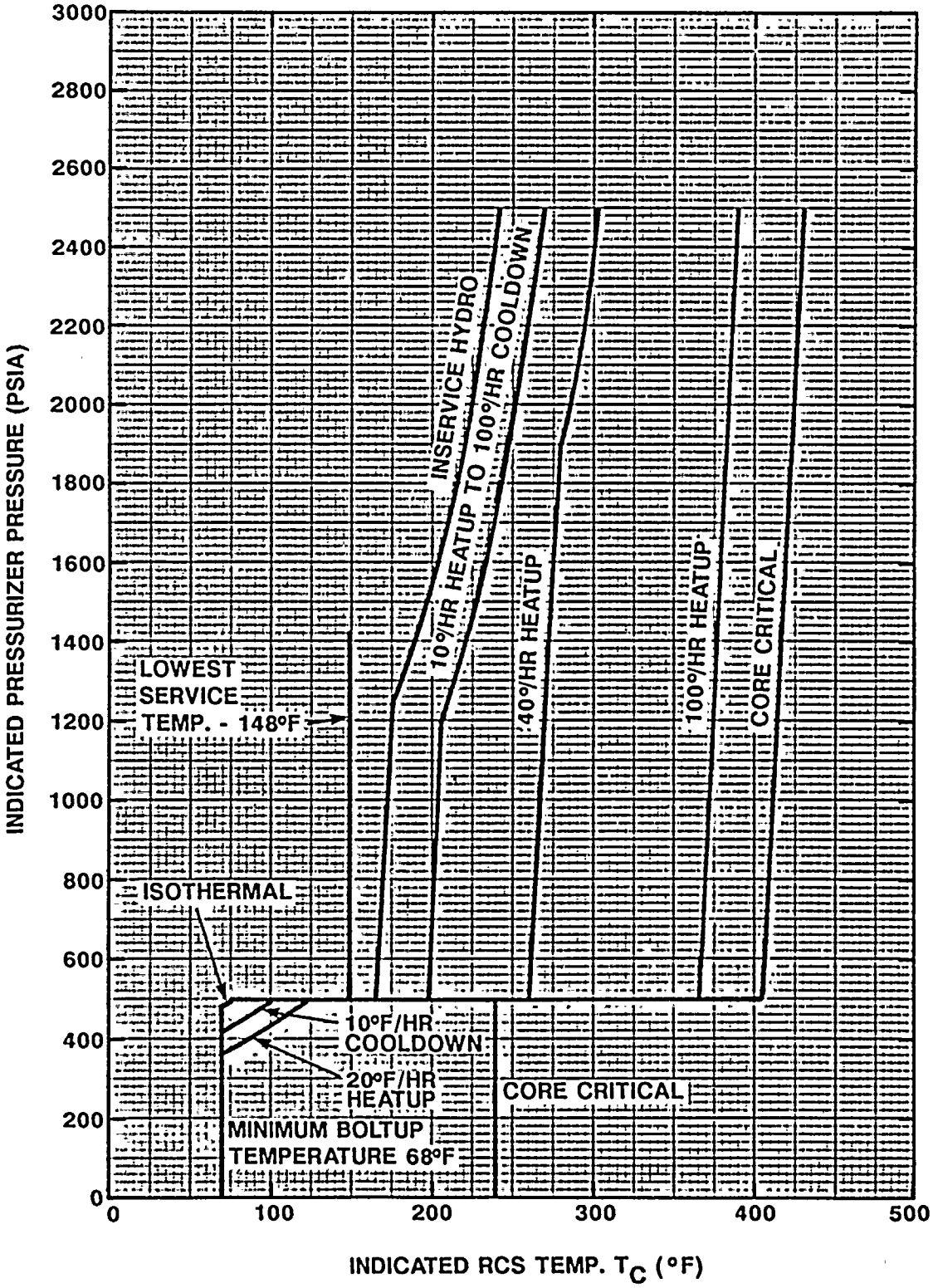
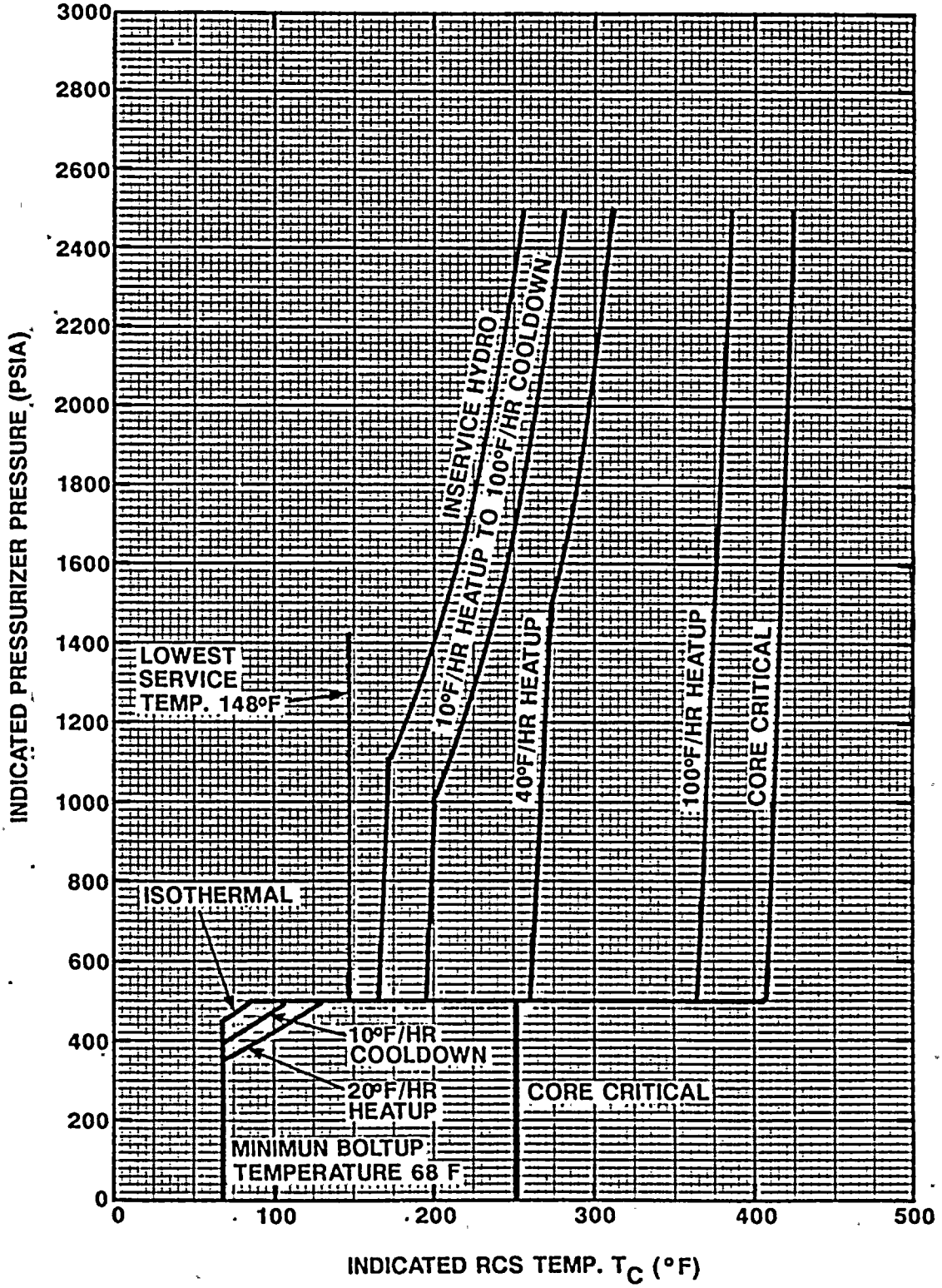


Figure 7

FIGURE 3.4-2b
REACTOR COOLANT SYSTEM PRESSURE/TEMPERATURE LIMITATIONS
FOR 10 TO 40 YEARS OF FULL POWER OPERATION



Design Change 50.59 Report

PCP Number	Description	Summary
85-02-CD-017 85-03-CD-017	This change replaced the alarming seal water flowmeters on the condensate pumps with new non-alarming rotameters. This change was implemented in Units 2 and 3 during this reporting period and affected FSAR Section 10.4.	This change did not introduce an unreviewed safety question. The replacement rotameter is similar in configuration to the existing meter and is not a safety related instrument. The elimination of the alarm function also reduces unnecessary alarms in the control room.
86-01-CH-003 86-02-CH-003	This design change revises Plant Change Package 86-01-CH-003 to add a time delay relay to cabinet E-ZAN-C02 to prevent the momentary closing of contacts TS-231HH and LL and T231 (due to a relay race condition) from closing valve CH-231 (seal injection isolation valve). This modification is necessary to ensure valve CHE-UV-231 operates as originally intended on a loss of power condition within the loop electronics.	This revision did not introduce an unreviewed safety question. The revision ensures that CHE-UV-231P will fail open on a loss of power to the instrument cabinet as noted in CESSAR Table 9.3-7 and FSAR Figure 9.3.13. Thus this PCP is not a design change as it corrects the wiring to allow the valve to function as originally designed.
86-02-CH-030	This change added narrow range pressure instrumentation for the reactor drain tank nitrogen blanket monitoring in the control room. This affected FSAR Sections 9.3.4.	This change did not introduce an unreviewed safety question. No safety related equipment is involved and the added instrumentation will enable more accurate reactor drain tank pressure monitoring.
85-02-CH-039	This change replaced indication scales and recalibrated process cards due to the installation of new Foxboro cards.	This modification did not introduce an unreviewed safety question. The change only affected the scales and did not change the function of the instrumentation.
85-01-CH-112	This change replaced the nitrogen regulator to the reactor drain tank with an identical regulator of a lower operating range. The previous pressure regulator had a spring range of 2-6 psig and was set at 3 psig. This allowed a continuous flow of nitrogen and unnecessary gaseous radwaste to the radwaste surge tank. The new regulator has a lower range and will be set at .5 psig.	This modification did not introduce an unreviewed safety question. The replacement of a pressure regulator with an identical regulator does not change any previous analysis. The new regulator will perform the same function as the previous but with reduced gaseous radwaste.
85-03-CH-170	This change was previously reported as item 4 in the 1987	

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Design Change 50.59 Report

PCP Number	Description	Summary
	50.59 Report.	
84-01-CM-004	This change replaces the level switches for the chemical waste tank. The setpoints are too low to set on the present range of the instruments. The set point on the old switches falls within the first 10 to 15% of its range making it inaccurate and preventing the system from operating as it was designed.	This modification did not introduce an unreviewed safety question. The chemical waste tank performs no safety function and affects no equipment which performs a safety function. The replacement of the level switches does not change the system operation but enhances the system performance.
85-01-CP-005	This change was reported as item 142 in the 1987 50.59. Report.	
85-02-CW-023	This change involved Pitot tube taps for use during testing of the cooling towers. The taps were in place but required modification for installation of the pitot tubes. An isolation valve and blind flange were added to the taps to aid in isolation of the taps for cooling tower performance testing. Excavation was also necessary to uncover the taps. The change was implemented in Unit 2 during this reporting period and affected FSAR Section 10.4.	This change did not introduce an unreviewed safety question. No important to safety equipment is involved in the change and the change allows for testing of the cooling towers to trend their performance and allow predictive maintenance.
85-01-DG-035	This change replaced a diesel generator manifold temperature control valve with a different model valve.	This modification did not introduce an unreviewed safety question. The repalcement valve meets the same specifications as the original and performs an identical function. No system operation is affected.
85-01-DS-004	This change added a pipe support to the emergency shower stand at the spray pond metering pump house.	This modification did not introduce an unreviewed safety question. No equipment important to safety or safety related was affected by this modification. The emergency shower is for personnel protection only.
85-01-DS-019	This change installed a backflow preventer in line AS-313 of the domestic water system at the auxiliary boiler. The change also installed vauum breakers on 1 inch lines AS-106,	This change did not introduce an unreviewed safety question. The change does not involve any equipment that is important to safety.

Design Change 50.59 Report

PCP Number	Description	Summary
	AS-107, AS108, and AS-522. The changes were implemented in Unit 1 during this reporting period and affected FSAR Section 9.2.	
85-01-DW-020	This change reduced the pressure to the seals on the control building oily waste sump pumps. The previous supply pressure was higher than the vendor recommedation and so this change was made to comp;y with the vendors recommendation.	This change did not introduce an unreviewed safety question. The reduced seal pressure does not constitute a change to the facility as described in the FSAR. No system operation or design criteria are affected by this change. No safety related or important to safety equipment or systems are affected by this change.
85-01-ED-012	This change rewired the heater drain pump low flow trip to provide a time delay prior to the trip signal being generated. This will prevent spurious trips caused by momentary low flow conditions.	This modification did not introduce an unreviewed safety question. There are no safety related or important to safety equipment affected by this change. The change will prevent spurious trips of the heater drain pumps and consequently reduce the probability of a loss of feedwater occurrence.
85-01-ES-004 85-02-ES-004 85-03-ES-004	This change removes the existing "Loss of Power" nuisance alarm from the Safety Equipment Status System (SESS) for the containment refueling purge valves CPA-UV-2A, 2B; CPB-UV-3A, 3B. During normal operation the valve circuit breakers are racked out per procedure 40AC-OZZ06. Since these valves are ESF actuated and monitored by SESS for loss of power a continuous nuisance alarm in the control room. The change will enable the SESS to alarm only when the valve is not in a safe position and loss of power occurs. In addition the loss of power alarm will be deleted from SESS for the valves SIC-UV-653, SID-UV-654, SPB-HV-50A, and SPB-HV-50B. These valves are not automatically actuated ESF devices. During normal operation the circuit breakers for these valves are racked out per procedure 40AC-OZZ06. Ths causes a continuous nuisance alarm in the control room.	This modification did not introduce an unreviewed safety question. The change to the alarm circuitry did not affect the operation of the equipment. The SESS is for operator convienence only and performs no safety function. The change will eliminate nuisance alarms from the control room and improve safety from a human factors standpoint.
85-01-FH-008	This change replaced the cadmium plated bolts on the spent	This modification did not introduce an unreviewed safety

Design Change 50.59 Report

PCP Number	Description	Summary
	fuel handling machine tool storage bracket with stainless steel bolts.	question. The stainless steel bolts are stronger than the cadmium plated bolts and have better corrosion resistance.
85-02-FH-041	This change installed bellville washers to remove the gap on the end of the load brake pinion shaft to assure maximum clutch engagement and proper operation of the spent fuel handling machine and refueling machine gear boxes. Reduction of the gap on the end of the load brake pinion shaft will correct a fuel hoist load brake overspeed problem.	This modification did not introduce an unreviewed safety question. The installation of the bellville washers corrects an existing problem and does not affect the operational or failure modes of the spent fuel handling machine or refueling machine. FSAR Section 9.1.4 was reviewed and installation of the washers does not change the safety evaluation.
85-02-FH-043	This change added spacers to limit the travel of the refueling machine hoist spreader. This eliminated an interference between the spreader and core support barrel which occured when extracting fuel from the outer edge of the core.	This modification did not introduce an unreviewed safety question. All the existing requirements applicable to the design and operation of the refueling machine remain intact and unaltered by the change involving the spacers. The spacers allow the refueling machine to function as designed. No changes were made to the operational or failure modes of the refueling machine.
84-01-FT-003	This change provided a separate power circuit to the mainfeedwater pump turbine turning gear. The original circuit routing was not adequate to supply sufficient power to the solenoids.	This modification did not introduce an unreviewed safety question. The main feedwater pump turbine turning gear is for equipment protection only and serves no safety function and affects no equipment important to safety or safety related. This change will allow it to perform its intended function.
85-01-FW-018	This change removed the low flow cutoff feature of the Foxboro square root extractor cards in the main feedwater flow system to provide automatic operation and flow indication at low flow.	This modification did not introduce an unreviewed safety question. The modification involves balance of plant equipment and affects no safety related or important to safety equipment. The change does not affect the operation of the main feedwater system other than to allow automatic operation at lower flow rates.
87-01-GA-002	This change modified socket welds (6 locations) on the	This change did not introduce an unreviewed safety question.

Design Change 50.59 Report

PCP Number	Description	Summary
87-02-GA-002	nitrogen supply line to the Steam Generators and Reactor Drain Tank. The subject line GANL008 (S3D class) is connected to valve GAA-UV002 (Q1B class) which is identified as a containment isolation valve per Table 6.2.4-1 of FSAR. The subject valve is Seismic Category I and the line is Seismic Category III. Section 3.7.2.8 of FSAR discusses the techniques used to consider the interaction of Non-Category I structures with Seismic Category I structures. The result of this analysis requires modification of the socket welds.	The modified socket welds meet the requirements of FSAR Section 3.7.2.8. Meeting these requirements brings the plant back into conformance with the FSAR and design bases.
85-01-GH-006	This modification provided a non-linear scale for the main generator hydrogen purity meter in the control room. It also provided for a curve fit to be performed on the Plant Computer point for generator hydrogen purity. The purpose ot the change was to match the non-linear output of the General Electric hydrogen purity monitor with the control room indications.	This modification did not introduce an unreviewed safety question. The hydrogen purity meter is for equipment protection of the main generator and does not perform an important to safety or safety related function. The change corrects the control room indication to provide a more accurate indication of hydrogen purity.
86-01-HC-008 86-02-HC-008	This change installed backdraft dampers in the discharge stacks of the control element drive mechanism (CEDM) cooling fans 2MHCNA02A, B, C, and D. The change was implemented in Unit 2 during this reporting period and affected FSAR Section 9.4.	This change did not introduce an unreviewed safety question. The dampers are not safety related and are qualified to withstand a safe shutdown earthquake. An analysis has been performed to ensure the structural integrity of the entire CEDM cooling unit.
85-01-HC-013	This modification added flanges to the Control Element Drive Motor (CEDM) cooling system collecting ring duct. The purpose of the change was to facilitate duct removal and re-installation during refueling.	This modification did not introduce an unreviewed safety question. This change did not affect system operation. The change was within the design criteria of the system and did not affect its siesmic qualification.
85-01-HC-015	This change added five containment air temperature inputs from thermocouples JHCNTE42A, B, C, D, and E to the plant computer. Signal conditioning cards were also installed in balance of plant analog instrument cabinet (JZJNC02C) and an input card was replaced in multipoint recorder	This change did not introduce an unreviewed safety question. The plant computer does not perform any safety functions and isolation devices are included in all safety related inputs to the computer.

Design Change 50.59 Report

PCP Number	Description	Summary
	JRMNUJR0005. These changes were implemented in Unit 1 during this reporting period and affected FSAR Secton 9.4 and drawing 13-E-ZJC-039, which is incorporated into the FSAR by reference.	
86-01-HJ-014	This change installed an electrically operated exhaust fan with automatic back draft shutter, wall mounted thermostat, a fixed louver with bug screen and dust filter in the corridor building elevator machinery room. The change was implemented in Unit 1 during this reporting period and affected FSAR Section 9.4 and drawings 13-J-HJL-004, 13-J-HJE-051, 13-E-HJB-002, 13-E-ZJC-037, 13-E-ZJC-038, and 13-J-ECL-002 which are incorporated into the FSAR by reference.	This change did not introduce an unreviewed safety question. The changes are not related to safety related equipment, but help reduce the temperature in the elevator machinery room.
87-01-HP-003 87-02-HP-003	This change modified a pipe support on the inlet line to containment Post-LOCA hydrogen monitor B. This modification is required to bring the pipe support in compliance with the ASME Code Section III requirements.	This modification did not introduce an unreviewed safety question. The hydrogen monitoring system is discussed in FSAR Section 6.2.5.2.2.2. This change brings the piping for this system in accordance with ASME Section III and thus establishes and improves the operability of the system.
84-01-HP-007	This modification changed the clamping and support for the calibration and reagent gas bottle of the Post LOCA hydrogen analyzers. The purpose of the modification was to ensure an acceptable seismic mounting was provided for the bottles and pressure regulators.	This modification did not introduce an unreviewed safety question. No change in system operation was performed. The changes do not affect the system as described in FSAR 6.2.5.2.1. The change ensures the hydrogen reagent bottles will be adequately supported for a seismic event.
85-01-HP-019	This modification installed two valves on the Post LOCA Hydrogen analyzer inlet lines to accomodate a sampling bomb. The purpose of this change was to provide an alternate sample flowpath for the containment atmosphere.	This modification did not introduce an unreviewed safety question. The addition of these valves does not affect system operation. The valve installation is in accordance with all plant design criteria and does not affect any equipment important to safety. The valves allow sampling of the containment atmosphere in the event the hydrogen analyzer is out of service.

Design Change 50.59 Report

PCP Number	Description	Summary
85-02-HS-004	This modification provided a supplemental air conditioning system to reduce the temperature of the microwave room (160' control building) to 75 degrees fahrenheit. The purpose of this change is to improve electrical equipment life in the room.	This modification did not introduce an unreviewed safety question. The addition of this non-quality related air conditioning unit does not affect any safety related equipment. The failure of the system would have no effect on safe shutdown of the plant.
84-01-LO-002 84-02-LO-002	This change added circuitry to the Main Turbine Emergency Bearing Oil Pump starting circuit to: 1. Start the EBOP on loss of power to the Turning Gear Oil Pump; 2. Added redundant pressure switches to the EBOP starting circuit. The purpose of this change was to improve the reliability of the EBOP.	This change did not introduce an unreviewed safety question. The EBOP is for equipment protection only and its operation does not affect any safety related or important to safety equipment. This change improves the reliability of the EBOP.
83-01-LR-003 83-02-LR-003	This change added a stainless steel bypass line around the Liquid Radwaste System Evaporator. The purpose of the line is to allow the use of alternate means of processing liquid radwaste when the evaporator is out of service.	This change did not introduce an unreviewed safety question. All the original requirements applicable to the design and operation of the LRS remain unaltered by the addition of a permanent line bypassing the LRS evaporator to an alternate method of radwaste processing. This change does not affect any equipment required for safe shutdown or to mitigate the consequences of an accident.
85-02-LR-004	This change replaced the meter face on chemical drain tank level indicator to read in percent versus inches of water.	This change did not introduce an unreviewed safety question. The FSAR does not cover this level of detail. No equipment function or operation is affected.
85-02-LR-022	This change rewires the foxoboro module for the chemical drain pump high discharge pressure trip to trip the pump if the pressure transmitter signal is lost. This provides a fail safe mode of operation.	This change did not introduce an unreviewed safety question. Ths feature is not described in the FSAR and is only utilized for protection of non-quality related equipment (chemical drain pump). No safety related or important to safety components are affected by this change.
85-03-LR-032	This change added stiffeners to the top steam tray of the Liquid Radwaste System (LRS) evaporator and changed the	This change did not introduce an unreviewed safety question. The stiffeners and change to the recycle line reduce the

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PCP Number	Description	Summary
	recycle line input from the cold side of the distillate cooler to the hot side. The purpose of this change was to prevent the recurrence of fatigue cracking in the evaporator body.	stresses in the evaporator body thus improving its structural integrity. The evaporator function is not changed and all project design criteria are met.
85-AO-OW-009	This change constructed a second evaporation pond east of the existing pond, with all related piping and structures. The change was implemented in all three units during this reporting period and affected FSAR Sections 2.4 and 9.3.	This change did not introduce an unreviewed safety question. The construction is a planned addition in the original design. The FSAR accident analysis are not affected.
86-01-PC-007 86-02-PC-007 86-03-PC-007	This change added a check valve and bleed valve to the air supply for the spent fuel pool and cask loading pit gate seals. The purpose of this change was to prevent deflation of the seals on a loss of air supply.	This change did not introduce an unreviewed safety question. This change improves the reliability of the spent fuel pool seals. The spent fuel pool is a backup source of borated water for the reactor coolant system (RCS) and this change reduces the possibility of a loss of this source of borated water due to leakage from the gate seals. Thus improving the margin of safety.
86-03-QA-007	This change provided a 240VAC/30A outlet in the hot chemistry lab.	This modification did not introduce an unreviewed safety question. The receptacle is powered from non-class power and affects no safety related or important to safety equipment.
86-03-QC-004	This change installed additional area lighting in the protected area. The additional lighting was required to meet FSAR Section 9.5.3.1,2 and 13.6.2. This change maintained the PVNGS commitment to provide .2 foot candles minimum for area lighting.	This modification did not introduce an unreviewed safety question. The additional lighting is powered from non-class busses and has been evaluated to ensure it does not potentially affect any safety related or important to safety equipment.
84-01-QF-017	This change installed the Emergency Notification System and Health Physics Network dial up phones as required per NRC emergency preparedness guidelines.	This modification did not introduce an unreviewed safety question. The plant communication system is not required for safe shutdown nor is it required to mitigate the consequences of an accident. This modification did not change the function or purpose of the plant communication system.

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PCP Number	Description	Summary
86-01-QF-021 86-02-QF-021	This change installed soundproof booths for the existing phones located in high noise level areas in containment.	This change did not introduce an unreviewed safety question. The installation of the booths was evaluated by Engineering for fire protection, potential for clogging containment recirculation sumps, and introduction of aluminum into containment. All aluminum was removed from the booths. The amount of material postulated to be removed from one of the booths in the event of a high energy line break was determined to be neglegible and have no afffect on the containment sumps operation. No fire protection or combustible materials loading problems were identified. The booths have no affect on safety related or important to safety equipment.
84-03-QF-026	This design change installed an additional Security base radio station radio to provide an backup security channel.	This change did not introduce an unreviewed safety question. The addition of a Security base radio station enhances security and does not affect plant safety analysis.
85-01-QF-043	This change deleted the "REQ FAL" command from the Plant Multiplex System software. This command changed the controlling processor from the online processor to the backup processor. However, if the online processor was still operative when the command was given the two processors would share the controlling function and the system would become unstable. There is an operator switch which performs the same function without the resultant unstable operation.	This change did not introduce an unreviewed safety question. This is not a change to the facility as described in the FSAR. The deletion of the command will result in better performance of the Plant Multiplex System. No safety related systems are affected by this change.
85-01-QF-055	This change: 1. Installed radio base stations, battery racks, and antenna tower for Security primary and backup radio channels at the corridor building Unit 3 160' elevation. 2. Installed new 7/8" coax antenna cable for operations, and Security primary and backup radio systems in the auxilary and radwaste buildings. 3. Installed new antenna and 7/8" coax antenna cable at the containment	This change did not introduce an unreviewed safety question. This change does not affect the facility design as described in the FSAR. This change does not affect any systems which are important to safety or safety related.

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PCP Number	Description	Summary
	building 74' elevation. The purpose of the change was to enhance Security and Operations radio communications within the protected area.	
85-01-RC-006	This change replaced the overload heaters on valves J-RCE-HV-430, 431, 432, to the correct full load amp (FLA) rating of 0.7 amps and changed the valve nameplates to reflect the correct FLA settings.	This change did not introduce an unreviewed safety question. These valves are not required for safe shutdown. The change provides the correct overload heater values for the installed valve motor operators.
87-01-RC-008 87-02-RC-008	This change modified pipe supports on lines RCE-L009 and RCE-L144. This was required to bring the pipe supports in compliance with the ASME Code Section II.	This change did not introduce an unreviewed safety question. The pipe supports do not affect system operation or function. The change brings the pipe supports in compliance with the ASME Code.
87-01-RC-011 87-02-RC-011	This change added standpipes to the pressurizer level taps on the bottom head of the pressurizer. The purpose of the change was to prevent sludge from clogging the sensing lines.	This change did not introduce an unreviewed safety question. The addition of standpipes does not affect the reactor coolant system (RCS) pressure boundary. The standpipes will improve the reliability of the pressurizer level indicators by preventing sludge from clogging the sensing lines rendering the indicators inoperable.
87-01-RC-041	This change modified the reactor coolant pump (RCP) shafts to reduce the susceptibility to fatigue cracking. The modifications consisted of removing the chrome from the keyway areas of the shaft, extending the shaft stop seal to act as a thermal barrier to the keyway, and beveling all step changes in the shaft.	This change did not introduce an unreviewed safety question. The modified shafts perform the same function and their operation is not affected. Reducing the shafts susceptibility to fatigue cracking reduces the probability of a RCP sheared shaft. This improves the safety margin for this analysis in FSAR Section 15.3.4..
85-01-RC-047	This item was previously reported as item 146 of the 1987 50.59 report.	
86-01-RD-005 86-02-RD-005	This change removed the sump level Lo-Lo nuisance alarms in the control room for LSLL-200 (fuel building), LSLL-107 (ESF), LSLL-108 (ESF), and LSLL-013 (reactor cavity). The	This change did not introduce an unreviewed ssafety question. The Lo-Lo alarms are not important to safety and do not affect equipment important to safety. The sumps are

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	power supply to the containment sump level transmitters was also changed to Class 1E to provide level monitoring in the event of loss of offsite power. The change was implemented in Unit 1 during this reporting period and affected FSAR Section 8.3.1.4.1.1-6 and drawings 13-E-ZJC-037, 13-E-PHA-001, and 13-E-NHA-019, which are incorporated into the FSAR by reference.	normally dry and the control room alarms were nuisance alarms. The powering of the containment sump level transmitters from a Class 1E source allows determination of RCS leakage in the event of loss of offsite power.
87-03-RM-003	This change added a ground cable to the plant computer typer per vendor recommendations.	This change did not introduce an unreviewed safety question. This addition of the ground cable meets the original specifications. The Plant Computer is designed for operator convienence and performs no safety function.
85-03-RZ-007	This change added plant vent, fuel building exhaust vent, and condenser air removal vent flow signals to CRACS and ERFDADS for Unit 3. This affected FSAR section 11.5 and drawings 13-E-ZJC-014 and 13-E-ZJC-039, which are incorporated into the FSAR by reference.	This change did not introduce an unreviewed safety question. The installation of flow sensors with interfaces to CRACS and ERFDADS satisfies requirements of ANSI N13.1-1969 and Regulatory Guides 1.21 and 1.97. There are no changes to the safety design basis.
85-01-RZ-022	This change modified the Post Accident Sampling System (PASS) to provide a permanent PASS gas sampling system by installing sample conditioning panel 01-J-SSN-A01C and 01-J-SSN-A01D and associated racks. This complies with the requirements of NUREG 0737, II.B.3.	This change did not introduce an unreviewed safety question. The PASS is not a safety system used in mitigating the consequences of an accident. The purpose of PASS is to provide samples for Post Accident analysis.
85-02-RZ-024 85-03-RZ-024	This change was previously reported as item 54 of the 1985 50.59 report.	
85-02-SB-036	This change installed supports for multiconductor cables inside the Plant Protection System Cabinets (1-J-SBA, SBB, SBC, SBD). This change prevents the cables from moving due to their own weight and loosening the connector back piece.	This change did not introduce an unreviewed safety question. The addition of the supports does not affect the function or operation of the system. The supports ensure the connectors remain tight thus improving system reliability,
85-01-SB-052	This change replaced variable setpoint cards J642, J635, and	This change did not introduce an unreviewed safety question.

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85-02-SB-052	J638 in cabintes J-SBA-C01, J-SBB-C01, J-SBC-C01, and J-SBD-C01. The purose of the change was to reduce the signal noise present in the cards and prevent spurious reactor trips. The new cards were supplied by Combustion Engineering as an enhancement to the present variable setpoint cards.	The new cards perform the same function the same as the original cards. The new cards will prevent spurious reactor trips which may challenge safety systems as a transient initiator. This change does not involve a change to the facility as described in the FSAR and does not affect the basis of Technical Specification 3/4.3.1.
87-01-SC-002 87-02-SC-002	This change modified the hanger design for pipe support hangers on the Steam Generator Sample lines. As a result of DER 86-32 a reanalysis of the pipe supports was performed and the above pipe support changes determined to be required.	This change did not introduce an unreviewed safety question. The pipe support modifications do not affect system operation. The pipe support modifications are required to meet the design criteria of FSAR Section 3.9.3, Regualtory Guide 1.84, and FSAR Table 5.2-2. This change corrects an identified deficiency and returns the plant to the requirements of the FSAR.
85-01-SC-028	This change removed the buck/boost transformers in the power supplies to the hotwell sample pumps, changed the power source to eliminate long cable runs which were causing excessive voltage drops, and eliminated the capability to start the pumps from the chemistry laboratory. The new power source provides the correct voltage for pump operation. The remote start capability is not required as the pumps are run continuously.	This change did not introduce an unreviewed safety question. The hotwell sample pumps perform no safety function. The change only involves the non-class power system in the turbine building and does not affect any safety related or important to safety equipment. The change improves the operation of the pumps by ensuring the proper voltage is supplied.
85-01-SC-045 85-02-SC-045	This change was previously reported as item 149 of the 1987 50.59 report.	
86-01-SF-001	This change revised the steam bypass control system (SBCS) quick-open, quick-open permissive and auto modulate sequence to provide more even steam loading for condenser shells. Previously, all the steam bypass valves in condenser shell "A" modulated full open prior to any of the steam bypass valves in either of the other two condenser shells opening. This was causing uneven heating of the main turbine exhaust	This change did not introduce an unreviewed safety question. The Steam Bypass Control System is not required for safe shutdown and does not mitigate the consequences of any accident described in the FSAR. The change improves system performance and does not affect the system design bases. It also prevents unnecessary turbine trips. This change does not affect any equipment important to safety or safety

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	hoods and high exhaust hood trips of the main turbine. This change evened the steam loading between condenser shells and eliminated this problem.	related.
86-01-SF-006	This change modified the Feedwater Control System (FWCS) to coordinate valve switchover at 15% power and provided dynamic compensation of feed pump turbine speed setpoint demand. The purpose of the change was to alleviate the potential for plant trips on loop temperature cold mismatch and prevent erratic control of steam generator water level due to feed pump turbine speed over response to control signal.	This change did not introduce an unreviewed safety question. This change improves the performance of the FWCS. The FWCS is not required to remain functional per CESSAR Chapter 15 analysis. The change involves only internal wiring and does not affect functions of the system as described in the FSAR Section 7.7.1.1.4.
87-01-SG-004 87-02-SG-004	This change was previously reported as item 154 of the 1987 50.59 report.	
86-01-SG-027	This change modified the main feedwater pipe whip restraints to provide adequate clearance for thermal expansion growth.	This change did not introduce an unreviewed safety question. The modification of the pipe supports does not affect system operation. Eliminating the interference between the main feedwater piping and the pipe whip restraint reduces the loading on the pipe and improves its ability to withstand other dynamic loading. Thus the margin of safety of the system is improved.
86-01-SG-039	This change removed temporary special instrumentation installed in the Unit 1 S/G #2. The instrumentation was for data gathering on steam generator performance. The testing program was completed and the instrumentation was removed.	This change did not introduce an unreviewed safety question. Removal of the instrumentation will restore the steam generator to its as designed condition. The instrumentation removed did not provide the operators with any information and did not perform any control or alarm function.
85-01-SG-044 85-02-SG-044	This change replaced the existing accumulator low pressure switches (JSGAPSL0260, JSGBPSL0261, JSGAPSL0262, JSGBPSL0263, JSGAPSL268, JSGBPSL0270) on the Main Steam Isolation Valves (MSIVs) and the Feedwater Isolation Valves	This change did not introduce an unreviewed safety question. The new switches are qualified to the same criteria as the original switches and perform the identical function. Only the reset point is changed. The change in the alarm reset

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	(FWIVs) with new Barksdale pressure switches. This switch replacement was required to eliminate nuisance alarms in the Safety Equipment Inoperable Status (SEIS).	point will prevent unnecessary control room alarms. The alarm reset point does not affect the Technical Specification Bases.
85-01-SG-067 85-02-SG-067	This change replaced the existing accumulator low pressure switches (JSGAPSL0264, JSGBPSL0265, JSGAPSL0266, JSGBPSL0267, JSGAPSL0269, and JSGBPSL0271) on the Main Steam Isolation Valves (MSIVs) and Main Feedwater Isolation Valves (FWIVs) with new Barksdale pressure switches. This switch replacement was required to eliminate nuisance alarms in the Safety Equipment Inoperable Status System (SEIS).	This change did not introduce an unreviewed safety question. The new switches are qualified to the same criteria as the original switches and perform teh identical function. Only the reset point is changed. The change in the alarm reset point does not affect the Technical Specification Bases.
85-01-SG-068	This change replaced the existing accumulator low pressure switches (JSGAPSL0260, JSGBPSL0261, JSGAPSL0262, JSGBPSL0263, JSGAPSL0264, JSGBPSL0265, JSGAPSL0266, JSGBPSL0267) on the Main Steam Isolation Valves (MSIVs) and the Feedwater Isolation Valves (FWIVs) with new Barksdale pressure switches. This switch replacement was required to eliminate nuisance alarms in the Safety Equipment Inoperable Status System (SEIS).	This change did not introduce an unreviewed safety question. The new switches are qualified to the same criteria as the original switches and perform the identical function. Only the reset point is changed. The change in the alarm reset point does not affect the Technical Specification Bases.
85-02-SG-095	This change installed wave springs under the piston rings in Steam Bypass Control Valves (SBCVs) 1JSGNPV1001, 1002, 1003, 1004, 1006, 1007, 1008. A wave spring was already installed in 1JSGNPV1005 and it was not included in this change. The purpose of the change was to improve the reliability of the piston ring seal by preventing foreign debris from entering the area above the piston ring and holding the ring away from its seating surface.	This change did not introduce an unreviewed safety question. The Steam Bypass System is not required for safe shutdown or to mitigate the consequences of any accident described in the FSAR. This change does not affect the system operation. The addition of the wave spring will improve valve relaibility and implements a recommendation of the valve vendor Control Components Inc..
85-02-SI-004	This change relocated Ultrasonic flow transmitters 2J-SIN-FI-303 and 304 from the discharge to the suction line of the High Pressure Safety Injection Pumps (HPSI). The change was implemented in Unit 2 during this reporting	This change did not introduce an unreviewed safety question. The change ensures compliance with FSAR Section 6.3 by achieving reliable Ultrasonic low flow indication. In addition, redundant input is available for low flow

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PCP Number	Description	Summary
	period and affected FSAR Section 6.3 and drawings 13-J-ZAF-001, 13-J-ZAF-002, 13-E-ZAC-001, and 13-E-ZAC-002, which are incorporated into the FSAR by reference.	indication.
87-01-SI-015	This change was previously reported as item 157 of the 1987 50.59 report.	
86-01-SI-039	This change was previously reported as item 150 of the 1987 50.59 report.	
86-02-SK-012	Safeguards Information	Safeguards Information
86-01-SK-013 86-02-SK-013	Safeguards Information	Safeguards Information
85-01-SK-026	Safeguards Information	Safeguards Information
85-02-SK-036	This change modified security hatches to incorporate hinges, handles, and test slot.	This change did not introduce an unreviewed safety question. This change does not impact any systems outside of security.
85-01-SO-001	This change rerouted the Generator Seal Oil Tank vent line from the south wall of the turbine building to the east wall of the turbine building. The change was necessary to move the vent oulet away from any potential ignition sources since the vent line may contain hydrogen.	This change did not introduce an unreviewed safety question. The change does not affect any equipment important safety or safety related. The change does not affect system operation. Moving the vent line away from potential ignition sources meets the General Electric requirements for locating the vent and reduces the probability of a fire.
85-02-SP-030	This change replaces the JAECO essential spray pond chemical injection pumps with Milton Roy pumps. The new pumps will perform the same function as the previous pumps and meet the same design specifications.	This change did not introduce an unreviewed safety question. FSAR Section 9.2.1 and 9.2.5.2 describes the Essential Spray Pond System. This change does not affect that description. The new pumps perform the same function and meet the same design requirements.
85-01-SQ-015	This change was previously reported as item 151 of the 1987	

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PCP Number	Description	Summary
	50.59 report.	
85-02-SQ-023 85-03-SQ-023	This change installed structural tie down hardware to provide an anchor for the portable airborne radiation monitors in each unit for Seismic IX considerations.	This change did not introduce an unreviewed safety question. This change does not change the facility as described in the FSAR. Addition of the tiedowns will prevent the portable monitors from damaging any important to safety or safety related equipment during or after a seismic event. The change does not alter the function or operation of any equipment or system.
85-01-SR-004	Ths change made modifications to the Unit 1 solid radwaste system as follows: 1. Lower the waste feed tank discharge header (SRN-004) below the tank water line. 2. Add a check valve below the water line. 3. Add a block valve and flush water line upstream of the new check valve. 4. Extend waste feed tank drain line (SRN-204) into the radwaste building floor drain. This affected FSAR Sections 11.4 and 9.3.	This change did not introduce an unreviewed safety question. The solid radwaste system is not safety related and no systems or components protecting the public from accidents within the solid radwaste system are modified.
86-AO-SR-014	This change made all the site preparations necessary for interface with dry active waste processing and storage facility (DAWPS), which was reported as a separate change (ref. 1987 report, item no. 42). The site preparations were implemented in all three Units during this reporting period and affected FSAR Sections 9.2 and 9.5, and drawings 13-E-ZVU-008, which is incorporated into the FSAR by reference.	This change did not introduce an unreviewed safety question. The dose limits specified in the Technical Specifications will not change. The safety evaluation performed for the DAWPS facility encompasses the changes performed thru this design change package.
86-AO-SR-023	This change was reported as item 42 of the 1987 50.59 report.	
86-03-SS-003	This change was previously reported as item 153 of the 1987 50.59 report.	
85-01-SS-011	This change installed an AC noise filter in the	This change did not introduce an unreviewed safety question.

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PCP Number	Description	Summary
	hydrogen/oxygen analyzers.	The noise filters are an internal modification to the analyzer circuitry which will enable the system to function as designed. Operation of the system as described in FSAR Section 9.3.2 is not affected.
85-01-SS-016 85-03-SS-016	This change provides demineralized flush water capability to the reactor coolant sampling line. The purpose of the line is to allow flushing of the line to reduce radiation levels in the hot chemistry lab in the event a post accident sample is taken from the RCS Hot Leg Loop 1.	This change did not introduce an unreviewed safety question. The flush line is installed per all applicable design criteria. The sampling system is not safety related. The flushing capability is required to meet Technical Specification 3.3.3.1 that requires inititation of a Preplanned Alternate Sampling Program to monitor Post Accident Sampling System parameters.
85-02-SV-002	This change moved the signal cable shield ground for the Loose Parts and Vibration Monitoring System (LPVMS) from the instrument ground bus to the chassis ground. This change reterminates the shield ground wire in accordance with the vendor requirements.	This change did not introduce an unreviewed safety question. This change does not constitute a change to the facility as described in the FSAR. The operation of the system is unaffected by this change. The retermination of the shield ground brings the installation in accordance with the vendor requirements.
85-01-TC-009	This item was previously reported as item 159 of the 1987 50.59 report.	
85-03-ZA-055	This change installed local storage racks for gas cylinders at the Post LOCA Analyzer J-HPB-E02, Post LOCA Analyzer J-HPA-E02, and the Hydrogen and Oxygen Analyzer. The purpose of the racks was to facilitate testing of this equipment with a calibration gas.	This change did not introduce an unreviewed safety question. The change did not constitute a change to the facility as described in the FSAR. The storage racks do not affect any equipment important to safety or safety related and were designed to meet Seismic Category IX requirements.
84-01-ZF-002	This change added eyebolt attachment points to the fuel building 10 ton crane trolley in order to secure safety chains while lifting the fuel pool gates. The addition of safety chains was a NUREG 0612 committment to prevent possible dropping of the fuel pool gate.	This change did not introduce an unreviewed safety question. The addition of safety chains ensures a fuel pool gate will not be dropped. This is not a change to the facility as described in the FSAR.

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PCP Number	Description	Summary
85-01-ZR-007 85-02-ZR-007 85-03-ZR-007	This change replaced the existing hook block on the radwaste crane (NSRN-G01) with a power-operated rotating hook block. This allows the crane operator to remotely position the hook to pick up containers and minimize personnel exposure.	This change did not introduce an unreviewed safety question. This change did not constitute a change to the facility as described in the FSAR. The 30 ton radwaste crane is not safety related. Its failure will not impact any safety related equipment or systems.

Site Modification 50.59 Report

Site Modification Number	Description	Safety Evaluation Summary
1,2-SM-AF-002	This modification transferred the open indication switch for valve JAFA-HV-54 from rotor 2 switch 7 to rotor 4 switch 15 for enhanced position indication. This change was made in response to INPO SOER 86-2.	This modification did not introduce an unreviewed safety question. The change increases the reliability of the closed position indication on the valve and does not affect the trip/throttle function of the valve.
2-SM-AR-002	This modification installed a shaft guard meeting the requirements of OSHA 1910.219.C.2 on post filter blower M-ARN-A02 (main condenser exhaust filter).	This modification did not introduce an unreviewed safety question. The addition of this shaft guard will not affect the performance of the exhaust filtration unit M-ARN-F01 as described in FSAR Sections 10.4.2, 10.4.3, and 11.3. Neither the blower M-ARN-A02 nor filter M-ARN-F01 have any safety function.
1,2,3-SM-AS-001	This modification lowered the condensate cross-tie pressure safety valve setpoints (PSV25) to 100 psig. The system design pressure is 100 psig and the system normally operates at 50 psig.	This modification did not introduce an unreviewed safety question. The Auxiliary Steam (AS) System is not described in FSAR Section 9. The AS system is not quality related nor safety related and does not affect any quality or safety related systems or components. This change does not affect the system operation. The change places the PSV setpoint in accordance with the system design pressure.
1,2-SM-CD-008	This modification reversed the polarity of computer input points CDJ11, 12, and 13 to provide correct readings. These points provide input for condensate pump kilowatts.	This modification did not introduce an unreviewed safety question. Reversing the polarity of these points allows them to be correctly displayed by the Plant Computer. The change affects no important to safety equipment as described in FSAR Section 3.2.
1,2-SM-CD-010	This modification removes the annunciator and audible alarm for condenser reheat tray high level. There is no operator action specified for this alarm. The computer alarm point will remain to alert operators to a potential problem but the annunciator and audible alarm are eliminated.	This modification did not introduce an unreviewed safety question. The purpose of the alarm is to alert the operators to a clogging of the strainer in the bottom of the condenser false floor so action may be taken to clean the strainers at the next refueling outage. Thus an audible alarm and annunciator are a nuisance to operators and serve no useful purpose.

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Site Modification Number	Description	Safety Evaluation Summary
1,3-SM-CE-001	This modification replaced the original Generator Temperature Monitor (GTM) with a newer state of the art monitor. The purpose of the change was to have a more reliable GTM system.	This modification did not introduce an unreviewed safety question. The GTM is for protection of the main generator and provides no plant safety function. This modification does not change the function of the system and the new equipment meets or exceeds all the original equipment specifications. No safety related or important to safety equipment is affected by this modification.
3-SM-CH-001	This modification was previously reported as item 118 in the 1986 50.59 report.	
1,3-SM-CH-002	This change was previously reported as item 119 of the 1986 50.59 report.	
3-SM-CH-003	This modification was reported as item 120 of the 1986 50.59 report.	
1-SM-CH-009	This modification changed the setpoints of the seal injection filter high differential pressure alarm from 15 to 18 psid and the reactor drain tank nitrogen pressure control valve from .5 psig to .8 psig. The seal injection filter high differential pressure alarm setpoint was changed to eliminate excessive filter changes and reduce personnel radiation exposure. The reactor drain tank nitrogen pressure control valve setpoint was changed to allow the control valve to operate further away from the low end of its operating band.	This modification did not introduce an unreviewed safety question. Both revised setpoints are within the original design criteria and will not increase the possibility of equipment malfunction.
2-SM-DG-001	This modification installed an additional pipe support on the diesel generator starting air pipe DG-B-020-GBCB-3". The purpose of the pipe support is to minimize line vibration. Unit 1 has this support installed. This modification installs this same support in Unit 2.	This modification did not introduce an unreviewed safety question. The addition of this pipe support reduces line vibration which improves the fatigue life of the piping. No change is made to system operation or the ability of the diesel to perform its safety related function.

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Site Modification Number	Description	Safety Evaluation Summary
2-SM-DG-004	This modification involved the Emergency Diesel Generator speed control circuitry and included the addition of suppression diodes across the motor operated potentiomenter's field to eliminate voltage spikes, and the changing of the speed reference wiring to a shielded type to block electrical noise. The change was required to correct the problem of speed varying upon start-up and operation of the diesel generator. This modification eliminates induced electrical noise in the governor speed reference circuitry which was causing the speed control problems.	This modification did not introduce an unreviewed safety question. This modification was required to meet Technical Specification requirements 4.8.1.1.2.a. & c. & d.6.b. and FSAR Section 8.3.1.1.4. The new wiring and diodes meet the original design specifications and do not change the operation of the DG speed control circuitry.
3-SM-DG-006	This modification added support to the conduit serving 3JDGATCL37. This was necessary to prevent the conduit from being stepped on and the switch to bend and fail.	This modification did not introduce an unreviewed safety question. The support is designed to meet Seismic Category I requirements. Reliability of the DG Cooling System will be enhanced since the conduit will not be stepped on causing damage to the temperature controller.
1-SM-DG-009	This modification replaced the current general purpose Agastat relays with Allen-Bradley type "R" relays. The new Allen-Bradley relays have hermetically sealed contacts which will enhance the reliability and stability of the diesel generator speed control.	This modification did not introduce an unreviewed safety question. The replacement of the Agastat relays with Allen-Bradley type "R" relays prevents the introduction of dirt or foreign material into the relay contacts. The Allen-Bradley relays have hermetically sealed contacts which are not susceptible to the problems experienced by the Agastat relays. The replacement of the relays does not affect the operation of the diesel generators and the post installation testing verified their correct operation.
1,2,3-SM-DG-012	This modification removes the DG overspeed trip switches, which were found to be unqualified, from the Emergency Mode electrical trip circuit.	This modification did not introduce an unreviewed safety question. FSAR 8.3.1.1.4.3 describes DG tripping devices. The Overspeed trip function will remain the same as described. The DG will mechanically and pneumatically trip in the Emergency Mode. The overspeed trip in the Test Mode is unchanged. Thus the assumptions made in the FSAR remain

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Site Modification Number	Description	Safety Evaluation Summary
		intact and the safety analysis is not affected.
1,2,3-SM-DG-013	This modification rewired diodes D-A26 and D-A27 to allow the Diesel Generator to go through a cooldown cycle when started from either starting air bank.	This modification did not introduce an unreviewed safety question. The change consisted of a minor wiring change in the non-quality related portion of the diesel generator controls. The change has no effect on the Emergency Mode of DG operation.
2-SM-DG-015	This modification installed four 1.5"x5"x5" carbon steel plates with bolts on the Unit 2 "A" diesel generator foundation frame. The purpose of the plates is to aid in any future realignment of the diesel generator.	This modification did not introduce an unreviewed safety question. The plates were reviewed for Seismic Category IX and determined not to affect any safety related or important to safety equipment.
3-SM-ED-001	This item was previously reported for Units 1 and 2 as item 122 in the 1986 50.59 report.	
2-SM-ED-003	This item was previously reported as item 123 in the 1986 50.59 report.	
2-SM-ED-004	This item was previously reported as item 124 in the 1986 50.59 report.	
1,2-SM-ED-006	This modification replaced the currently installed Magnetrol level switch microswitches in the Feedwater and Moisture Separator Reheater System with a microswitch of a higher temperature rating. The purpose of the changeout was to improve the reliability of the level switches.	This modification did not introduce an unreviewed safety question. The new level switches perform the same function as the previous switches. The new switches will perform more reliably due to their ability to withstand a greater temperature. No safety related or important to safety equipment is affected by this modification.
2-SM-ED-007	This modification changed the setpoint of the Moistrue Separator Reheater (MSR) high level alarms to provide alarm action prior to operation of the high level bypass control valve.	This modification did not introduce an unreviewed safety question. The setpoint is for monitoring purposes only and provides no automatic function. Changing the setpoint will alert operations personnel to a problem with the normal level control system. The previous setpoint would only alert

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Site Modification Number	Description	Safety Evaluation Summary
		operations personnel after failure of both the normal and high level control systems. Thus the new setpoint will allow time for operations personnel to correct a problem with the MSR drain tanks level control system prior to receiving a MSR high level turbine trip. This reduces the probability of a Turbine Trip and subsequent challenging of safety systems.
2-SM-ED-008	This modification installed a reinforcing sleeve on the heater drain tanks, EDN-X04A & B, nozzle number 11. Nozzle loading from piping vibration during Reactor Power Cutback was analyzed between the 5th point heaters and the heater drain tank. The analysis revealed that nozzle number 11 of the heater drain tank required reinforcement.	This modification did not introduce an unreviewed safety question. The heater drain tank performs no safety function. The installation the the nozzle reinfocement improves the reliability of the heater drain tanks and reducing the probability of a loss of feedwater event due to heater drain tank nozzle failure.
1-SM-ED-009	This modification replaced the First and Second Stage Moisture Separator Reheater (MSR) Drain Tanks garlock manway gaskets with a seal welded diaphram to prevent recurring leaks.	This modification did not introduce an unreviewed safety question. The MSR drain tanks are not safety related nor important to safety and affect no equipment in those categories.
1-SM-EW-002	This modification corrected and identified limit switch settings for motor operators on valves EWAUV65 and 45. This modification was implemented in Unit 1 during this reporting period and affected drawing 13-E-EWB-003 which is incorporated into the FSAR by reference.	This change did not introduce an unreviewed safety question. Testing following the modification ensured that all functional and safety performance requirements are met. Consequences of valve failure are addressed in the current safety evaluation.
2-SM-FH-002	This modification replaced the 10 ton fuel handling crane load cell, which is no longer in production, with a newer model load cell. The new load cell will perform the same function as the old style and does not change system operation.	This modification did not introduce an unreviewed safety question. This change consists of an equivalvent part replacement and does not change system function or interlocks.
2-SM-FH-003	This modification lengthened the actuator for the spreader extended limit switch of the refueling machine. The purpose of this modification is to ensure the spreader extended	This modification did not introduce an unreviewed safety question. The modification does not alter the design criteria of CESSAR Section 9.1.4.1.2f or the failure mode

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	light illuminates when the spreader is extended.	analysis of CESSAR Table 9.1-2. CESSAR Section 9.1.4.3.4 describes the safety analysis for fuel handling. This modification has no impact on that analysis.
2-SM-FH-006	This modification relocated cam TR1 of the spent fuel handling machine such that trolley travel is halted five feet from the south gate of the cask transfer pit. The additional distance is required to ensure that acceptable dose rates are realized outside of the cask transfer pit when spent fuel is being handled in the pit.	This modification did not introduce an unreviewed safety question. The relocation of the cam does not alter the design criteria of CESSAR Section 9 or the failure mode analysis of CESSAR Table 9.1-2. CESSAR Section 9.1.4.3.4 describes the safety analysis for fuel handling. This modification has no impact on this analysis.
2-SM-FH-007	This modification changed the load cell setpoints of the Spent Fuel Handling Machine to be consistent with new guidance provided by Combustion Engineering.	This modification did not introduce an unreviewed safety question. These setpoint changes are consistent with the CESSAR Section 9.1.4.2.2.8 requirement which states "During withdrawal or insertion of a fuel assembly, the load on the hoist cable is monitored to assure that movement is not restricted. Setpoints are such that damage to the assembly is prevented." The new setpoints do not introduce any new types of malfunctions of the Spent Fuel Handling Machine.
2-SM-FH-008	This modification changed the setpoints of the refueling machine load cell to account for wet hoistbox weight and include additonal guidance from Combustion Engineering.	This modification did not introduce an unreviewed safety question. The change in the load cell setpoints does not affect the operation or failure modes of the refueling machine. This change ensures compliance with Technical Specification 3.9.6 and includes a conservative margin to account for any errors caused by switch tolerances.
3-SM-FP-001	This modification was previously reported under item 125 of the 1986 50.59 report.	
1,2,3-SM-FP-003	This modification replaced a failed Struthers/Dun relay in the carbon dioxide fire protection system with a Square D equivalvent relay.	This modification did not introduce an unreviewed safety question. The new relay will perform the same function as the previous relay. System operation is unaffected.

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Site Modification Number	Description	Safety Evaluation Summary
1,3-SM-FW-001	This change replaced the Ashcroft main feedpump suction and discharge pressure trip switches with United Electric pressure switches.	This change did not introduce an unreviewed safety question. There is no change in system operation the new pressure switches will function the same as the previously installed pressure switches. The feedwater system is not required for plant safety per CESSAR Chapter 7.7.
2,3-SM-GR-002	This modification changed the time delay on the HI-HI Oxygen alarm and auto dilution of the waste gas decay tank from 20 minutes to 5 minutes. The purpose of the modification was to ensure a valid HI-HI Oxygen concentration is present prior to auto dilution. The 5 minute time delay will allow a timely suspension of additions to the waste gas decay tank upon a HI-HI alarm as per Technical Specification 3.11.2.5.	This modification did not introduce an unreviewed safety question. Reducing the time delay increases the margin of safety as the auto dilution and tripping of the waste gas compressors will occur earlier if an actual high oxygen concentration is present.
1-SM-HC-003	This modification exchanged the grease entry and grease drain fittings on the CEDM cooling fan thrust bearings. The purpose of this modification is to improve lubrication to the thrust bearings to prevent premature failure of the bearings.	This modification did not introduce an unreviewed safety question. CEDM cooling provides no safety related function. CEDM cooling is designed to preclude failure of important to safety components. The exchanging of the grease fittings is an alternate configuration specified by the vendor and does not affect the function of the cooling fans except to prolong thrust bearing life. This will improve the reliability of the system.
2-SM-HJ-002	This modification changed the setpoints of differential pressure switches 2J-HJN-PDSH-89, 90, 91, and 92 to .8 inches of water from .55 inches of water. The previous setpoint was to close to the process value and resulted in numerous unnecessary alarms.	This modification did not introduce an unreviewed safety question. The setpoint change affects switches which are not quality related and have no safety design basis in the FSAR. The new setpoints will still provide the operators with an alarm when a high differential pressure condition exists but will eliminate unnecessary alarms caused by normal fluctuations in process flow.
1-SM-HP-003	This modification bypassed a damaged heater terminal block and directly wired the heaters in the post LOCA hydrogen	This modification did not introduce an unreviewed safety question. Wiring is per original specification JM359 and

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	analyzer 1JHPBE02.	installed per 13-EM-306. No change to circuits is involved, therefore the analyzer is functionally the same and will perform its safety related functions as required by FSAR 6.2.5.
1,2,3-SM-HR-002	This modification sealed the vent cone penetration between the radwaste buliding exhaust duct to the plant stack and the boric acid concentrator vent pipe. The purpose of this modification was to prevent a possible unmonitored path for air leakage.	This modification did not introduce an unreviewed safety question. FSAR Table 3.2-1 classifies this system as non-seismic and non-safety. The system is not addressed in FSAR 6.4 (Habitability) and per FSAR 9.4.3 it has no Safety Design Basis.
1,2,3-SM-HT-001	This modification changed the jumpers on the annunciator logic cards to allow the control room annunciator "TURB BLDG HVAC TRBL" to reflash upon receipt of additional alarms at the local panel. Previously the trouble alarm would alarm on the first alarm at the local panel but would not reflash upon receipt of additional alarms at the local panel.	This modification did not introduce an unreviewed safety question. The alarm panel J-HTN-E01 is not described in the FSAR. The alarm panel is not required to function to protect, or identify a problem with any piece of equipment that is identified as important to safety.
1,2-SM-IA-001	This modification installed a new air receiver foundation and air compressor foundation to support installation of the breathing air system. The modification provides two 18" and one 16" raised concrete foundations over the existing turbine building slab at the 100' elevation near the existing instrument air compressors.	This modification did not introduce an unreviewed safety question. The addition of a raised concrete slab over the Turbine building foundation has no effect on the operability of any safety related, important to safety, or safe shutdown systems. The slab conforms to the General Design Criteria for the Turbine building.
1,2-SM-IA-002	This modification added check valves to the plant service air system stations to prevent cross contamination of the breathing air system. The purpose of this modification was to prevent the injection of contaminated air or other gases into the plant service air system by connection to one of its outlet stations. The service air system is to function as a permanent source of breathing air.	This modification did not introduce an unreviewed safety question. The service air header utility stations are used to provide air to maintenance power tools. The system performs no plant safety function. The installation of check valves at the utility stations only prevents the inadvertant backfeeding of a another gas source into the service air header and does not change the system operation.
2-SM-IA-003	This modification installed a moisture filter in the	This modification did not introduce an unreviewed safety

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Site Modification Number	Description	Safety Evaluation Summary
	instrument air supply line to the Main Steam Support Structure. The purpose of the filter is to reduce the moisture content of the instrument air supply to the Main Steam Isolation Valves and Feedwater Isolation Valves.	question. The instrument air system is not required for safe shutdown and is not important to safety. The addition of the filter does not affect system operation except to lower the moisture content of the air down stream of the filter.
1-SM-LR-002	This modification added pipe caps with corrosion coupons and removable spool pieces to the chemical waste drain system. The pipe caps and removable spool pieces allow for monitoring of corrosion of the piping system.	This modification did not introduce an unreviewed safety question. The addition of the pipe caps and removable spool pieces does not change the function of the system and allows for monitoring of the corrosion of the piping sytem to prevent leakage. The chemical waste system is not an important to safety nor safety related system.
3-SM-LR-003	This modification provided connections for installation of portable/temporary charcoal beds in line between the LRS evaporator distillate discharge and the LRS ion exchangers. These charcoal beds are necessary if organic carryover from the evaporator is present in the distillate.	This modification did not introduce an unreviewed safety question. The LRS is not addressed in FSAR accident analysis nor the Technical Specifications. Any leakage which may result from the charcoal vessel connections will be directed to the floor drains for reprocessing by the LRS.
1,2-SM-LR-005	This modification defeated the interlock which trips the LRS evaporator on concentrate monitor tank high level. The purpose of this modification is to allow evaporator operation when the concentrate monitor tanks are full.	This modification did not introduce an unreviewed safety question. Evaporator trips are not addressed in FSAR Section 11.2. Operating procedures will be relied upon to ensure that concentrate transfers to the concentrate monitor tanks cannot occur when the switch is in the "Defeat" position. Tank overflows provide backup protection to prevent spillage/contamination.
2-SM-MA-005	This modification removed the varistors from Westinghouse Sudden Pressure Relay circuits. Due to the high faiure rate of the varistors APS Substation Engineering recommended removing them from the circuit. This does not affect the functioning of the Sudden Pressure Relays.	This modification did not introduce an unreviewed safety question. All equipment affected by this change is non-safety related. The Sudden Pressure Relay Circuit will function the same as prior to the modification but with enhanced reliability. The improved reliability reduces the possibility of a loss of offsite power occurence due to failure of the varistors and subsequent tripping of the main transformer breakers.

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Site Modification Number	Description	Safety Evaluation Summary
1,2-SM-MA-008	This modification reterminated two cables in computer cabinet JRJNC20 to provide the correct polarity for the computer input. The cables provide monitoring capability of the main generation synchronizing bus voltage.	This modification did not introduce an unreviewed safety question. The cables provide monitoring capability for the main generator synchronizing bus at the plant computer. The change corrects the input polarity to provide proper indication. The circuits involved are of a low voltage type and affect no safety related or important to safety systems or equipment.
2-SM-NA-001	This modification rekeyed the synchronizing switch operators to prevent multiple synchronizing switches from being on at the same time.	This modification did not introduce an unreviewed safety question. The change to the switches only prohibits an operator from having two synchronizing switches on at the same time and prevents the possibility of blowing a fuse in the synchronizing circutry from cross connected sources. This prevents a human error from disabling the synchronizing system and improves its reliability. This change affects no design features described in the FSAR.
1,2,3-SM-NC-001	This modification changed the alarm set point of the Nuclear Cooling water pump high discharge pressure switch PSHH-0015 from 110 psig to 115 psig. This change eliminates a nuisance alarm in the control room. The new alarm setpoint moves the alarm above the normal operational range of the pumps discharge pressure.	This modification did not introduce an unreviewed safety question. The equipment involved is not important to safety nor safety related. The change removes a nuisance alarm from the control room. The new alarm setpoint is above the normal operating range of the system and will alert the operators to an abnormal operating condition. The function of the alarm is not affected.
2-SM-OW-002	This modification provided a means to bypass the oil/water separator during periods when the separator is out of service for maintenance.	This modification did not introduce an unreviewed safety question. The Oil Waste system is not discussed in FSAR and has no impact on important to safety or safety related equipment.
1-SM-PC-001	This change replaced the 10" LOCA drain blind flange with 1" drain valve in the containment fuel pool cooling system with a 10" blind flange and reducers to a 1" drain valve. The	This modification did not introduce an unreviewed safety question. The new blind flange has the same design parameters as the original. The change is in accordance with

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	purose of this change was to avoid a possible radioactive crud trap. The gradual reduction in size of the new flange provides a path for crud to follow to the drain valve and be removed from the system.	the PVNGS philosophy of maintaining radiation exposure as low as reasonably achievable. There are no functional changes to the design.
3-SM-PE-001	This modification changed the diesel generator brushes from the originally specified model to a new model which is .25" longer. The new brushes have a longer life and require less maintenance than the previous brushes.	This modification did not introduce an unreviewed safety question. The new brushes meet or exceed the design requirements of the originals. This change will not adversely affect the diesel generator system or its ability to perform its intended safety function.
1,2,3-SM-PE-002	This modification deleted the Min-Max Excitation Limiter alarm and trip function on the Diesel Generator. The purpose of this change is to eliminate spurious trips during diesel generator testing.	This modification did not introduce an unreviewed safety question. The Min-Max Excitation Limiter was supplied as an annunciation device. Cooper Bessemer wired it as an alarm and trip device. The component is prone to spurious trips and has caused diesel generator test failures. The limits for diesel generator excitation are adequately defined in the aproved operating procedures. The Min-Max trip was bypassed in the Emergency mode of diesel generator operation. There is no safety design basis for the Min-Max limiter.
3-SM-PN-001	This modification disabled the automatic forward transfer feature of the static by-pass switch when a reverse transfer of the switch has occurred because of an inverter failure. This change is necessary to prevent the loss of power to distribution panel when a DC ground fault occurs during a 1.5 second "Out of Synch" condition exist during the transfer.	This modification did not introduce an unreviewed safety question. The backup regulator will still function as described in FSAR 8.3.1.1.6 and thus no safety analyses are affected. This modification will ensure that vital 125 VAC is supplied to vital loads as long as power is available, and reduces the possibility of a loss of power upon a automatic transfer to another source.
1,3-SM-QA-002	This modification relocated a light in the Auxiliary Steam Vent Condenser Room (54' Auxiliary Bldg.) to better illuminate the valves and controls.	This modification did not introduce an unreviewed safety question. This change only relocates a normal lighting panel to provide better illumination. There is no change to facility operation and no FSAR assumptions are affected.

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Site Modification Number	Description	Safety Evaluation Summary
2-SM-QA-003	This modification added normal lighting inside a room providing ladder access to the diesel generator building roof. The ladder is routinely used by security personnel and thus the lack of lighting was a safety concern.	This modification did not introduce an unreviewed safety question. The addition of the normal lighting in this room has no affect upon any equipment important to safety or safety related.
2,3-SM-QB-002	This modification changes the power source for lighting panel E-QAN-D08E from a normal source to an essential source. The purpose of this modification is to provide additional lighting for the Safe Shutdown Route required by Appendix R.	This modification did not introduce an unreviewed safety question. The addition of this lighting panel to the essential lighting system will enhance facility safety by providing better lighting along the Safe Shutdown Route.
1,2,3-SM-QB-003	This modification added emergency lighting in the Shift Technical Support Center adjacent to the control room. The pupose of the emergency lighting is to provide illumination to support coordinating emergency plan activites in the event of loss of off site power.	This modification did not introduce an unreviewed safety question. The lighting system is not classified as important to safety. The addition of this emergency lighting will improve the operating staffs ability to coordinate emergency plan activities.
1,2,3-SM-QC-004	Safeguards Information	Safeguards Information
2-SM-QD-001	This modification recircuited the light in front of JSBB-C02A, B to be fed from Uniterruptible Power Supply (UPS) unit 2EQDNN02 so that the 3 foot candle light level required by FSAR for control room panels required for safe shutdown can be obtained.	This modification did not introduce an unreviewed safety question. The change ensures the minimum light required for control room panels required for safe shutdown (FSAR 14.10.4.3) will be met. The increased lighting level will improve the operators ability to safely shutdown the plant utilizing emergency lighting.
1,2,3-SM-QD-002	This modification removed the power from the space heaters in the inverter supplying the control room emergency lights. The vendor and Engineering evaluated the need for space heaters in this application and determined that they are not required in a temperature controlled environment. The space heater was constantly energized and was causing damage to the heater terminals due to excessive heat.	This modification did not introduce an unreviewed safety question. Both Engineering and the Vendor recommended determinating the space heater in this application. The space heater diconnection actually enhances the operability of the equipment by removing a source of unnecessary heat in the inverters. The excess heat was causing a gradual deterioration in the components and wiring of the inverters.

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Site Modification Number	Description	Safety Evaluation Summary
		No system function was changed.
2,3-SM-QF-007	This modification eliminates the buck/boost transformers from the Plant Multiplexer power supply. The buck/boost transformers were supplying too high a voltage to the Multiplex cabinets causing power supply and input/output board failures.	This modification did not introduce an unreviewed safety question. The Plant Multiplex system does not affect any systems important to safety or safety related. Elimination of the buck/boost transformers will allow the system to operate at normal/rated voltage.
A-SM-QF-011	This modification changed the resistance values of four resistors in the Plant Multiplexer Pulse Output Cards. The purpose of the change was to allow proper operation of the Salt River Project telemetering relays.	This modification did not introduce an unreviewed safety question. The Plant Multiplex System is not important to safety. This change does not affect the function of the Plant Multiplex System except to prevent it from interfering with operation of the SRP telemetering relays.
1,2,3-SM-QF-015	This modification added a telephone to the Assistant Shift Supervisors desk in the control room.	This modification did not introduce an unreviewed safety question. The addition of a telephone on the Assistant Shift Supervisors desk does not affect any equipment and does not change any safety analysis assumptions.
1,2,3-SM-QH-001	This modification removed Curtis GFT-3 terminal block, due to repeated terminal block failures. The terminal block upstream of the removed terminal block was then wired directly to the breaker the GFT-3 was serving.	This modification did not introduce an unreviewed safety question. This modification was performed on the cathodic protection which has no safety function. The removal of the terminal block does not affect the function of the system and will enhance the reliability of the system.
1,2,3-SM-QH-003	This modification installed jumpers to bypass contacts for the cathodic protection system interrupter circuit. The cathodic protection system has an interrupter circuit which allows the entire system to be cycled on/off at various time intervals from one location. This interties various Motor Control Centers (MCC) and permits a problem in one MCC to interrupt operation of all MCCs. The installation of these jumpers will defeat the intertie between MCC cubicles.	This modification did not introduce an unreviewed safety question. The only affect this change has is to prevent a fault in one MCC from disabling the entire cathodic protection system. This improves the reliability of the cathodic protection system.

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1,2,3-SM-QM-002	This modification provided a separate annunciator window for the Post LOCA hydrogen analyzer heat trace panel trouble alarm.	This modification did not introduce an unreviewed safety question. The change did not affect any equipment important to safety or safety related.
3-SM-QM-006	This modification reterminated two field cables in the heat tracing system to match existing design drawings.	This modification did not introduce an unreviewed safety question. This change did not impact any important to safety or safety related equipment and installed the terminations per the original design intent.
3-SM-QM-007	This modification increased the size of a heat trace supply breaker from 15 amps to 20 amps. This change was necessary to prevent the normal line current from exceeding 80% of the breaker rating.	This modification did not introduce an unreviewed safety question. The change in breaker rating is required to meet the National Electric Code and will provide adequate fault protection. No quality related equipment was involved with this change.
1-SM-QM-008	This modification replaced transformer 1E-QMN-X08A with a new style transformer. The original transformer is no longer manufactured. The replacement transformer is electrically identical to the original.	This modification did not introduce an unreviewed safety question. The equipment involved does not affect any safety related or important to safety equipment. The new transformer is electrically equivalent to the previous one and thus system function is unimpaired.
1,2-SM-RC-001	This modification installed backup fuses to provide redundant protection for containment penetration and meet the requirements of Regulatory Guide 1.63.	This modification did not introduce an unreviewed safety question. The addition of backup fuses adds redundancy to the electrical protection scheme of the containment penetration to prevent a single failure from damaging the penetration.
3-SM-RC-003	This modification changed hanger 13-RC-146-H-005 to be bolted rather than welded in place. This will facilitate faster removal and reduce personnel exposure when the CEDM support structure is removed and reinstalled.	This modification did not introduce an unreviewed safety question. The bolted hanger design is equivalent to the welded in terms of the existing load capabilities (deadweight, thermal, seismic, etc.).
1-SM-RC-004	This modification replaced Rosemount pressure transmitters	This modification did not introduce an unreviewed safety

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	1JRCAPT103 and 1JRCBPT104 with ITT Barton 763 transmitters. The change was necessary to meet CESSAR Section 7.6.1.2.1.G requirement for diverse sensors for shutdown cooling valve interlocks. PVNGS had been operating under a relaxation of the diversification requirement for the first fuel cycle (FSAR 1.9.2.4.11).	question. The implementation of diversity in the shutdown cooling valve interlock pressure transmitters restores Unit 1 to its as analyzed and as designed condition.
1-SM-RC-005	This modification changed the setpoints for the pressurizer pressure high pressure alarm and proportional/back-up heater cut out interlocks to be consistent with Technical Specification change package 87-012. This changed the current setpoint of 2350 psia to a more conservative setpoint of 2285 psia.	This modification did not introduce an unreviewed safety question. Changing the setpoints made the alarm and pressurizer heater cut-outs consistent with the new Technical Specification pressurizer pressure operating limits of 2025/2300 psia.
1-SM-RC-008	This change installed spectacle blind flanges on the RCS cold leg drain lines. This prevent leakage from the RCS drain valves from back flowing into the Reactor Coolant Pump seal drain lines and causing damage to the RCP seals.	This modification did not introduce an unreviewed safety question. The modification provides a positive means of preventing leakage from the RCS loop drains. It does not affect any important to safety or safety related equipment except to prevent any leakage from affecting and possibly degrading the RCP third stage seal. Thus the change improves the reliability to the RCP seals.
2-SM-RC-009	This modification was the same as 1-SM-RC-005 except is was performed in Unit 2 for Cycle 2 operation.	
2,3-SM-RI-001	This modification eliminates the cycling of the normal and alternate limit switches in the Movable In-Core Detector Drive System. This cycling was overloading the Control Room alarm printer.	This modification did not introduce an unreviewed safety question. This change does not affect the basic operation of the MICDS. The MICDS is addressed by CESSAR Section 7.7.1.1.8 under the general heading "Control Systems Not Required for Safety."
1,2,3-SM-RJ-003	This modification added trend recorder K-RJN-UJR-0019. The purpose of the trend recorder is to give operators a better indication of Assymetric Shape Index (ASI) oscillations.	This modification did not introduce an unreviewed safety question. The recorder serves no safety related function. The recorder inputs are from the Plant Computer which is

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		also not safety related or important to safety. The recorder is located in the control room and its mounting has been Seismicaly analyzed.
1-SM-RJ-005	This modification revised the software for the Core Operating Limit Supervisory Program to be consistent with the assumptions made for the Unit 1 Cycle 2 reload analysis.	This modification did not introduce an unreviewed safety question. The new software ensures core operating limits are computed in accordance with the safety analysis performed for the Unit 1 Cycle 2 reload.
2,3-SM-RJ-013	This modification changed the Plant Monitoring System database to correct inaccurate information on the Metering logs. The Metering logs record incoming and outgoing power and compute average megawatts.	This modification did not introduce an unreviewed safety question. The Plant Monitoring System is not important to safety. This change corrects inaccurate readings.
1-SM-RJ-014	This modification changed the Plant Monitoring System point configuration for the hourly and daily billing logs. This allowed accumulation of data for these points over the required interval.	This modification did not introduce an unreviewed safety question. The chages were to the electrical billing points in the Plant Computer and do not affect any safety related or important to safety equipment.
3-SM-RJ-017	This modification deleted computer points NAYS4 and NAYS19 from the Unit 3 database. These computer points are only applicable to Units 1 and 2 and were inadvertantly included in the Unit 3 database listing.	This modification did not introduce an unreviewed safety question. The plant computer is not safety related and the computer points deleted were not applicable to the Unit. This change does not affect operation of the plant computer.
2,3-SM-RK-001	This modification deleted annunciator points AS14 and AS15 for the Auxiliary Boiler from the computer data base in Units 2 and 3. The Auxiliary Boiler is located by Unit 1 which maintains control of its operation. These alarms are not applicable to Units 2 and 3.	This modification did not introduce an unreviewed safety question. The alarms removed were not applicable to Units 2 and 3.
3-SM-RK-002	This modification installed a time delay in the Radwaste Trouble Alarm to the control room. The time delay allows the Radwaste operators five minutes to acknowledge an alarm before the control room recieves a trouble alarm.	This modification did not introduce an unreviewed safety question. The alarm circuitry is non-class and is not required for nuclear safety.

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1,2,3-SM-RK-003	This modification changed the NSSS ESFAS annunciator logic to alarm only when an actual actuation has occurred. The previous design would alarm when only a half leg actuation occurred.	This modification did not introduce an unreviewed safety question. The change is to a non-safety system which is for indication only and does not affect the actuation of any safety system. The new logic will still annunciate an actuation but will eliminate false annuciation on a half leg trip.
1,3-SM-RK-004	This modification prevents two trouble alarms for the chlorine system from annunciating in the Main Control Room. The equipment being monitored is under the jurisdiction of the Water Reclamation Facility (WRF) operations personnel. No response to the alarm is required by Unit operations personnel.	This modification did not introduce an unreviewed safety question. The alarms deleted are not required for personnel or plant safety and are not included in the FSAR.
1,2,3-SM-RM-001	This modification added a mimic of the Safety Injection System to panel RMNB02 to aid the operators in visualizing the system.	This modification did not introduce an unreviewed safety question. The mimic is an operator aid only and does not affect operation of the Safety Injection System. The weight of the mimic on the panel is insignificant.
1-SM-RM-005	This modification replaced existing Control Room multipoint recorders in Panel B07 with more reliable microprocessor based rocorders. The modification was implemented in all three units during this reporting period and affected FSAR Section 10.2.	This modification did not introduce an unreviewed safety question. The new recorders meet all applicable industry standards, vendor qualification, and seismic qualifications. Since the recorders are for monitoring only, their failure would not prevent a PPS/ESFAS initiation.
2-SM-RM-007	This modification enhanced the control room nameplates and mimics.	This modification did not introduce an unreviewed safety question. The change to the nameplates and mimics improves the operators ability to safely operate the plant by making it easier to identify components and visualize the system.
1-SM-RM-010	This modification provided demarcation and labeling on panel 1JRMNB01 to group the Unit 2 and 3 bus controls. The pupose	This modification did not introduce an unreviewed safety question. This modification provides demarcation and

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	of the change was to aid operators in discriminating controls associated with the electrical busses of Units 2 and 3. This change is part of the control room human factors program.	labeling to group the Units 2 and 3 bus controls (on a Unit 1 control panel) and results in overall visual enhancement that will improve the control room operators ability to prevent accidents. The physical change itself does not impact any safety or non-safety operations of the plant.
1,2,3-SM-SA-002	This modification installed wiring strain relief clamps in the Balance of Plant Engineered Safety Features Actuation System (BOP ESFAS). The purpose of the modification was to improve connector and wiring life. This change was recommended by the vendor.	This modification did not introduce an unreviewed safety question. The wiring strain relief clamps do not affect system operation. The clamps do not affect the Seismic qualification of the cabinet.
2-SM-SB-002	This modification replaced existing ESFAS switch blocks with gold sliding contact switch blocks. The purpose of the change is to prevent spurious ESFAS actuations.	This modification did not introduce an unreviewed safety question. Gold sliding contacts will maintain the trip paths better than the heavy duty silver contacts previously installed. The actuation of the contacts will be the same as described in the FSAR to initiate a safety actuation. The switch contacts are normally closed and a failure of the contacts would result in an action to the safe state.
1,2,3-SM-SB-003	This modification connected the reference buses for Foxboro Cabinets J-SBA-C02A, SBB, SBC, and SBD to the instrument ground bus. The purpose of this modification was to eliminate a signal attenuation problem affecting inputs to the CPCs and Plant Computer.	This modification did not introduce an unreviewed safety question. The grounding of the system reference busses of the process protective cabinets does not have an adverse affect on the operation of the process protective cabinet or the associated equipment. This has been demonstrated by testing.
1,2,3-SM-SB-005	This modification changed the Plant Protection System (PPS) power supplies to annunciate a bistable power supply that has failed by overvoltage. A credible new power supply failure mode (overvoltage) was identified which would not be annunciated under the previous power supply design. The new design will detect an overvoltage failure and clamp the output voltage of the failed power supply to 2 volts which	This modification did not introduce an unreviewed safety question. The changes made to the power supply do not affect its operation except to annunciate a failure and prevent a power supply which has failed in the overvoltage condition from affecting or potentially damaging other equipment. This improves the system reliability by providing indication of a power supply failure in either the under or overvoltage

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	will annunciate the failed power supply.	condition.
1,2,3-SM-SB-007	This modification increased the time delay for the Steam Generator Low Level pretrip alarm and trip of the reactor by replacing R223 and R250 on the bistable comparator card. The purpose of this modification was to prevent a reactor trip following a large load rejection.	This modification did not introduce an unreviewed safety question. The new time delay of 550 miliseconds is less than the Technical Specification requirement of 1150 miliseconds. The function of the circuitry and operational design has not been changed and no new failure modes have been introduced by this change. The new resistors meet the same specifications as those originally installed.
1,2,3-SM-SB-008	This modification reconfigured the Control Element Assembly (CEA) Reed Switch Position Transmitters (RSPT) power supply jumpers to increase the accuracy of CEA position indication.	This modification did not introduce an unreviewed safety question. This change did not affect the design function or reliability of the RSPTs. The changes improve the accuracy of the CEA position indication system and thus provide a more accurate signal to Core Protection Calculators (CPC) and Control Element Assembly Calculators (CEAC). This enhances their ability to perform their safety functions.
1-SM-SB-009	This modification implemented Revision 4 Software for the Core Protection Calculators in Unit 1 for Cycle 2 operations. The changes are being made consistent with the Cycle 2 reload analysis.	This modification did not introduce an unreviewed safety question. The Revision 4 software has been thoroughly tested. The revision does not change the generic algorithms previously approved by the NRC.
1,2-SM-SC-006	This modification provided sample capability to the Chemistry Cold Lab of condensate demineralizer effluent upstream of the demineralizer bypass and chemical injection points.	This modification did not introduce an unreviewed safety question. This change was made to the condensate sampling system and did not affect any safety related or important to safety equipment. No changes were made to system operation other than the location of a sample point.
1,2,3-SM-SC-007	This modification installed a key lock override switch to allow rejecting condensate to the Condensate Storage Tank during of normal conditions.	This modification did not introduce an unreviewed safety question. The components affected by this change do not have a safety function or safety design bases.
3-SM-SG-001	This modification was previously reported as item 128 of the	

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	1986 50.59 report.	
1,2,3-SM-SG-002	This modification performed the following items on the Main Steam Safety Valves (MSSV): 1. Reduce insulation per vendor recommendation, 2. Replace brass cotter pin with stainless steel per vendor recommendation, 3. Remove manual lifting lever per vendor instructions and IEN 84-33. The pupose of the above modifications was to prevent insulation from covering vent holes in the valve body, eliminate a potential material incompatibility, and prevent the manual operator from holding the valve open after is has lifted.	This modification did not introduce an unreviewed safety question. The function of the safety valves will not be affected in any way. The manual lifting device is never used and has been known to cause safeties to stick open. Substitution of stainless steel for brass cotter pin alleviates material compatability concerns. Insulation removal is for personnel protection. It has been blown off several valves if packing leakage occurs upon lifting.
2-SM-SG-003	This modification was previously reported as item number 163 of the 1987 50.59 report.	
1,2,3-SM-SG-009	This modification replaced the needle valves in the pneumatic controls of the Steam Bypass Valves with needle/check valves to improve valve position modulation.	This modification did not introduce an unreviewed safety question. The needle/check valves do not change the operation of the system. This modification was recommended by the valve vendor. There are no important to safety components in the Steam Bypass Control System (SBCS).
1-SM-SG-012	This modification changed the setpoint of 1J-SGN-PSV1127 from 700 psig to 730 psig. This change was required to prevent normal variations in the Nitrogen supply system pressure from lifting the relief.	This modification did not introduce an unreviewed safety question. The change in setpoint is allowed under ASME code Section VIII. There is no change to the operation of the system except to prevent unnecessary lifting of relief valve 1J-SGN-PV1127 and subsequent loss of nitrogen.
3-SM-SI-008	This modification adjusted the motor operator limit switch setting for valve 3JSIB-UV-615 to obtain the opening stem travel as required by 73ST-3SI01.	This modification did not introduce an unreviewed safety question. The adjustment of the limit switch ensures the valve will come to the proper safety related position as defined by Surveillance Procedure 73ST-3SI01.
2-SM-SI-009	This modification provided limit switch settings for valve operators of 2JSIA-UV-664 and 2JSIB-UV-665. It also rewired	This modification did not introduce an unreviewed safety question. The change will not affect the operability of the

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	the Safety Equipment Acutuation Status input from the valve operators to provide the correct valve position indication.	valves. These valves are normally open and close on an RAS. SEAS indication previously did not provide a true indication of closure since it was taken from a mid-position contact. This change provides clear indication of valve status. The limit switch settings provided will improve the valve reliability.
2-SM-SI-022	This modification reworked pipe support SI-178-H-008 to allow for thermal growth of the piping.	This modification did not introduce an unreviewed safety question. This change restored the piping support to its as designed and as analyzed condition. No safety analysis assumptions are affected.
A-SM-SK-001	Safeguards Information	Safegaurds Information
A-SM-SK-005	Safeguards Information	Safeguards Information
A-SM-SK-012	Safeguards Information	Safeguards Information
A-SM-SK-027	Safeguards Information	Safeguards Information
1,2,3-SM-SP-002	The description and summary of this change was included as item 51 of the 1987 50.59 report.	
1-SM-SP-005	This modification extended the essential spray pond corrosion rack to a depth of 3" below the Technical Specification low limit for pond water depth. This change was necessary to prevent alternate wetting and drying of the corrosion coupons which produces incorrect corrosion rate data.	This modification did not introduce an unreviewed safety question. Corrosion racks are necessary as part of the spray pond monitoring program of Technical Specification 6.8.4.f. Thus accurate corrosion rate data is required. The only way to ensure accurate data is taken is to implement this modification. The modfication was evaluated for its potential impact on the safety analysis and no new failure mode was identified which could impact operation of the spray ponds.
2,3-SM-SQ-003	This modification provides a time delay relay in the trip	This modification did not introduce an unreviewed safety

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Site Modification Number	Description	Safety Evaluation Summary
	circuit of radiation monitor RU0007A. The time delay prevents spurious trips of RU-0007A. When RU-0007A trips it diverts the auxiliary steam condensate to the liquid radwaste system. Preventing spurious trips reduces the amount of liquid radwaste which has to be processed.	question. The function of RU-0007A is not affected except that momentary spikes above the trip setpoint will not cause a trip and diversion of the auxiliary steam condensate to the liquid radwaste system. An actual increase in activity in the auxiliary steam condensate will still actuate a trip and correctly divert condensate to the liquid radwaste system. Thus system operation is unaffected by this change and no safety analysis assumptions are affected.
3-SM-SQ-007	This modification was previously reported as item 53 in the 1987 50.59 report.	
1-SM-SQ-008	This modification removed voltage from the check source of the fuel building radiation monitor. The purpose of this change was to eliminate undesirable ramping of radiation rate on the fuel building radiation mointor causing the monitor to be declared inoperable.	This modification did not introduce an unreviewed safety question. The check source will still be able to be activated to perform the monthly check required by Technical Specification 3.3.3.9.
1,3-SM-SQ-025	This modification added software to the Radiation Monitoring System mini-computer to allow it to perform hourly system status print outs.	This modification did not introduce an unreviewed safety question. The software change does not affect the function of the RMS mini-computer except to give it the capability to provide hard copy storage of the hourly averages.
1,2-SM-SS-006	This modification added two ball valves and a check valve to provide additional isolation capability for the argon gas supply to the Nuclear Sampling System preparation panel. The purpose of this modification was to prevent sample fluid from entering the argon gas system.	This modification did not introduce an unreviewed safety question. The function of the sampling system is unaffected. The addition of these valves only provides a defense in depth approach to prevent contamination of the argon system by back leakage of RCS sample fluid into the system. The portion of the sample system affected by this modification performs no safety function.
1-SM-SV-003	This modification changed the size of the reactor coolant pump vibration monitor proximity probe bracket. The purpose of the change is to prevent the bracket from having a	This modification did not introduce an unreviewed safety question. This change was only a minor modification in the proximity probe bracket to change its resonant frequency

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	resonant frequency corresponding to the vane passing frequency of the pump. Having a resonance in the proximity probe bracket near the vane passing frequency produces higher than actual pump vibration readings.	away from the vane passing frequency of the pump. The vibration monitoring system is not safety related and performs only monitoring of the vibration. No safety analysis assumptions are affected by this modification.
3-SM-ZC-003	This modification provided for coping of a channel (stair stringer) to clear an interference with existing electrical conduit.	This modification did not introduce an unreviewed safety question. Engineering reviewed the original design considerations and determined that the coping of the stairway channel will not affect the structural integrity of the stairway. Thus no affect on its Seismic qualification or continued function.
1-SM-ZF-001	This modification provided the folowing changes to the Fuel handling crane: 1. Eliminate the "Geared Hoist Limit Bypass" and change the keyed selsctor switch to a "Gate Mode." This new mode will allow for lifting the gates around the spent fuel pool area as required during maintenance and refueling activities. This switch will bypass the 5000 lb. load interlock of the "Fuel Container" area and will be administratively controlled; 2. Add additional electrical interlocks to ensure that the crane long and cross travel will be prevented if the hoist is withdrawing or inserting a fuel assembly into its storage position; 3. Add electrical interlocks to the crane long and cross travel controls to ensure that anytime over 2000 lbs. is on the crane hoist, travel into the spent fuel area will be prohibited. In addition, if the hoist load is over 5000 lbs. travel into the fuel container area will also be prevented, unless the crane is switched to the new "Gate Mode."	This modification did not introduce an unreviewed safety question. The change is required to ensure that no hoist loads in excess of 2000 lbs are taken over the spent fuel pool as required by Technical Specification 3/4.9.7. It adds interlocks to prevent crane long and cross travel if the hoist is operating as required in FSAR Section 9.1.4.2.2.17. All modes of crane operation with this new change are previously stated and analyzed in the FSAR.
1-SM-ZR-002	This modification installed an 8" thick lead shield wall in the waste disposal area of the radwaste building at the 100' elevation. This shielding was required for the storage of high level radioactive resin in this area.	This modification did not introduce an unreviewed safety question. The addition of the shield wall in the radwaste building does not affect the operability of any safety related, safe shutdown, or important to safety systems.

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Site Modification Number	Description	Safety Evaluation Summary
1-SM-ZT-001	This modification rerouted cable tray 1EZT1ENTDAC to gain enough slack to reterminate cable 1ETC01NC1CA. Cable 1ETC01NC1CA was damaged and some cable slack was necessary to remove the damaged portion and reterminate the cable.	This modification did not introduce an unreviewed safety question. The FSAR does not address routing of non class cable trays. The routing of the cable tray does not affect any safe shutdown circuit nor is any safety related equipment in its vicinity. There is no change to operation of any equipment and all plant design criteria are maintained.
1-SM-ZY-002	This modification added a 2" ABS sleeved penetration through the east wall of the spray pond metering pump house to provide for a chemical supply line.	This modification did not introduce an unreviewed safety question. The spray pond pump house is non-quality related and contains no safety related equipment.
A-SM-ZY-005	This modification installed a 50' antenna adjacent to the east end of the Administrative Annex. The purpose of the antenna is to provide a digital data communications link between Palo Verde and Phoenix.	This modification did not introduce an unreviewed safety question. The antenna is located outside the protected area and does not affect any safety related or important to safety structures, systems, or components.

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Temporary Modification Number	Description	Safety Evaluation Summary
1-87-SM-033	This temporary modification removed the trigger/switch card of the digital cassette accelerogragh. The purpose of this modification was to determine the source of a spurious alarm of the system.	This modification did not introduce an unreviewed safety question. The siesmic system does not perform any safety function or initiate any automatic safety function. The siesmic system is an information system only, the failure of the system does not affect any other system.
1-88-CH-020	This temporary modification threaded the pipe nipple downstream of valve 1PCHNHV0923 and added a pipe cap. The pipe cap was installed to prevent leakage of the valve. This valve is part of the system that vents gaseous radwaste from the Reactor Drain Tank (RDT). The addition of the pipe cap resulted in the isolation of the valve. The alarm response procedure for high RDT pressure was revised to remove the pipe cap prior to venting the system.	This modification did not introduce an unreviewed safety question. The addition of the pipe cap which isolates the valve did not present any safety problems because the pressure could be relieved by removing the cap and venting or by using the feed and bleed method. The rupture disc on the RDT provided over-pressure protection. The valve does not have a safety related function and its isolation will not adversely impact any safety related equipment.
1-88-HA-062	This temporary modification installed Cooper Roller bearings in Air Filteration Unit (AFU) 1M-HAN-J01B (Auxiliary Building Normal AFU), in lieu of SKF spherical bearings shown in vendor manual M721B-602. The SKF bearings had a poor maintenance history and the Cooper bearings are designed for heavier loads and higher speeds.	This modification did not introduce an unreviewed safety question. Per UFSAR Table 3.2-1, these filter units are not safety related, nor improtant to safety. There is no safety design basis for the Auxiliary Building normal AFU in UFSAR 9.4.2. In addition, this new style bearing should extend fan and motor bearing life.
1-88-HA-069	This temporary modification replaced existing Alnor flow switch (1J-HAN-FSL-0129) with a McDonnell & Miller sail type switch. The existing Alnor flow switch is no longer manufactured and the McDonnel & Miller flow switch is an acceptable substitute.	This modification did not introduce an unreviewed safety question. The new flow switch will function the same as the previous switch. The system is non-quality related and does not change the safety design bases of the UFSAR Chapter 9.4.2.1.
1-88-HC-019	This temporary modification installed a 60 inch blind flange on the discharge bell of the Control Element Drive Mechanism (CEDM) cooling fan 1MHCNA02A. The purpose of this modification was to provide CEDM cooling with a single fan.	This modification did not introduce an unreviewed safety question. This modification allows for CEDM cooling with one CEDM cooling fan failed. CEDM cooling is not a safety related function. The blind flange was contructed to meet

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Temporary Modification Number	Description	Safety Evaluation Summary
		Seismic Category XI requirements and to preclude the failure of any safety related components.
1-88-HR-066	This temporary modification installed a temporary trailer, to decontaminate tools and equipment, in the Unit 1 fenced in Radiation Controlled Area (RCA). The exhaust from this trailer was routed into the radwaste building HVAC system to prevent a potential unmonitored release of radioactivity.	This modification did not introduce an unreviewed safety question. The trailer is located outside the walls of the radwaste building and away from any safety related equipment which might be damaged by the trailer during a Design Basis Event. The trailer was evaluated as a potential missile and found to be of no significance. The trailer does not interface with any equipment important to safety.
1-88-MT-004	This temporary modification disabled the annunciation for the Torsional Vibration Monitoring System (TVMS) while it is out of service.	This modification did not introduce an unreviewed safety question. The TVMS is for monitoring of the Main Turbine and performs no safety function. The system is not described in the FSAR or Technical Specifications. Removing annunciation while the system is out of service eliminates a source of spurious alarms in the control room.
1-88-NA-043	This temporary modification provided temporary power to several buildings during a planned outage of bus 1ENANS06.	This modification did not introduce an unreviewed safety question. This temporary hook-up only affected non-class 1E power to non-safety related equipment and buildings.
1-88-NA-058	This temporary modifcation is the same as 1-88-NA-043.	
1-88-NG-022	This temporary modification provided non-class power to load center 1ENGNL18 from load center 1ENGNL01 for purposes of powering lighting panels 1EQAND2 (100'Turbine Bldg.), D4 (176' Turbine Bldg.), D08 (100' Control Bldg.), and D09 (120' Radwaste Bldg.). This was necessary to maintain lighting and convenience outlets during an outage of bus 1ENANS02.	This modification did not introduce an unreviewed safety question. The change only involved connecting two non-class busses which are not important to safety or safety related. The change maintained lighting to various areas of the plant which improves operations ability to perform tasks in these areas.

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Temporary Modification Number	Description	Safety Evaluation Summary
1-88-NG-044	This temporary modification supplied power to panel AENGNL44, in particular the associated switchyard multiplexers, due to an outage of bus 1ENANS06. The power was provided by the use of a station mobile diesel generator.	This modification did not introduce an unreviewed safety question. No safety related power systems or safety related equipment were affected by the temporary power provided.
1-88-NG-046	A temporary modification was required to supply power to bus AENGNL43, in particular the startup yard multiplexers and respective multiplexer air conditioning, due to an outage of 1ENANS05.	This modification did not introduce an unreviewed safety question. No safety related power systems or safety related equipment were affected by the supply of temporary power.
1-88-NG-048	This temporary modification supplied power to normal lighting panels, which provide lights and convenience outlets, due to an outage of bus 1ENANS01.	This modification did not introduce an unreviewed safety question. This temporary power hookup used non class 1E 480 VAC power and fed only non safety related equipment.
1-88-NG-050	This temporary modification provided power to the containment polar crane due to the outage of the 13.8 Kv bus 1ENANS01.	This modification did not introduce an unreviewed safety question. This change only affects the non-class IE 480 VAC power system as described in FSAR Section 8.3.1.1.1..
1-88-NG-051	This temporary modification provided power from non-class load center AENGNL45 to non-class load center AENGNL48 due to an outage 1ENANS05. This modification provided temporary limited power to the Service Building prioritized loads.	This modification did not introduce an unreviewed safety question. No safety related power systems per UFSAR Section 8.3.1.1.1 or safety related equipment per UFSAR Section 3.2.1 were affected by this change.
1-88-NG-054	This temporary modification provided additional load capabilityto Temporary Modification 1-88-NG-051. This modification was required due to the extended outage of 1ENANS05.	This modfication did not introduce an unreviewed safety question. No safety related power systems or safety related equipment was affected by this modification.
1-88-NG-056	This temporary modification is the same as modification 1-88-NG-044.	
1-88-NG-059	This temporary modification supplied power to Loadcenter	This modification did not introduce an unreviewed safety

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	AENGNL48, which provides power to the Administration and Service Buildings, due to an outage on bus 1ENANS06.	question. This temporary change affected only non class 1E 480 VAC power systems and impacted no safety related equipment.
1-88-NH-002	This temporary modification provided power to 1ENHNM0346 from 1ENHNM5028 due to an outage of bus 1ENANS05.	This modification did not introduce an unreviewed safety question. This temporary change affects only non-class 1E power as described in UFSAR Capter 8.
1-88-NH-023	A temporary modification was made in Unit 1 during this reporting period to provide temporary power to feed the containment equipment hatch 1C-ZCN-H03 during the outage of bus 1E-NAN-S02. This affected drawing 13-E-NHA-072, which is incorporated into FSAR by reference.	This modification did not introduce an unreviewed safety question. Fault current protection will be provided on both the equipment feed and the temporary cable feed. Load shed of SIAS/CIAS is provided on the motor control center feeds. The change in power source is non-class to non-class and does not supply safety related equipment.
1-88-NH-024	This temporary modification provided non-class power to the non-class liquid nitrogen pumps 1-M-GAN-P01A & B during an outage of bus 1ENANS02.	This modification did not introduce an unreviewed safety question. The modification changes the electric supply source from an unavailable non-class motor control center (MCC) to an onsite construction power panel. The nitrogen pumps are not required for safe shutdown of the plant and no safety related equipment was affected.
1-88-NH-025	This temporary modification is the same as modification 1-88-NH-023.	
1-88-NH-027	This temporary modification provided power to the digital Radiation Monitoring System (RMS) during the rework of bus 1ENANS02.	This modification did not introduce an unreviewed safety question. This change affects only non class power and maintained the function provided by the digital RMS.
1-88-NH-028	This temporary modification supplied power to the local plant multiplex battery charger 1ENANN01 due to the loss of power to bus 1ENANS02.	This modification did not introduce an unreviewed safety question. The power supply to the battery charger is a non class 1E 480 VAC supply which was temporarily replaced with an alternate non class 480 VAC source. No safety related systems or components were adversely impacted by

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Temporary Modification Number	Description	Safety Evaluation Summary
		this modification.
1-88-NH-031	This temporary modification provided power to the Blowdown High Total Dissolved Solids (TDS) Sump Pumps during the rework of bus 1ENANS02.	This modification did not introduce an unreviewed safety question. This modification only impacts a non class 1E 480 VAC system and affects no safety related equipment. The sump pumps were powered as before with a different Motor Control Center.
1-88-NH-033	This temporary modification installed power to the Reactor Makeup Water Pump, 1MCHNP03B, due to an outage on bus 1ENANS02.	This modification did not introduce an unreviewed safety question. Only non class 1E power systems and non safety related equipment were affected by this change.
1-88-NH-034	This temporary modification supplied power to the HVAC units for the Post Accident Monitoring Units (PAMU) due to an outage on bus 1ENANS02. This modification provided assurance that the PAMU would remain operable, as required.	This modification did not introduce an unreviewed safety question. This power hookup affects only the non class 1E 480 VAC power system as described in UFSAR 8.3.1.1.1 and assures the PAMU remains operational during hot weather conditions.
1-88-NH-036	A temporary modification was provided to supply power to M-CPN-M06 from E-NHN-D25 due to the loss of E-NHN-D26 as a result of the failure of the Auxillary Transformer and the loss of 1ENANS02.	This modification did not introduce an unreviewed safety question. This change only affects non 1E panels which are part of the non 1E 480 VAC system as described in UFSAR 8.3.1.1.1.
1-88-NH-037	A temporary modification was made in Unit 1 during this reporting period to provide power from the S01 train for the RU-7. This modification affected drawing 13-E-NHA-020, which is incorporated into the FSAR by reference.	This modification did not introduce an unreviewed safety question. There was no change to the operation of the SQ system. The change involved temporarily powering RU-7 from an alternate source to allow maintenance on the normal power source. The modification allowed continuous operation of RU-7 during the outage.
1-88-NH-041	This temporary modification involved supplying power to the Containment Power Access Purge Output Damper 1MCPNM05A due to an outage on bus 1ENANS02.	This modification did not introduce an unreviewed safety question. This power hookup only affects non-class 1E power and is is provided to non safety related equipment.

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1-88-NH-045	This temporary modification provided power to panel 1ENHND03 from 1ENHNM5011 during an outage of 13.8 kV bus 1ENANS01.	This modification did not introduce an unreviewed safety question. This temporary change affects only non-class 1E power as described in UFSAR 8.3.1.1.1.
1-88-NH-047	This temporary modification provided power to battery charger 1ENKNH19 and to multiplexer 1ENGNQ01 from a portable diesel generator. This temporary power hookup was required due to the outage of 1ENANS05.	This modification did not introduce an unreviewed safety question. The power hookup involved only non-class electrical systems as discussed in UFSAR Chapter 8.
1-88-NH-049	This temporary modification supplied power to the Radwaste Building and Normal Control Room Air Handling Unit Fan due to an outage on bus 1ENANS01.	This modification did not introduce an unreviewed safety question. This temporary power hookup affected only non class 1E 480VAC power system as discussed in FSAR Section 8.3.1.1.1 which fed non safety related equipment.
1-88-NH-052	This temporary modification supplied power to the Control Building Normal Air handling unit during the outage of the 13.8 kV bus 1ENANS01.	This modification did not introduce an unreviewed safety question. No safety related equipment or power systems were affected by this modification as described in FSAR Table 3.2.1 and Section 8.3.1.1.1.
1-88-NK-021	This temporary modification jumpered out failed cell 17 of non-class battery 1ENKNF18. This left the battery in a 59 versus 60 cell configuration.	This modification did not introduce an unreviewed safety question. The capacity of the battery was originally 109.68%. Removal of one cell will not reduce this to a level below that required in the original specification. No safety related or important to safety equipment was affected by this modification.
1-88-RC-001	This temporary modification installed a jumper on RTD 1JRCNTE0154 to permit continued operation of the RTD with an open circuit on one leg of the compensation leads. This will result in continued temperature indication with a neglegible effect on accuracy.	This modification did not introduce an unreviewed safety question. The RTD will still perform the same function with only a neglegible loss of accuracy due to the shortened compensation lead. The RTD is for equipment protection and does not perform any control or safety function.

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1-88-RC-060	A temporary modification was made in Unit 1 during this reporting period to remove RTD 01JRCBTE0125 and cabling from thermowell 01JRCBTW0125 and install dual element RTD 01JRCATE0122CA/C1 in its place. The original RTD for 01JRCATE0122CA/C1 was broken in its thermowell and could not be completely removed rendering the RTD and thermowell unusable. Consequently, a new RTD was obtained and installed in the themowell previously occupied by 01JRCBTE0125. The new RTD will function as 01JRCATE0122CA/C1. This modification affected FSAR Section 5.1.	This modification did not introduce an unreviewed safety question. All of the functions of 01JRCATE0122CA/C1 will be performed with the RTD in its new location. The removal of TE-125 RTD results in the bistable that activates the B-train portion of the Low Temperature Over Pressure (LTOP) annunciator being inoperable. A toggle switch is being temporarily installed in the annunciator cabinet to perform this function and will be adminstratively controlled by procedures 410P-0ZZ01 and 410P-1ZZ10 such that the B-train LTOP annunciator will be enabled whenever RCS temperature is less than 300 degrees Farenheit. The A-train annunciator is not affected. No separation or seismic criteria are violated.
1-88-SB-003	This temporary modification installed a voltage disturbance analyzer to monitor 120VAC input power and 12VDC bistable logic power of PPS Channel C (SBC-C01) in Unit 1. The purpose of the modification was to troubleshoot spurious Channel C trips.	This modification did not introduce an unreviewed safety question. The four channels of Plant Protection System (PPS) are separated electrically and physically such that a fault in one channel will not prevent the PPS from performing its safety function. This modification only affects one channel. Technical Specifications allow operation with one channel of PPS inoperable.
1-88-SG-063	This temporary modification installed a check valve and relief valve downstream of the quick open "Ross" Solenoid valve on steam bypass valves 1001 and 1004 to enhance the valves modulation capability.	This modification did not introduce an unreviewed safety question. The addition of the check valve and relief valve allow the steam bypass valves to meet their modulate close time specification. The steam bypass valves are not important to safety or safety related. This change does not introduce any new failure modes to the steam bypass control system.
1-88-SG-068	This temporary modification installed four pressure connections on Steam Bypass Control System (SBCS) valves PV1001 and PV1005. The purpose of the connections was to	This modification did not introduce an unreviewed safety question. The SBCS is not important to safety and defined as not required for plant safety by CESSAR Chapter 7.7.

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	allow monitoring of the valve and valve operator during testing. The system operation and control are not affected.	The pressure connections are for monitoring only and do not affect the operation of the valves or SBCS.
1-88-SK-007	Safeguards Information	
1-88-SK-029	Safeguards Information	
1-88-SV-008	This temporary modification lowered the reactor coolant pump shaft vibration danger alarm setpoint to 10M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint will provide an earlier warning of a problem with the RCP shaft.
1-88-SV-009	This temporary modification lowered the reactor coolant pump shaft vibration alert setpoint to 8M for sensors 01KSVNYSH21 and 01KSVNYSH22.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint allows more time to diagnose a problem with the RCP shafts and will alert the operators to a potential problem earlier.
1-88-SV-010	This temporary modification lowered the alert setpoint for reactor coolant pump sensors 01KSVNYSH27 and 01KSVNYSH28 to 8M.	This modification did not introduce an unreviewed safety question. The lowering of the alert setpoints allows an earlier warning of a potential problem with the RCP shaft.
1-88-SV-011	This temporary modification lowered the danger setpoint of reactor coolant pump vibration sensors 01KSVNYSHH27 and 01KSVNYSHH28 to 10M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoints will provide an earlier warning of a problem with a RCP shaft and allow more time for operator action.
1-88-SV-012	This temporary modification lowered the alert setpoints of reactor coolant pump vibration sensors 01KSVNYSH25 and 01KSVNYSH26 to 8M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint provides an earlier warning of a potential problem with a RCP shaft.
1-88-SV-013	This temporary modification lowered the danger setpoints of the RCP Shaft Vibration sensors 01KSVNYSHH25 and 01KSVNYSHH26 to 10M.	This modification did not introduce an unreviewed safety question. The lowering of the danger setpoints will alert operators to a potential problem with the RCP shafts sooner than the previous setpoint. This system performs no control function and is used for diagnostics and

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Temporary Modification Number	Description	Safety Evaluation Summary
		information only.
1-88-SV-014	This temporary modification lowered the alert setpoint of reactor coolant pump shaft vibration sensors 01KSVNYSH23 and 01KSVNYSH24 to 8M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint provides an earlier warning of a problem with a RCP shaft.
1-88-SV-015	This temporary modification lowered the danger setpoint of reactor coolant pump sensors 01KSVNYSHH23 and 01KSVNYSHH24 to 10M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint provides an earlier warning of a problem with a RCP shaft.
1-88-SV-067	This temporary modification raised the setpoint of Loose Parts Vibration Monitor channel 5 to greater than 0.5 ft-lbs to reduce the number of spurious alarms.	This modification did not introduce an unreviewed safety question. While this modification is implemented Channel 5 of the LPVMS is considered inoperable and the action statement of LCO 3.3.3.7 will be implemented. This is an anlyzed condition with provisions for operation defined in the Technical Specifications.
2-87-HA-060	A temporary modification installed automatic grease feeders to the fan and motor bearings for Auxiliary Building Normal Air Filtration Units (AFU), 2M-HAN-J01A and J01B, in place of the ZIRC fittings. This modification was performed due to the frequent failure of the bearings. Excessive lubrication frequencies of the bearings was suspected of contributing to the failures.	This modification did not introduce an unreviewed safety question. The AFUs are not safety related nor would the lubrication frequency of the bearings adversely impact any safety related function.
2-87-HR-057	This temporary modification replaced zirc grease fittings with automatic grease feeders on Air Filtration Units (AFU) 2M-HRN-J01A & B.	This modification did not introduce an unreviewed safety question. The new automatic grease feeders should improve the reliability of the AFUs by providing continuous lubrication. Per FSAR Table 3.2-1, the system is non-safety, it is not mentioned in FSAR 6.4 "Habitability," and per FSAR 9.4.3, it has no safety design basis.
2-87-SG-062	This temporary modification installed a new design solenoid	This modification did not introduce an unreviewed safety

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	topworks cover and position limit switches on valve 2J-SGB-UV219. This was done to rectify a continuing problem with dual indication experienced with Valcor solenoid valves.	question. The new equipment is built to the same design specifications and has no impact on relibility/operation. The valve will be tested per ASME Section XI to verify operability.
2-88-CH-011	This temporary modification lowered the RCP 2A seal injection low flow alarm setpoint to 2.5 gpm from 6.0 gpm. The seal injection flow to RCP 2A is below the current setpoint but has been evaluated by Engineering as acceptable. Thus the setpoint has been reduced to eliminate the continuous alarm condition and restore the alarm function of alerting the operators to a reduction in flow below that required for operation.	This modification did not introduce an unreviewed safety question. The revised setpoint meets the flow requirements of the RCP seals.
2-88-HA-016	A temporary modification was made in Unit 2 during this reporting period to install a jumper in motor control center (MCC) E-PHA-M3726. The purpose of the jumper was to actuate the essential cooling system for the auxiliary feedpump room to permit maintenance on the non essential cooling system and maintain acceptable room temperatures. This affected drawing 13-E-HAB-006, which is incorporated in the FSAR by reference.	This modification did not introduce an unreviewed safety question. The essential cooling system is designed to provide cooling to the turbine driven auxiliary feedpump room when the feedpump is running. Actuating the essential cooling system placed it in its safety related condition of providing room cooling. In the event the feedpump were actuated the essential coolers would already be in operation performing its safety related function.
2-88-HA-019	This temporary modification added automatic grease feeders to fan and motor bearings for Air Filtration Unit (AFU) 2M-HAN-J01A in place of zirc fittings. The purpose of the change was to evaluate if providing a continuous grease supply would result in extended fan and motor life.	This modification did not introduce an unreviewed safety question. Per Table 3.2-1, these filter units are not safety related, nor important to safety. There is no safety design basis for the Auxiliary Building normal AFUs in FSAR 9.4.2. Providing a continuous grease feed should extend fan and motor life.
2-88-HJ-002	A temporary modification was performed to remove four pairs of Control Room Pressure Boundary Isolation Dampers for maintenance and testing. Sheet metal blanks were installed in place of the dampers and subsequent testing was performed	This modification did not introduce an unreviewed safety question. Control Room Special Pressurization Test was performed after the installation of the blanks to ensure integrity of the Control Room envelope. The presence of

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	to verify the reestablishment of the Control Room pressure boundary.	the blanks essentially placed the Control Room envelope in an isolated configuration and did not adversely impact other plant systems.
2-88-LR-001	This temporary modification was installed permanently by Site Modification 2-SM-LR-005. See 1,2-SM-LR-005 for description of this modification.	
2-88-NQ-020	This temporary modification provided uniterruptible 120 VAC power to the Unit 2 Test Data Acquisition System (TDAS). The power is being supplied from non-class 1E 120 VAC distribution panel 2E-NQN-D01.	This modification did not introduce an unreviewed safety question. The TDAS system is a non-quality related system used for data gathering during testing and plant transients. The power supplied to the system is from a non-class 1E source. TDAS is not included in the FSAR and no credit is taken for its operation in the mitigation of an accident or its use for safe shutdown.
2-88-QH-005	This temorary modification lifted cable AEQH02NC1KQ to isolate failed rectifier AEQHNH16. None of the above equipment is quality related.	This modification did not introduce an unreviewed safety question. The lifting of leads to the failed rectifier does not affect any equipment important to safety or safety related.
2-88-RC-021	This temporary modification disconnected shorted proportional heater 2-M-RCE-B11 and rewired the other heaters in the bank in an open delta configuration.	This modification did not introduce an unreviewed safety question. The heater which was disconnected was a non-class 1E heater. No RCS boundary or class equipment is being affected.
2-88-SB-018	This temporary modification installed a digital storage recorder on Channel C Reactor Trip Switchgear (RTSG) shunt and undervoltage coils to determine the cause of spurious actuations.	This modification did not introduce an unreviewed safety question. The digital recorder is for monitoring only and did not impact the operation of the RTSG.
2-88-SC-013	This temporary modification installed a chemical fume exhaust system on the hydrazine and ammonia day tanks in the Secondary Chemistry Control System.	This modification did not introduce an unreviewed safety question. The installation of the chemical fume exhaust system does not affect the operation of the Secondary

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Temporary Modification Number	Description	Safety Evaluation Summary
		Chemistry Control System. This modification does not affect any quality related structures, components, or systems (PVNGS FSAR 3.2 Classification of Structures, Components, and Systems, Table 3.2-1).
2-88-SK-007	Safeguards Information	
2-88-SP-010	This temporary modification changed the "A" train essential spray pond differential flow alarm setpoint to 1200 gpm from 775 gpm. This change is necessitated by flow annubar FI-7 which has been determined to be reading higher than actual flow. This higher indicated flow was causing excessive differential flow alarms in the control room. No replacement annubar is available so the alarm setpoint is temporarily raised until a new annubar can be procured.	This modification did not introduce an unreviewed safety question. Engineering reviewed the design calculations for the differerntial flow alarm and determined that any setpoint up to 1400 gpm will meet the design basis of the system. The 1200 gpm setpoint therefore meets the system design bases. The alarm is designed to warn of a major line break and will perform that function.
2-88-SQ-003	This temporary modification installed a disk emulating system, consisting of a controller and a memory module, in the Radiation Monitoring System (RMS) minicomputer. This disk was provided to enhance the RMS minicomputer.	This modification did not introduce an unreviewed safety question. The addition of the disk emulating system enhanced the operation of the RMS minicomputer.
2-88-SQ-023	This temporary modification installed insulation and heat tracing on the Condenser/ Gland Seal exhaust sample lines to the Radiation Monitor RU-141. The purpose of the modification was to maintain the sample flow temperature above the dew point and prevent moisture accumulation in the sample lines.	This modification did not introduce an unreviewed safety question. The heat tracing and insulation can only improve operation of RU-141 and does not affect the operation of any other equipment. This modification was evaulated for its effect on safe shutdown systems and determined to have no effect on safe shutdown systems components, or safety functions.
2-88-SV-014	This temporary modification reduces the alert and danger alarm setpoints for the reactor coolant pump shaft displacement to 9M from 12M. The purpose of the reduction was to provide early warning of a RCP shaft shear event.	This modification did not introduce an unreviewed safety question. The lowering of the setpoint will provide an ealier warning of the potential of a RCP shaft shear event. System operation is not affected.

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Temporary Modification Number	Description	Safety Evaluation Summary
2-88-SV-015	This temporary modification lowered the alert and danger setpoints for the reactor coolant pump shaft displacement alarms from 9M to 7M.	This modification did not introduce an unreviewed safety question. The lowering of the setpoints will provide an earlier warning of the potential RCP shaft shear event.
2-88-TC-006	A temporary modification was required to to assure operation of the Instrument Air (IA) compressors during the Turbine Cooling Water (TC) System outage. The Domestic Water (DS) System was connected to the TC by rubber hoses through IA compressors IAN-C01A and IAN-C01B only.	This modification did not introduce an unreviewed safety question. The use of a temporary cooling water supply did not alter the operation of the IA compressors. The interface between this portion of the TC System and other systems was not impacted.
3-88-CW-018	This temporary modification installed a carbon fiber drive shaft in cooling tower fan 3MCWNA02M. This shaft replaced the existing stainless steel shaft which had experienced problems with thermal expansion. The new carbon fiber shaft eliminates thermal expansion as a concern.	This modification did not introduce an unreviewed safety question. The new drive shaft performs the same function as the old one and does not affect system operation. The cooling towers are not required to mitigate the consequences of an accident or for safe shutdown.
3-88-HJ-005	This temporary modification replaced the original lower extension shaft on damper 3M-HJA-M02 with a shorter shaft while maintenance was being performed on the damper. The purpose of this modification was to provide Control Room envelope isolation of the outside air makeup duct during the maintenance.	This modification did not introduce an unreviewed safety question. The operation of the Control Room essential ventilation system remained as described in UFSAR 6.4. During the time that the modification was installed the associated air filtration unit, 3M-HJA-F04, was considered inoperable.
3-88-MA-001	This temporary modification installed jumpers across the Main Transformer Bushing Potential Device (PBA) and lifted a PBA-X coil wire to prevent coil damage. This modification was performed because the PBA was causing the cooling fans and pumps to cycle on and off.	This modification did not introduce an unreviewed safety question. The PBA is not quality related and the installation of the jumper was to increase the system reliability.
3-88-MA-010	A temporary modification was installed to reduce the Main Transformer Control Cabinet internal temperature. This modification utilized a window air conditioning unit and provided ducting for closed loop cooling circulation through	This modification did not introduce an unreviewed safety question. This system as a non safety related system. The addition of the cooling was intended to increase the system reliability and reduce occurences of generation

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Temporary Modification Number	Description	Safety Evaluation Summary
	the control cabinet.	down-time caused by nuisance trips of overload relays and breakers.
3-88-MT-002	This temporary modification disabled the annunciator for the Torsional Vibration Monitoring System (TVMS) until the system is operational. The purpose of the TM was to eliminate a spurious control alarm.	This modification did not introduce an unreviewed safety question. The TVMS is for monitoring Torsional Vibrations in the Main Turbine shaft and performs no control or plant safety function. The system is currently out of service and having the alarm continuously present in the control room serves no useful purpose.
3-88-QF-017	A temporary modification was required to troubleshoot the remote Multiplexer cabinet 3ENGNQ03 to determine the cause of erroneous signals which caused the main feeder breaker and several cooling tower fans to trip. This modification lifted the output breakers of the discrete output cards on the remote Multiplexer cabinet.	This modification did not introduce an unreviewed safety question. The Circulating Water System, as described in UFSAR Section 10.4.5, performs no safety related function. The loss of condenser vacuum due to a loss of circulating water has been previously analyzed in CESSAR Section 15.2.3.
3-88-SC-012	This temporary modification is the same as 2-88-SC-013 except it is installed in Unit 3.	
3-88-SC-014	This temporary modification installed a threaded carbon steel spool in place of a damaged flow meter. This installation was necessary due to the rupture of the Condensate Demineralizer Acid Dilution water flow meter and no replacement flow meter was available.	This modification did not introduce an unreviewed safety question. The removal of the flow meter and the addition of the pipe spool allowed for the regeneration of the demineralizers for Unit 3 power ascension. The affected portion of the Condensate Clean up System has no safety related function.
3-88-SK-006	Safeguards Information	
3-88-SQ-009	This temporary modification added software to enhance troubleshooting of the Radiation Monitoring System mini-computer.	This modification did not introduce an unreviewed safety question. The addition of the software only aids in troubleshooting RMS communication loops and does not affect the other operations of the computer. Thus the system functions are not impaired.

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Temporary Modification Number	Description	Safety Evaluation Summary
3-88-SQ-020	A temporary modification was performed to remove the insulation and install a welding preheating blanket on RU-141 process inlet line. This modification was performed to reduce the moisture in RU-141 and RU-142.	This modification did not introduce an unreviewed safety question. The insulation removal and addition of the preheating blanket enhanced the ability to obtain a representative samples during cool ambient conditions and increases the reliability of the Effluent Monitoring System.
3-88-SQ-021	This temporary modification is identical to 2-88-SQ-023 but was implemented in Unit 3.	
3-88-SV-007	This temporary modification lowered the alert alarm setpoint of the RCP Shaft Vibration sensors 03KSVNYSH25 and 03KSVNYSH26 to 7M.	This modification did not introduce an unreviewed safety question. The lower setpoint will provide earlier annunciation of excessive shaft displacement. This will provide more time to diagnose a problem and take appropriate corrective action.
3-88-SV-008	This temporary modification lowered the danger alarm setpoint for RCP Shaft Vibration sensors 03KSVNYSHH25 and 03KSVNYSHH26 to 9M.	This modification did not introduce an unreviewed safety question. The lower setpoint will provide earlier indication of a problem with a RCP shaft and provide more time for appropriate corrective action to be taken.

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Procedure Number and Revision	Description	Safety Evaluation Summary
75RP-9ZZ78, Rev 6	The change to Procedure 75PR-9ZZ78, Rev 6, "Decontaimination," incorporates a log of contamination monitor alarms at the Radiological Controlled Area (RCA) exits and changes the contamination limits for removable contamination, setting them equal to those for fixed contamination.	This procedure revision did not introduce an unreviewed safety question.These changes to a procedure described in the UFSAR ensure that records are maintained of all personnel who alarm the radiation monitor at the exit to the RCA and provide clear and more conservative requirements related to contamination limits for removable contamination in line with IE Circular No. 81-07.
76TP-9ZZ01, Rev 0	This new procedure, 76TP-9ZZ01, Rev. 0, "Secondary Side Decontamination System," describes the procedural controls placed on temporarily installed equipment used to reduce the amount of radioactivity in the plant secondary side prior to discharge to the evaporation pond.	This new procedure did not introduce an unreviewed safety question. The temporarily installed equipment interfaces with permanently installed plant equipment described in the UFSAR and is utilized to reduce radioactivity levels in the effluent discharged to the evaporation pond to within Technical Specification 3/4.11.1 levels when the secondary side of the plant is radioactively contaminated. The temporarily installed equipment will not affect plant operations and is not required for safe shutdown of the plant.
73TP-9HJ05, Rev 0	This new procedure, 73TP-9HJ05, Rev 0, "Control Room Pressure Test Utilizing AFU Manual Isolation Dampers," was prepared to test the ability of new air filter unit (AFU) isolation dampers to isolate the control room and maintain pressurization requirements as described in UFSAR section 6.4.2.4.A and further specified in Technical Specification 4.7.7.d.3.	This new procedure did not introduce an unreviewed safety question. The new procedure was prepared to test the new AFU isolation dampers to verify that they function as described in both UFSAR and as specified in the Technical Specifications.
42TP-2ZZ02, Rev 0	This new procedure, 42TP-2ZZ02, Rev 0, "Unit 2 Antimony Cleanup," describes the procedural controls placed on the Antimony cleanup program instituted in PVNGS Unit 2 to reduce the Antimony buildup in the RCS.	This new procedure did not introduce an unreviewed safety question. The procedure temporarily modifies plant configuration described in the UFSAR as well as normal plant chemistry. This process has been widely practiced within the industry for reducing Antimony buildup.

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Procedure Number and Revision	Description	Safety Evaluation Summary
73TP-1RC01, Rev 0	This new procedure, 73TP-1RC01, Rev 0, "CEA Exercise," details the procedural controls associated with manual exercising of Control Element Assembly (CEA) 56 during maintenance activities on the Control Element Drive Mechanism (CEDM) 56 housing.	This new procedure did not introduce an unreviewed safety question. During performance (in refueling mode) of the procedure, the borom concentration is such that the shutdown margin is well within Technnical Specification limits.
72IC-2RX03, Rev 0	This new procedure, 72IC-2RX03, Rev 0, "Core Reloading," provides the detailed sequence for the refueling activities for PVNGS Unit 2.	This new procedure did not introduce an unreviewed safety question. Changes in the core fuel pattern from the initial fueling of Unit 2 were accounted for in the analyses performed for Cycle 2 and submitted to the NRC in the Reload Analysis Report.
75RP-9ZZ78, Rev 5	This procedure, 75RP-9ZZ78, Rev 5, "Decontamination" incorporates additional guidance relating to survey and contamination control for hot particles.	This procedure revision did not introduce an unreviewed safety question. These changes to a procedure described in the UFSAR provide additional guidance related to hot particle control to ensure personnel radiation exposures are maintained ALARA.
44OP-2SC02, Rev 0	This new procedure, 44OP-2SC02, Rev 0, "Resin Transfer Between Condensate Demineralizer and a Vendor Vessel," provides instructions for transferring resin between the Condensate Demineralizer System (CDS) and a vendor transfer vessel.	This new procedure did not introduce an unreviewed safety question. This procedure controls the installation of temporary equipment which interfaces with permanently installed plant equipment described in the UFSAR and is utilized to transfer resin between the CDS and a vendor transfer vessel. The temporarily installed equipment will not affect plant operations and is not required for safe shutdown of the plant.
ANF-1123, Rev 0	This new procedure, ANF-1123, Rev 0, "Procedure for Ultrasonic Inspection of Fuel Assemblies at Palo Verde Unit 2," provides instructions for performing an inspection to identify Unit 2 fuel assemblies that had failed (experienced breached cladding) during Cycle 1.	This new procedure did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to identify those fuel assemblies that have failed during Cycle 1 so that they can be properly dispositioned. This activity does not introduce any safety concerns beyond those previously analysed in the UFSAR.

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Procedure Number and Revision	Description	Safety Evaluation Summary
ANF-P71,048,Rev 1	This procedure, ANF-P71,048, Rev 1, "Indexing X-Y Table," provides instructions for utilizing a system providing remote positioning of probes used to perform varous measurements on irridated fuel assemblies.	This procedure revision did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed in association with the inspection of spent fuel assemblies to identify failures. The activity does not introduce any safety concerns beyond those previously analysed in the UFSAR.
PVNGS 400-007, Rev 1	This procedure, PVNGS-400-007, Rev 1, "Procedure for Visual Inspection of Fuel Rods and Configuration and In Pool Movement of Rod Storage Baskets,"provides information and instruction to enable the inspection of fuel rods contained in a Rod Storage Basket.	This procedure revision did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to visually (by camera or periscope) inspect spent fuel assmblies, contained in a Rod Storage Basket, to identify any unacceptable conditions. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.
PVNGS-400-008, Rev 1	This procedure, PVNGS-004-007, Rev 1, "Procedure for the Removal and Installation of Upper End Fittings on System 80 Fuel Assemblies," provides information and instructions concerning the operation of various tools for the purpose of removing and installing upper end fittings on system 80 Fuel Assemblies.	This procedure revision did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to remove and reinstall the fuel assembly upper end fitting to access the fuel rods for inspection and relpacement, and/or to access the guide tubes for shimming. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.
PVNGS-400-009, Rev 0	This procedure, PVNGS-400-009, Rev 0, "Procedure for Eddy Current Guide Tube Wear Inspection and Circumferential Indexing of CEA Guide Tubes in System 80 Fuel Assebmblies," describes techniques for testing non-sleeved CEA Guide Tubes for inside surface wear and circumferential indexing of wear indications.	This new procedure did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to examine surface wear on the interior surface of the CEA guide tubes. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.

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Procedure Number and Revision	Description	Safety Evaluation Summary
ST 16273-002, Rev 0	This procedure, ST NO. 16273-002, Rev 0, "Fuel Assembly Reconstitution," details the sequence of work necessary on a fuel assembly that requires a recage due to one or more broken rods or other unrepairable defects.	This new procedure did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to sequence the work required to remove defective fuel rods from an assembly and replacing them with substitutes. This activity does not introduce any safety concerns beyond those already analyzed in the UFSAR.
STD-NSS-070, Rev 4	This procedure, STD-NSS-070, Rev 4, "Procedure for Removal, Transfering, and Insertion of Fuel Rods in 16x16 Fuel Assemblies," provides the information and instructions necessary to remove, transfer, and reinsert fuel rods, dummy spacer rods, and stainless steel replacement rods in fuel assemblies.	This procedure revision did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to remove and replace defective fuel rods in fuel assemblies. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.
XN-NF-P71,099, Rev 0	This new procedure, XN-NF-P71,099, Rev 0, "ULTRATEST System-USIP-12," provides information and instructions for installation, adjustment, and operation of test equipment for ultrasonic testing of fuel assemblies.	This new procedure did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to ultrasonically examine the individual fuel rods of spent fuel assemblies for failures. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.
XN-NF-P71,098, Rev 0	This new procedure, XN-NF-P71,098, Rev 0, "ULRTATEST Computerized Data Acquistion System-COMPO 286," provides information and instructions for installation, adjustment, and operation of a computerized data acquisition system for use with the ULTRATEST failed fuel detection system that performs ultrasonic testing of fuel assemblies.	This new procedure did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to ultrasonically examine the individual fuel rods of spent fuel assemblies for failures. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.

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Procedure Number and Revision	Description	Safety Evaluation Summary
STD-NSS-117, Rev 2	This new procedure, STD-NSS-117, Rev 2,"Procedure for Eddy Current Defect Examination of 14x14 or 16x16 Single Fuel Rods," describes the technique for eddy current defect testing of individual fuel rods from either 14x14 or 16x16 configuration fuel assemblies.	This procedure revision did not introduce an unreviewed safety question. The test, which is not described in the UFSAR, is performed to identify, by eddy current methods, failed fuel rods in spent fuel assemblies. This activity does not introduce any safety concerns beyond those previously analyzed in the UFSAR.

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SAR Change No.	Description	Safety Evaluation Summary
3002	Reported as Plant Change PCP 85-13-ES-004-00 (Design Change DCP 1/2/3 OJ-ES-007) in this report.	
3008	Reported as Item 160 in the 1987 Report.	
3009	Reported as Site Modification 1-SM-RC-004 in this Report.	
3012	This change to Section 3.11 and Appendix 3E of the Updated Final Safety Analysis Report (UFSAR) provides post-LOCA integrated dose levels utilized in equipment qualification calculations for rooms containing Low Pressure Safety Injection recirculation fluids and for the 70 foot level of the west penetration room containing Post Accident Sampling Systen (PASS) valves.	This change did not introduce an unreviewed safety question. The inclusion of this information in the UFSAR reports dose levels that were used in environmental qualification calculations previously reported to the NRC in the Environmental Qualification Report. It has no effect upon any other information reported in the UFSAR.
3022	This change to Section 1.8 of the UFSAR provides an additional exclusion statement to the commitment for Regulatory Guide 1.143, Rev 0. This exclusion statement further defines the boundary of the radwaste system addressed by Regulatory Guide 1.143.	This change did not introduce an unreviewed safety question. The addition of the exemption statement provides further definition of the boundary of the radwaste system to include information in Revision 1 of Regulatory Guide 1.143. This change to Regulatory Guide 1.143 has been accepted by the NRC staff, and the ACRS had concurred, during the NRC review and approval of Revision 1.
3023	This change to Appendix 9B.2 of the UFSAR revises requirements for fire door installation, to allow the installation to deviate from the originally tested configuration, that formed the basis for the original testing.	This change did not introduce an unreviewed safety question. The fire door installation deviations from the originally tested configuration have been found acceptable based upon additional testing. These deviations are also in accordance with the requirements of Generic Letter 86-10 to ensure that fire barriers continue to meet the level of protection originally required.
3025	This change to Sections 1.8, 9.3, and 11.3 of the UFSAR deletes the requirement to sequentially analyze the Chemical and Volume Control System (CVCS) tanks and the waste gas	This change did not introduce an unreviewed safety question. The requirements to individually monitor the CVCS tanks is satisfied by continuously monitoring the header to the Surge

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	decay tank for hydrogen and oxygen. The change also deletes requirements to analyze the waste gas holdup system for hydrogen.	Tank. Monitoring the hydrogen concentratrions in the waste gas holdup system is no longer required as the hydrogen concentration will always be assumed to be greater than four volume percents; therefore, the hydrogen monitors have been removed from operation. By always assuming that the waste gas holdup system has a hydrogen concentration greater that 4% by volume, the margin of safety is increased as actions to reduce the oxygen concentration will be initiated upon reaching two volume percent oxygen without regard to the measured hydrogen concentration. This change was incorporated into the PVNGS Technical Specification as Amendments 36, 23, and 12 for Units 1, 2, and 3 respectively.
3026	This change to section 9.2 of the UFSAR incorporated all the seismic class 1 valves that are installed in 1 1/2 inch and larger lines and are in the water flow path of the essential chilled water system.	This change did not introduce an unreviewed safety question. During a safety system functional inspection, the NRC identified that not all in-line valve installed in 1 1/2 inch and larger lines of the water side of the essential chilled water system were included in the listing in UFSAR Table 9.2-29. These valves were previously included in UFSAR Figure 9.2-10 and analyzed in accordance with applicable Seismic Design Criteria. This change incorporates those valves not previously included in Table 9.2-10 and introduces no other notifications to the UFSAR.
3028	This change to Table 9.3-3 of the UFSAR incorporated dissolved hydrogen and total gas into the listing for reactor coolant letdown sample analysis.	This change did not introduce an unreviewed safety question. The change incorporates information that was inadvertently left out of the table during a previous revision.
3033	This change to section 9.3 of the UFSAR reflects more accurately the testing requirements for determining operability of the Post Accident Sampling System (PASS) to specify which components require testing.	This change did not introduce an unreviewed safety question. The change provides consistency among documents which contain requirements and descriptions of the PASS.

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3034	This change to Table 9.2-28 of the UFSAR is an update to reflect the as-built configuration of the Essential Chilled Water System.	This change did not introduce an unreviewed safety question. The change reflects final design calculations and installed conditions.
3036	This change to section 1.9 of the UFSAR deletes certain inspection requirements for the Unit 2 steam generator feedwater sparger.	This change did not introduce an unreviewed safety question. The deletion of the inspection requirements for Unit 2 was based upon the satisfactory results of the feedwater water hammer tests in Units 1 and 3 and is discussed in correspondence to the NRC (161-00963) dated April 22, 1988.
3038	This change to Table 1.8-1 provides a note to explain the radiation monitor deviation to R.G. 1.97 accuracy requirements.	This change did not introduce an unreviewed safety question. The change reflects information provided to the NRC in correspondence (161-00667) dated November 20, 1987.
3040	This change to sections 1.9 and 15.1 of the UFSAR reports an increase in maximum feedwater flow beyond that previously incorporated in the UFSAR by reference to CESSAR.	This change did not introduce an unreviewed safety question. The PVNGS main feedwater system has been determined to be capable of supplying 125% of the nominal feedwater flow at 100% power (rather than the 110% previously reported in CESSAR) under the off-normal conditions analyzed in section 15.1.2.
3041	This change to sections 1.2 and 2.4 of the UFSAR incorporates the additional (second) evaporation pond recently completed.	This change did not introduce an unreviewed safety question. The site of the additional evaporation pond was previously shown as a "future" evaporation pond on UFSAR figures.
3042	This change to Figure 5.4-1 of the UFSAR incorporates a change in the pressurizer High Pressure Alarm from 2350 to 2285 psia.	This change did not introduce an unreviewed safety question. The change is conservative and resulted from the thermal improvement program initiated by the Unit 1, Cycle 2 reload.
3043	The change to section 1.9 of the UFSAR takes an exception to CESSAR regarding the presense at an SRO when fuel is being handled. An exception to CESSAR is also taken with regard to when inventory should be taken to ensure the tag board is correct.	This change did not introduce an unreviewed safety question. This change is incorporated to achieve consistancy between the PVNGS Technical Specifications and the UFSAR.

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3044	The change to Tables 8.3-1 and 8.3-3 of the UFSAR revises class IE loading for two valve motor operators.	This change did not introduce an unreviewed safety question. This change reflects revised class IE loadings resulting from upgrading the motor operators on two safety injection valves.
3045	These changes to Table 1.8-1 of the UFSAR provide additional information concerning the existing design of the plant with regard to Regulatory Guide 1.97. Exception is taken concerning steam generator wide range level indication.	This change did not introduce an unreviewed safety question. These changes to Regulatory Guide 1.97 compliance reflect changes in response to NRC inspection findings documented in Inspection Report 50-528/88-12 and provided additional information concerning the existing design of the plant.
3050	These changes to section 17.2 of the UFSAR provide administrative changes imposed as a result of the past reorganization.	This change did not introduce an unreviewed safety question. These changes reflect responsibility changes for quality assurance activities resulting from a division reorganization.
3052	These changes to section 8.3 and Table 1.8-1 of the UFSAR reflect a change to the power source of the containment sump level transmiters.	This change did not introduce an unreviewed safety question. The change reflects a realignment of the power source for the containment sump level receivers from non-class to class IE.
3053	These changes to section 13.4 of the UFSAR reflect organizational restructuring with respect to the Nuclear Safety and Licensing Department.	This change did not introduce an unreviewed safety question. The change relects changes to the Nuclear Safety Department resulting from a division reorganization.
3055	These changes to Chapter 13 of the UFSAR reflects organizational restructuring with respect to PVNGS.	This change did not introduce an unreviewed safety question. The changes reflect realignment of the PVNGS organizations resulting from a project reorganization.
3056	These changes to Chapters 6, 9, 10, and 11 of the UFSAR are for consistancy with design documents.	This change did not introduce an unreviewed safety question. These changes are for editorial and consistancy purposes to achieve uniformity with design documents.

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SAR Change No.	Description	Safety Evaluation Summary
3058	These changes to Table 1.8-1 of the UFSAR correct typographical errors and clarify information.	This change did not introduce an unreviewed safety question. These changes correct typographical errors and add clarification to reflect the design documents related to Regulatory Guide 1.97 compliance.
3059	These changes to section 17.2 of the UFSAR reflect the QA/QC organizational restructuring.	This change did not introduce an unreviewed safety question. These changes reflect responsibility changes in the Quality Assurance/Quality Control organization and program.
3060	These changes correct typographical errors and change Table 7.1-1 of the UFSAR to reflect the as-built configuration.	This change did not introduce an unreviewed safety question. The change corrects a typographical error and changes entries in the table to reflect the existing plant configuration.
3061	These changes to sections 6.2 and 6.3 of the UFSAR incorporates reload anaysis report information for large break LOCA, small break LOCA, and the post Cycle 1 evaluation for Units 1 and 2.	This change did not introduce an unreviewed safety question. These changes consist of editorial corrections as well as information from the Unit 1 and 2 Reload Analysis Report that was previously submitted to the NRC.
3062	This change to chapter 7 of the UFSAR updates the current Safety Analysis Report in support of the reloads for Units 1 and 2.	This change did not introduce an unreviewed safety question. Information, that was previously referenced to CESSAR, was incorporated into the UFSAR in this change. Editorial corrections were incorporated as well as information from the Unit 1 and 2 Reload Analysis Report that was only submitted to the NRC.
3063	The changes to sections 4.2.3 and 4.4 of the UFSAR are being made in support of the reloads for Units 1 and 2.	This change did not introduce an unreviewed safety question. The change information, that was previously referenced to CESSAR, was incorporated into the UFSAR in this change. Editorial corrections were incorporated as well as information from the Unit 1 and 2 Reload Analysis Report that was previously submitted to the NRC.

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3064	This change to chapter 15 of the UFSAR incorporates tests from Units 1 and 2 Reload Analysis Reports.	This change did not introduce an unreviewed safety question. The changes incorporate information from the Unit 1 and Unit 2 Reload Analysis Reports previously submitted to the NRC.
3065	This change to section 4.3 of the UFSAR incorporates CESSAR 4.3 into the UFSAR for Units 1 and 2 and revises section 4.3 to reflect Cycle 2 information for Unit 2.	This change did not introduce an unreviewed safety question. This change incorporates information previously included in the CESSAR into the UFSAR and reflects Cycle 2 information for Unit 2 in the UFSAR.
3066	This change to Appendix 9B of the UFSAR deletes requirements for a 3-hour rated fire barrier between the fuel building and the associated pipe tunnel.	This change did not introduce an unreviewed safety question. No wall exists in the pipe tunnel and no design for a wall is provided. A wall is not required due to a lack of combustibles and ignition sources in the tunnel, as well as the distance from the nearest safe shutdown circuitry or equipment.
3067	This change to section 5.2 of the UFSAR reflects application of Code Case N-247-1 to RCP Hex Nuts.	This change did not introduce an unreviewed safety question. This change documents the application of a code case that was previously approved for use at PVNGS.
3068	This change to section 9.5, Appendix 9A, and Appendix 9B of the UFSAR incorporates editorial corrections and a revision of combustible loading in the Fire Protection Evaluation Report.	This change did not introduce an unreviewed safety question. The changes reflect editorial corrections and revised combustible loading calculations.
3069	This change to section 6.3 of the UFSAR revises the CESSAR interface evaluation safety inspection task K-Factor range provided in the ECSS small and large break LOCA analysis.	This change did not introduce an unreviewed safety question. The ECCS small and large break LOCA was evaluated to expand the K-Factor range. The existing analysis remained valid and the ECCS performance criteria of 10 CFR 50.46 is satisfied.

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3071	This change to section 6.5 and Appendix 3B of the UFSAR includes the addition of two piping analysis computer programs not previously identified in the UFSAR.	This change did not introduce an unreviewed safety question. These computer programs are used in the performance of snubber reduction and water hammer analyses and have been bench marked against other standard computer programs used in the industry.
3072	This change to section 12.3 of the UFSAR incorporates additional shielding calculational computer programs used at PVNGS.	This change did not introduce an unreviewed safety question. This change incorporates additional computer programs used at PVNGS to reflect current plant activities and does not affect plant systems or components.