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PALO VERDE - UNIT 1

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AMENDMENT NO. 78

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
D. Supplementary Protection System				
Pressurizer Pressure - High	S	R	Q	1, 2
II. RPS LOGIC				
A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
III. RPS ACTUATION DEVICES				
A. Reactor Trip Breakers	N.A.	N.A.	M, R (10)	1, 2, 3*, 4*, 5*
B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

- * - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.
- (1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.
- (2) Heat balance only (CHANNEL FUNCTIONAL TEST not included):

- a. Between 15% and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation.

If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.

If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.

If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.

- b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.

During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.

- (3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.
- (4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

- (6) - This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
- (7) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERRI term in the CPC and is equal to or greater than 4%.
- (8) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.
- (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct current values of addressable constants are installed in each OPERABLE CPC.
- (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
D. Supplementary Protection System				
Pressurizer Pressure - High	S	R	Q	1, 2
II. RPS LOGIC				
A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
B. Initiation Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
III. RPS ACTUATION DEVICES				
A. Reactor Trip Breakers	N.A.	N.A.	M, R(10)	1, 2, 3*, 4*, 5*
B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

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AMENDMENT NO. 64

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- * - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.
 - (1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.
 - (2) Heat balance only (CHANNEL FUNCTIONAL TEST not included):
 - a. Between 15% and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation.
 - If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.
 - If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.
 - If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.
 - b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.
- During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.
- (3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.
 - (4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
 - (5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- (6) - This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
- (7) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERRI term in the CPC and is equal to or greater than 4%.
- (8) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.
- (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct (current) values of addressable constants are installed in each OPERABLE CPC.
- (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
D. Supplementary Protection System				
Pressurizer Pressure - High	S	R	Q	1, 2
II. RPS LOGIC				
A. Matrix Logic	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*
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III. RPS ACTUATION DEVICES				
A. Reactor Trip Breakers	N.A.	N.A.	M, R(10)	1, 2, 3*, 4*, 5*
B. Manual Trip	N.A.	N.A.	Q	1, 2, 3*, 4*, 5*

PALO VERDE - UNIT 3

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TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- * - With reactor trip breakers in the closed position and the CEA drive system capable of CEA withdrawal, and fuel in the reactor vessel.
- (1) - Each STARTUP or when required with the reactor trip breakers closed and the CEA drive system capable of rod withdrawal, if not performed in the previous 7 days.
- (2) Heat balance only (CHANNEL FUNCTIONAL TEST not included):
 - a. Between 15% and 80% of RATED THERMAL POWER, compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation.
 - If any signal is within -0.5% to 10% of the calorimetric then do not calibrate except as required during initial power ascension after refueling.
 - If any signal is less than the calorimetric calculation by more than 0.5%, then adjust the affected signal(s) to agree with the calorimetric calculation.
 - If any signal is greater than the calorimetric calculation by more than 10% then adjust the affected signal(s) to agree with the calorimetric calculation within 8% to 10%.
 - b. At or above 80% of RATED THERMAL POWER; compare the linear power level, the CPC delta T power and the CPC nuclear power signals to the calorimetric calculation. If any signal differs from the calorimetric calculation by an absolute difference of more than 2%, then adjust the affected signal(s) to agree with the calorimetric calculation.
- During PHYSICS TESTS, these daily calibrations may be suspended provided these calibrations are performed upon reaching each major test power plateau and prior to proceeding to the next major test power plateau.
- (3) - Above 15% of RATED THERMAL POWER, verify that the linear power subchannel gains of the excore detectors are consistent with the values used to establish the shape annealing matrix elements in the Core Protection Calculators.
- (4) - Neutron detectors may be excluded from CHANNEL CALIBRATION.
- (5) - After each fuel loading and prior to exceeding 70% of RATED THERMAL POWER, the incore detectors shall be used to determine or verify the shape annealing matrix elements used in the Core Protection Calculators.

TABLE 4.3-1 (Continued)

REACTOR PROTECTIVE INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

- (6) - This CHANNEL FUNCTIONAL TEST shall include the injection of simulated process signals into the channel as close to the sensors as practicable to verify OPERABILITY including alarm and/or trip functions.
- (7) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation or by calorimetric calculations and if necessary, adjust the CPC addressable constant flow coefficients such that each CPC indicated flow is less than or equal to the actual flow rate. The flow measurement uncertainty may be included in the BERRI term in the CPC and is equal to or greater than 4%.
- (8) - Above 70% of RATED THERMAL POWER, verify that the total steady-state RCS flow rate as indicated by each CPC is less than or equal to the actual RCS total flow rate determined by either using the reactor coolant pump differential pressure instrumentation and the ultrasonic flow meter adjusted pump curves or calorimetric calculations.
- (9) - The quarterly CHANNEL FUNCTIONAL TEST shall include verification that the correct (current) values of addressable constants are installed in each OPERABLE CPC.
- (10) - At least once per 18 months and following maintenance or adjustment of the reactor trip breakers, the CHANNEL FUNCTIONAL TEST shall include independent verification of the undervoltage and shunt trips.