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May 20, 2004

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

SUBJECT: Request for Amendment to Technical Specification Surveillance Requirement Frequencies to Support 24-Month Fuel Cycles in Accordance with the Guidance of Generic Letter 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle"

REFERENCES:
(1) Generic Letter 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991
(2) Regulatory Guide 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," Revision 2, dated March 1978
(3) Letter from Keith R. Jury (AmerGen Energy Company, LLC) to U.S. NRC, "Request for License Amendment Related to Revision of Instrument Channel Trip Setpoint Allowable Values," dated November 11, 2003

Pursuant to 10 CFR 50.90, "Application for amendment of license or construction permit," AmerGen Energy Company (AmerGen), LLC hereby requests an amendment to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for Clinton Power Station (CPS) to support operation with 24-month fuel cycles. Specifically, the change addresses certain TS Surveillance Requirement (SR) frequencies that are specified as "18 months" by revising them to "24 months" in accordance with the guidance of Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle" (Reference 1). Also consistent with this guidance, a change is proposed to Administrative Controls Section 5.5.7, "Ventilation Filter Testing Program (VFTP)," to address changes to 18-month frequencies that are specified in Regulatory Guide (RG) 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," (Reference 2). In order to support changes to some of the 18-month frequencies, setpoint analysis revisions result in changes to selected allowable values.

A001

An administrative change to remove TS Table 3.0.2-1, "Surveillance Intervals Extended to November 30, 2000," and reference to it in SR 3.0.2, is also provided. This Table reflects a previously issued one-time surveillance interval extension that expired on November 30, 2000. A second administrative change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply.

This request is developed assuming that the allowable value changes requested in Reference 3 will be approved. Any change to the Reference 3 request will be tracked for potential impact on this request, and any necessary changes to this request will be addressed.

The information supporting the proposed TS changes is subdivided as follows.

Attachment 1 provides our evaluation supporting the proposed changes
Attachment 2 contains the copies of the marked up TS pages
Attachment 3 contains the copies of the marked up Bases pages (for information only)
Attachment 4 summarizes formal licensee commitments pending NRC approval of the proposed amendment
Attachment 5 provides detailed GL 91-04 evaluation results
Attachment 6 provides detailed evaluation methods utilized
Attachment 7 provides a list of applicable instruments within the scope of this amendment request
Attachment 8 provides the CPS positions regarding NRC Status Report on EPRI TR-103335

The proposed TS changes have been reviewed by the CPS Plant Operations Review Committee and approved by the Nuclear Safety Review Board in accordance with the Quality Assurance Program.

AmerGen is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated State Official.

AmerGen is requesting approval of this change by May 1, 2005. Approval by this date will support scheduling and planning the subsequent refueling outage based on 24-month Surveillance Frequency requirements. Once approved, the amendment will be implemented within 60 days.

Should you have any questions related to this information, please contact Mr. Timothy Byam at (630) 657-2804.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

May 20, 2004
Executed on

Keith R. Jury
Keith R. Jury
Director – Licensing and Regulatory Affairs
AmerGen Energy Company, LLC

Attachments:
1. Evaluation of Proposed Changes
2. Markup of Proposed Technical Specification Page Changes
3. Markup of Proposed Technical Specification Bases Pages (For Information Only)
4. Commitments
5. Detailed Evaluation Results
6. Detailed Evaluation Methods
7. Applicable Instrumentation
8. NRC Status Report—CPS Positions

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

ATTACHMENT 1
Evaluation of Proposed Changes

Subject: Request for Amendment to Technical Specification Surveillance Requirement Frequencies to Support 24-Month Fuel Cycles in Accordance with the Guidance of Generic Letter 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle"

1.0 DESCRIPTION

This letter proposes to amend Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-62 for Clinton Power Station (CPS), Unit 1.

The requested change affects certain TS Surveillance Requirement (SR) frequencies that are specified as "18 months" by revising them to "24 months" in accordance with the guidance of Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991 (Reference 1). Also consistent with this guidance, a change is proposed to Administrative Controls Section 5.5.7, "Ventilation Filter Testing Program (VFTP)," to address changes to 18-month frequencies that are specified in Regulatory Guide (RG) 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," (Reference 2).

In order to support certain changes to the 18-month frequencies, setpoint analysis revisions result in changes to selected allowable values.

Additionally, for instrument functions with channel calibration requirements remaining at 18 months that also have functions within the same instrument table being extended to 24 months, a new channel calibration surveillance is added for the 18 month channel calibrations. This reflects only an administrative renumbering of 18 month SRs.

An administrative change to remove TS Table 3.0.2-1, "Surveillance Intervals Extended to November 30, 2000," and the reference to it in SR 3.0.2, is also provided. This Table reflects a previously issued one-time surveillance interval extension that expired on November 30, 2000. This one-time extension was approved in CPS License Amendments 125 and 129 (References 3 and 4, respectively). A second administrative change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply. This one time exception was approved in CPS License Amendment 122 (Reference 5).

This request is developed assuming that the allowable value changes requested in Reference 6 are approved. Any change to the request in Reference 6 will be tracked for potential impact on this request, and any necessary changes will be addressed.

AmerGen is requesting approval of this change by May 1, 2005. Approval by this date will support scheduling and planning the subsequent refueling outage based on 24-month surveillance frequency requirements. As demonstrated in this submittal, the proposed changes do not adversely impact safety. The proposed amendment is similar to amendments issued for LaSalle County Station (Reference 7) as part of the LaSalle conversion to improved Technical Specifications, for the Perry Nuclear Power Plant (Reference 8), and for E.I. Hatch Nuclear Plant (Reference 9).

2.0 PROPOSED CHANGES

2.1 Generic Letter 91-04 Changes

2.1.1 Changes from 18 Months to 24 Months

To accommodate a 24-month fuel cycle for CPS, certain TS SR frequencies that are specified as "18 months" are revised to "24 months." The proposed changes were evaluated in accordance with the guidance provided in NRC GL 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle" (Reference 1). The following SR frequencies are revised to 24 months:

TS 3.1.7 Standby Liquid Control (SLC) System

SR 3.1.7.8	Verify flow through one SLC subsystem from pump into reactor pressure vessel.
SR 3.1.7.9	Verify all piping between storage tank and pump suction is unblocked.

TS 3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

SR 3.1.8.3	Verify each SDV vent and drain valve: a. Closes in ≤ 30 seconds after receipt of an actual or simulated scram signal; and b. Opens when the actual or simulated scram signal is reset.

3.3.1.1 Reactor Protection System (RPS) Instrumentation

SR 3.3.1.1.12	Perform CHANNEL FUNCTIONAL TEST.
SR 3.3.1.1.13	Perform CHANNEL CALIBRATION.
SR 3.3.1.1.14	Verify the APRM Flow Biased Simulated Thermal Power-High time constant is within the limits specified in the COLR.
SR 3.3.1.1.15	Perform LOGIC SYSTEM FUNCTIONAL TEST.
SR 3.3.1.1.16	Verify Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.
SR 3.3.1.1.17	Verify the RPS RESPONSE TIME is within limits.

3.3.1.2 Source Range Monitor (SRM) Instrumentation

SR 3.3.1.2.6	Perform CHANNEL CALIBRATION.

3.3.2.1 Control Rod Block Instrumentation

SR 3.3.2.1.7	Perform CHANNEL CALIBRATION.
SR 3.3.2.1.8	Perform CHANNEL FUNCTIONAL TEST.

3.3.3.1 Post Accident Monitoring (PAM) Instrumentation

SR 3.3.3.1.3	Perform CHANNEL CALIBRATION.

3.3.3.2 Remote Shutdown System

SR 3.3.3.2.2 Verify each required control circuit and transfer switch is capable of performing the intended functions.
SR 3.3.3.2.3 Perform CHANNEL CALIBRATION for each required instrument channel.

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation

SR 3.3.4.1.2 Perform CHANNEL CALIBRATION.
SR 3.3.4.1.3 Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.
SR 3.3.4.1.4 Verify TSV Closure and TCV Fast Closure, Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.
SR 3.3.4.1.5 Verify the EOC-RPT SYSTEM RESPONSE TIME is within limits.

3.3.4.2 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation

SR 3.3.4.2.4 Perform CHANNEL CALIBRATION.
SR 3.3.4.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

SR 3.3.5.1.4 Perform CHANNEL CALIBRATION.
SR 3.3.5.1.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

SR 3.3.5.2.4 Perform CHANNEL CALIBRATION.
SR 3.3.5.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.1 Primary Containment and Drywell Isolation Instrumentation

SR 3.3.6.1.5 Perform CHANNEL CALIBRATION.
SR 3.3.6.1.6 Perform LOGIC SYSTEM FUNCTIONAL TEST.
SR 3.3.6.1.7 Verify the ISOLATION SYSTEM RESPONSE TIME for the main steam isolation valves is within limits.

3.3.6.2 Secondary Containment Isolation Instrumentation

SR 3.3.6.2.4 Perform CHANNEL CALIBRATION.
SR 3.3.6.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.3 Residual Heat Removal (RHR) Containment Spray System Instrumentation

SR 3.3.6.3.4 Perform CHANNEL CALIBRATION.
SR 3.3.6.3.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.4 Suppression Pool Makeup (SPMU) System Instrumentation

SR 3.3.6.4.6	Perform CHANNEL CALIBRATION.
SR 3.3.6.4.7	Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.5 Relief and Low-Low Set (LLS) Instrumentation

SR 3.3.6.5.3	Perform CHANNEL CALIBRATION.
SR 3.3.6.5.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.7.1 Control Room Ventilation System Instrumentation

SR 3.3.7.1.3	Perform CHANNEL CALIBRATION.

3.3.8.1 Loss of Power (LOP) Instrumentation

SR 3.3.8.1.3	Perform CHANNEL CALIBRATION.
SR 3.3.8.1.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

SR 3.3.8.2.2	Perform CHANNEL CALIBRATION.
SR 3.3.8.2.3	Perform a system functional test.

3.4.2 Flow Control Valves (FCVs)

SR 3.4.2.1	Verify each FCV fails "as is" on loss of hydraulic pressure at the hydraulic unit.

3.4.4 Safety/Relief Valves (S/RVs)

SR 3.4.4.2	Verify each required relief function S/RV actuates on an actual or simulated automatic initiation signal.
SR 3.4.4.3	Verify each required S/RV actuator strokes when manually actuated.

3.4.7 RCS Leakage Detection Instrumentation

SR 3.4.7.3	Perform CHANNEL CALIBRATION of required leakage detection instrumentation.

3.5.1 ECCS - Operating

SR 3.5.1.5	Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.
SR 3.5.1.6	Verify the ADS actuates on an actual or simulated automatic initiation signal.
SR 3.5.1.7	Verify each ADS valve actuator strokes when manually actuated.
SR 3.5.1.8	Verify the ECCS RESPONSE TIME for each ECCS injection/spray subsystem is within limits.

3.5.2 ECCS - Shutdown

SR 3.5.2.6 Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.

3.5.3 RCIC System

SR 3.5.3.4 Verify, with RCIC steam supply pressure ≤ 150 psig and ≥ 135 psig, the RCIC pump can develop a flow rate ≥ 600 gpm against a system head corresponding to reactor pressure.

SR 3.5.3.5 Verify the RCIC System actuates on an actual or simulated automatic initiation signal.

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

SR 3.6.1.3.7 Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.

SR 3.6.1.3.12 Verify each instrumentation line excess flow check primary containment isolation valve actuates within the required range.

3.6.1.6 Low-Low Set (LLS) Valves

SR 3.6.1.6.1 Verify each LLS valve actuator strokes when manually actuated.

SR 3.6.1.6.2 Verify the LLS System actuates on an actual or simulated automatic initiation signal.

3.6.1.7 Residual Heat Removal (RHR) Containment Spray System

SR 3.6.1.7.3 Verify each RHR containment spray subsystem automatic valve in the flow path actuates to its correct position on an actual or simulated initiation signal.

3.6.1.8 Main Steam Isolation Valve (MSIV) Leakage Control System (LCS)

SR 3.6.1.8.3 Perform a system functional test of each MSIV LCS subsystem.

3.6.1.9 Feedwater Leakage Control System (FWLCS)

SR 3.6.1.9.1 Perform a system functional test of each FWLCS subsystem.

3.6.2.4 Suppression Pool Makeup (SPMU) System

SR 3.6.2.4.4 Verify each SPMU subsystem automatic valve actuates to the correct position on an actual or simulated automatic initiation signal.

3.6.3.1 Primary Containment Hydrogen Recombiners

SR 3.6.3.1.1	Perform a system functional test for each primary containment hydrogen recombiner.
SR 3.6.3.1.2	Visually examine each primary containment hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.
SR 3.6.3.1.3	Perform a resistance to ground test for each heater phase.

3.6.3.2 Primary Containment and Drywell Hydrogen Igniters

SR 3.6.3.2.3	Verify each required igniter in inaccessible areas develops sufficient current draw for a ≥ 1700°F surface temperature.
SR 3.6.3.2.4	Verify each required igniter in accessible areas develops a surface temperature of ≥ 1700°F.

3.6.3.3 Containment/Drywell Hydrogen Mixing Systems

SR 3.6.3.3.2	Verify each Containment/Drywell Hydrogen Mixing System flow rate is ≥ 800 scfm.

3.6.4.1 Secondary Containment

SR 3.6.4.1.4	Verify each standby gas treatment (SGT) subsystem will draw down the secondary containment to ≥ 0.25 inch of vacuum water gauge within the time required.
SR 3.6.4.1.5	Verify each SGT subsystem can maintain ≥ 0.25 inch of vacuum water gauge in the secondary containment for 1 hour at a flow rate ≤ 4400 cfm.

3.6.4.2 Secondary Containment Isolation Dampers (SCIDs)

SR 3.6.4.2.3	Verify each automatic SCID actuates to the isolation position on an actual or simulated automatic isolation signal.

3.6.4.3 Standby Gas Treatment (SGT) System

SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.
SR 3.6.4.3.4	Verify each SGT filter cooling bypass damper can be opened and the fan started.

3.6.5.3 Drywell Isolation Valves

SR 3.6.5.3.5	Verify each required automatic drywell isolation valve actuates to the isolation position on an actual or simulated isolation signal.

3.6.5.6 Drywell Post-LOCA Vacuum Relief System

SR 3.6.5.6.3	Verify the opening pressure differential of each drywell post-LOCA vacuum relief valve is ≤ 0.2 psid.

3.7.1 Division 1 and 2 Shutdown Service Water (SX) Subsystems and Ultimate Heat Sink (UHS)

SR 3.7.1.3	Verify each SX subsystem actuates on an actual or simulated initiation signal.

3.7.2 Division 3 Shutdown Service Water (SX) Subsystem

SR 3.7.2.2	Verify the Division 3 SX subsystem actuates on an actual or simulated initiation signal.

3.7.3 Control Room Ventilation System

SR 3.7.3.4	Verify each Control Room Ventilation subsystem actuates on an actual or simulated initiation signal.
SR 3.7.3.5	Verify the air inleakage rate of the negative pressure portions of the Control Room Ventilation System is $\leq$ 650 cfm.
SR 3.7.3.6	Verify each Control Room Ventilation subsystem can maintain a positive pressure of $\geq$ 1/8 inch water gauge relative to adjacent areas during the high radiation mode of operation at a flow rate of $\leq$ 3000 cfm.

3.7.4 Control Room Air Conditioning (AC) System

SR 3.7.4.1	Verify each control room AC subsystem has the capability to remove the assumed heat load.

3.7.6 Main Turbine Bypass System

SR 3.7.6.2	Perform a system functional test.
SR 3.7.6.3	Verify the TURBINE BYPASS SYSTEM RESPONSE TIME is within limits.

3.8.1 AC Sources-Operating

SR 3.8.1.8	Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.
SR 3.8.1.9	Verify each DG rejects a load greater than or equal to its associated single largest post accident load and following load rejection, the engine speed is maintained less than nominal plus 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is lower.
SR 3.8.1.10	Verify each DG operating at a power factor $\leq$ 0.9 does not trip and voltage is maintained $\leq$ 5000 V for DG 1A and DG 1B and $\leq$ 5824 V for DG 1C during and following a load rejection of a load $\geq$ 3482 kW for DG 1A, $\geq$ 3488 kW for DG 1B, and $\geq$ 1980 kW for DG 1C.

SR 3.8.1.11 Verify on an actual or simulated loss of offsite power signal:
a. De-energization of emergency buses;
b. Load shedding from emergency buses for Divisions 1 and 2; and
c. DG auto-starts from standby condition and:
1. energizes permanently connected loads in ≤ 12 seconds,
2. energizes auto-connected shutdown loads,
3. maintains steady state voltage ≥ 4084 V and ≤ 4580 V,
4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and
5. supplies permanently connected and auto-connected shutdown loads for ≥5 minutes.

SR 3.8.1.12 Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each DG auto-starts from standby condition and:
a. In ≤ 12 seconds after auto-start and during tests, achieves voltage ≥ 4084 V and frequency ≥ 58.8 Hz;
b. Achieves steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and
c. Operates for ≥ 5 minutes.

SR 3.8.1.13 Verify each DG's automatic trips are bypassed on an actual or simulated ECCS initiation signal except:
a. Engine overspeed;
b. Generator differential current; and
c. Overcrank for DG 1A and DG 1B.

SR 3.8.1.14 Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours:
a. For ≥ 2 hours loaded ≥ 4062 kW for DG 1A, ≥ 4069 kW for DG 1B, and ≥ 2310 kW for DG 1C; and
b. For the remaining hours of the test loaded ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C.

SR 3.8.1.15 Verify each DG starts and achieves:
a. in ≤ 12 seconds, voltage ≥ 4084 V and frequency ≥ 58.8 Hz and
b. Steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

SR 3.8.1.16 Verify each DG:
a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;
b. Transfers loads to offsite power source; and
c. Returns to ready-to-load operation.

SR 3.8.1.17 Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ECCS initiation signal overrides the test mode by:
a. Returning DG to ready-to-load operation; and
b. Automatically energizing the emergency loads from offsite power.

SR 3.8.1.18 Verify the sequence time is within ± 10% of design for each load sequence timer.

SR 3.8.1.19 Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal:

a. De-energization of emergency buses;
b. Load shedding from emergency buses for Divisions 1 and 2; and
c. DG auto-starts from standby condition and:
   1. energizes permanently connected loads in ≤ 12 seconds,
   2. energizes auto-connected emergency loads,
   3. achieves steady state voltage ≥ 4084 V and ≤ 4580 V,
   4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and
   5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.

<u>3.8.4 DC Sources-Operating</u>

SR 3.8.4.2 Verify each Division 1 and 2 battery charger supplies ≥ 300 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours and each Division 3 and 4 battery charger supplies ≥ 100 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours.
<u>OR</u>
Verify each battery charger can recharge the battery to the fully charged stated within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.

SR 3.8.4.3 Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.

<u>3.8.11 Static VAR Compensator (SVC) Protection Systems</u>

SR 3.8.11.2 Perform a system functional test of each SVC protection subsystem, including breaker actuation.

<u>5.5.7 Ventilation Filter Testing Program (VFTP)</u>

Also, consistent with Reference 1 guidance, a change is proposed to Administrative Controls Section 5.5.7, "Ventilation Filter Testing Program (VFTP)," to address changes to 18 month frequencies that are specified in Reference 2. This change incorporates an explicit exception to the 18 month interval recommended by Reference 2, by revising the first paragraph of TS 5.5.7 as follows (added words shown underlined):

5.5.7 A program shall be established to implement the following required testing of Engineered Safety Feature (ESF) filter ventilation systems at the frequencies specified in Regulatory Guide 1.52, Revision 2<u>, except that testing specified at a frequency of 18 months is required at a frequency of 24 months</u>.

2.1.2 Allowable Value Changes

In accordance with Reference 1, for calibration interval extensions a comparison of the projected drift errors over the extended calibration interval was made with the values of drift used in the setpoint calculations. Additionally, conditions and assumptions of the setpoint and safety analysis were reviewed to validate appropriate acceptance criteria. In the majority of cases, the comparisons and reviews confirmed that the existing setpoints and TS allowable values were conservative with respect to the projected drift and consistent with safety analysis assumptions. However, to support some of the above changes to a 24-month frequency, setpoint analysis revisions are required that result in changes to the following TS allowable values. For TS Table 3.3.6.1-1, Function 5.e, Reactor Vessel Pressure-High, a change to the associated analytical limit is required to support the corresponding allowable value change. For all other allowable value changes, a change to the safety analysis (analytical limit or other design basis assumption) is not required to support the changes.

3.3.6.1 Primary Containment and Drywell Isolation Instrumentation

- Table 3.3.6.1-1, Function 1.b, Main Steam Line Pressure-Low
  Allowable value for the main steam isolation function is revised from ≥ 840 psig (as proposed in Reference 6) to ≥ 841 psig

- Table 3.3.6.1-1, Function 5.e, Reactor Vessel Pressure-High
  Allowable value for the residual heat removal - shutdown cooling (RHR-SDC) isolation valve interlock function is revised from ≤ 110 psig to ≤ 113 psig

3.3.6.3 Residual Heat Removal (RHR) Containment Spray System Instrumentation

- Table 3.3.6.3-1, Function 4, Timers, System A and System B
  Allowable value revised from ≥10.10 minutes and ≤10.23 minutes to ≥606 seconds and ≤614 seconds

3.3.8.1 Loss of Power (LOP) Instrumentation

- Table 3.3.8.1-1, Function 1.b, Division 1 and 2 Loss of Voltage - Time Delay
  Allowable value revised from ≤10 seconds to ≤5.0 seconds

- Table 3.3.8.1-1, Function 1.c, Division 1 and 2 Degraded Voltage Reset
  Allowable value revised from ≥ 4090 V and ≤ 4111 V, to ≥ 4102.2 V and ≤ 4109.3 V

- Table 3.3.8.1-1, Function 1.d, Division 1 and 2 Degraded Voltage Drop-out
  Upper allowable value deleted

- Table 3.3.8.1-1, Function 2.c, Division 3 Degraded Voltage Reset
  Allowable value revised from ≥ 4090 V and ≤ 4111 V, to ≥ 4102.2 V and ≤ 4109.3 V

- Table 3.3.8.1-1, Function 2.d, Division 3 Degraded Voltage Drop-out
  Upper allowable value deleted

- Table 3.3.8.1-1, Function 2.e, Division 3 Degraded Voltage - Time Delay Allowable value revised from ≥ 14 seconds and ≤ 16 seconds to ≥ 13.2 seconds and ≤ 16.8 seconds

2.1.3 Renumbered 18-Month Surveillance Requirements

For channel calibration requirements remaining at 18-month frequency, the applicable surveillance is administratively renumbered by adding a new 18-month surveillance requirement. This editorial presentation preference replaces the current 18-month channel calibration SR, allowing the surveillances extended to 24-months to retain current SR numbering. The following lists the new SR being added and the associated instrumentation table functions being revised.

<u>3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation</u>

SR 3.3.5.1.6 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.5.1.4 for the following functions)
- Function 1.a, 2.a, 4.a, 5.a: Reactor Vessel Water Level–Low Low Low, Level 1
- Function 3.a: Reactor Vessel Water Level–Low Low, Level 2
- Function 3.c: Reactor Vessel Water Level–High, Level 8

<u>3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation</u>

SR 3.3.5.2.6 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.5.2.4 for the following functions)
- Function 1: Reactor Vessel Water Level–Low Low, Level 2

<u>3.3.6.1 Primary Containment and Drywell Isolation Instrumentation</u>

SR 3.3.6.1.8 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.6.1.5 for the following functions)
- Function 1.a, 2.j, 5.d: Reactor Vessel Water Level–Low Low Low, Level 1
- Function 2.a 2.e, 3.h, 4.f: Reactor Vessel Water Level–Low Low, Level 2
- Function 4.a: Reactor Water Cleanup (RWCU) System Differential Flow-High

<u>3.3.6.2 Secondary Containment Isolation Instrumentation</u>

SR 3.3.6.2.6 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.6.2.4 for the following function)
- Function 1: Reactor Vessel Water Level-Low Low, Level 2

<u>3.3.6.3 Residual Heat Removal (RHR) Containment Spray System Instrumentation</u>

SR 3.3.6.3.6 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.6.3.4 for the following function)
- Function 3: Reactor Vessel Water Level–Low Low Low, Level 1

3.3.6.4 Suppression Pool Makeup (SPMU) System Instrumentation

SR 3.3.6.4.8 Perform CHANNEL CALIBRATION.
(which replaces SR 3.3.6.4.6 for the following function)
- Function 2: Reactor Vessel Water Level–Low Low Low, Level 1

2.2 Administrative Changes

Also included in this application are two administrative changes. The first change removes Table 3.0.2-1 and reference to it from SR 3.0.2. This Table reflects a previously issued one-time surveillance interval extension that expired on November 30, 2000. The second change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply.

3.0 BACKGROUND

3.1 Generic Letter 91-04 Changes

In NRC GL 91-04 (Reference 1), the NRC provided generic guidance for evaluating a 24-month surveillance test interval for TS SRs that are currently performed at 18-month intervals. Section 4.0 that follows defines each step outlined by the NRC in Reference 1 and provides a description of the methodology used by CPS to complete the evaluation for each specific TS SR being extended from 18 months to a 24 month frequency. The methodology utilized in the CPS drift analysis is the same Exelon Generation Company, LLC (EGC), standard (provided in Attachment 6) used to justify calibration interval extensions for a 24-month fuel cycle for the LaSalle County Station, which was found acceptable by the NRC in Reference 7.

The proposed TS changes based on Reference 1 have been divided into two categories. The categories are: (1) changes to surveillances other than channel calibrations, identified as "**Non-Calibration Changes**"; and (2) changes involving the channel calibration frequency identified as "**Channel Calibration Changes.**"

For each component having a surveillance interval extended, historical surveillance test data and associated maintenance records were reviewed in evaluating the effect on safety. In addition, the licensing basis was reviewed for functions associated with each revision to ensure it was not invalidated. Based on the results of these reviews, it is concluded that there is no adverse effect on plant safety due to increasing the surveillance test intervals from 18 to 24 months with the continued application of SR 3.0.2, which allows a 25% extension (i.e., grace period up to 30 months) to SR frequencies.

Additionally, to support some of the above channel calibration changes to a 24-month frequency, setpoint analysis revisions are required that result in changes to selected TS allowable values. For TS Table 3.3.6.1-1, Function 5.e, Reactor Vessel Pressure-High, a change to the associated analytical limit is required to support the corresponding allowable value change. For all other allowable value changes, a change to the safety analysis (analytical limit or other design basis assumption) is not required to support the change. These are discussed in detail with the associated channel calibration surveillance in Attachment 5, Section B, "Channel Calibration Changes."

Other CPS setpoint calculations, and affected calibration and functional test procedures, have been revised, or will be revised prior to implementation to reflect the new 30-month drift values. The revised setpoint calculations were developed in accordance with the CPS commitment to the guidance provided in Regulatory Guide 1.105, "Instrument Setpoints" (Reference 10) as implemented by the CPS setpoint methodology (Reference 11) and the Instrument Society of America (ISA) Standard 67.04 (Reference 12). These calculations determined the instrument uncertainties, setpoint, and allowable value for the affected function. The allowable values were determined in a manner suitable to establish limits for their application. As such, the revised allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. In performing the revised setpoint calculations to support any revised allowable values described above, the use of ISA RP67.04, Part II (Reference 12), "Method 3" was not utilized.

3.2 Administrative Changes

An administrative change to remove TS Table 3.0.2-1 and the reference to it in SR 3.0.2, is also provided. This Table reflects a previously issued one-time surveillance interval extension that expired on November 30, 2000. This one-time extension was approved in References 3 and 4. A second administrative change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply. This one time exception was approved in CPS License Amendment 122 (Reference 5).

4.0 TECHNICAL ANALYSIS

4.1 Generic Letter 91-04 Changes

The proposed TS surveillance frequency changes from 18 months to 24 months have been divided into two categories as generally outlined in Reference 1. The categories are: (1) changes to surveillances other than channel calibrations, identified as "**Non-Calibration Changes**"; and (2) changes involving the channel calibration frequency identified as "**Channel Calibration Changes.**"

4.1.A Non-Calibration Changes

Reference 1 identifies three steps to evaluate non-calibration changes:

<u>STEP 1</u>: Licensees should evaluate the effect on safety of the change in surveillance intervals to accommodate a 24 month fuel cycle. This evaluation should support a conclusion that the effect on safety is small.

EVALUATION

Each non-calibration SR frequency being changed has been evaluated with respect to the effect on plant safety. The methodology utilized to justify the conclusion that extending the testing interval has a minimal effect on safety was based on the fact that the function/feature is:

(1) Tested on a more frequent basis during the operating cycle by other plant programs;
(2) Designed to have redundant counterparts or be single failure proof; or
(3) Highly reliable.

A summary of the evaluation of the effect on safety for each non-calibration SR frequency being changed is presented in Attachment 5.

STEP 2: Licensees should confirm that historical maintenance and surveillance data do not invalidate this conclusion.

EVALUATION

The surveillance test history of the affected SRs has been evaluated. This evaluation consisted of a review of available surveillance test results and associated maintenance records for at least the five cycles of operation prior to and including the Spring 2002 refueling outage. With the extension of the testing frequency to 24 months, there will be a longer period between each surveillance performance. If a failure that results in the loss of the associated safety function should occur during the operating cycle that would only be detected by the performance of the 18-month TS SR, then the increase in the surveillance testing interval might result in a decrease in the associated function's availability. In addition to evaluating these surveillance failures, potential common failures of similar components tested by different surveillances were also evaluated. This additional evaluation determined whether there is evidence of repetitive failures among similar plant components.

The surveillance failures that are detailed in Attachment 5 exclude failures that:
(a) Did not impact a TS safety function or TS operability;
(b) Are detectable by required testing performed more frequently than the 18 month surveillance being extended; or
(c) Where the cause can be attributed to an associated event such as a preventative maintenance task, human error, previous modification, or previously existing design deficiency, or that were subsequently re-performed successfully with no intervening corrective maintenance (e.g., plant conditions or malfunctioning measurement and test equipment (M&TE) may have caused aborting the test performance).

These categories of failures are not related to potential unavailability due to testing interval extension, and are therefore not listed or further evaluated in this submittal.

This review of surveillance test history validated the conclusion that the impact, if any, on system availability will be minimal as a result of the change to a 24-month testing frequency. Specific SR test failures, and justification for this conclusion, are discussed in Attachment 5.

STEP 3: Licensees should confirm that the performance of surveillances at the bounding surveillance interval limit provided to accommodate a 24-month fuel cycle would not invalidate any assumption in the plant licensing basis.

EVALUATION

As part of the evaluation of each affected SR, the impact of the changes against the assumptions in the CPS licensing basis was reviewed. In general, testing interval changes have no impact on the plant licensing basis. In some cases, the change to a 24-month fuel cycle may require a change to licensing basis information as described in the Updated Safety Analysis Report (USAR). However, since no changes requiring NRC review and approval have been identified, the USAR changes associated with fuel cycle extension to 24 months will be drafted in accordance with CPS procedures that implement 10 CFR 50.59, "Changes, tests and experiments," and will be submitted in accordance with 10 CFR 50.71, "Maintenance of records, making of reports," paragraph (e).

The performance of surveillances extended for a 24 month fuel cycle will be trended as a part of the Maintenance Rule Program. Any degradation in performance will be evaluated to verify that the degradation is not due to the extension of surveillance or maintenance activities.

4.1.B Channel Calibration Changes

Reference 1 identifies seven steps for the evaluation of instrumentation calibration changes.

STEP 1: Confirm that instrument drift as determined by as-found and as-left calibration data from surveillance and maintenance records has not, except on rare occasions, exceeded acceptable limits for a calibration interval.

EVALUATION

The effect of longer calibration intervals on the TS instrumentation was evaluated by performing a review of the surveillance test history for the affected instrumentation including, where appropriate, an instrument drift study. In performing the historical evaluation, an effort was made to retrieve recorded channel calibration data for associated instruments for at least five operating cycles prior to and including the Spring 2002 refueling outage. By obtaining this past recorded calibration data, an acceptable basis for drawing conclusions about the expectation of satisfactory performance can be made.

The failure history evaluation and drift study demonstrates that, except on rare occasions, instrument drift has not exceeded the current acceptable limits. Specific SR test failures and the specific evaluation basis supporting this conclusion are discussed in Attachment 5.

STEP 2: Confirm that the values of drift for each instrument type (make, model, and range) and application have been determined with a high probability and a high degree of confidence. Provide a summary of the methodology and assumptions used to determine the rate of instrument drift with time based upon historical plant calibration data.

EVALUATION

The effect of longer calibration intervals on the TS instrumentation was evaluated by performing an instrument drift study. In performing the drift study, an effort was made to retrieve recorded channel calibration data for associated instruments for at least five operating cycles prior to and including the Spring 2002 refueling outage. By obtaining this past recorded calibration data, a true representation of instrument drift was determined (except in cases where all collected data still resulted in insufficient data for valid statistical analysis).

The methodology used to perform the drift analysis is consistent with the methodology utilized by other Exelon sites, specifically the LaSalle County Station 24-month submittal as approved by the NRC in Reference 7. This previously reviewed methodology (i.e., Appendix J of NES-EIC-20.04, Revision 3, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy") is the basis for the CPS 24-Month Project, and is provided in Attachment 6. The methodology is also based on Electric Power Research Institute (EPRI) TR-103335, "Statistical Analysis of Instrument Calibration Data" (Reference 13).

For a typical transmitter/analog trip module instrument loop, the LaSalle drift evaluation (as well as other 24-month submittals reviewed by CPS) methodology was applied to transmitter calibration data only (i.e., other portions of the loop are typically calibrated more frequently and the extension from 18 months to 24 months generally evaluated only the transmitter drift). However, CPS calibration procedures typically do not require transmitter-only as-found readings at each 18-month calibration; rather CPS performs an entire loop as-found and performs calibrations of loop components as deemed necessary if the loop as-found is not within tolerance. As such, CPS drift analysis methodology conservatively applies as-found / as-left (AFAL) readings from the entire loop utilizing the same methodology that would be applied to transmitter-only data.

Data Collection and Conditioning

The CPS methodology utilizes the AFAL analysis methodology to statistically determine drift for current calibration intervals. The AFAL methodology utilizes historical data obtained from surveillance tests. The raw calibration data is conditioned prior to use for the drift calculation. The conditioning consists of eliminating tests or individual data points that do not reflect actual drift. The removed data is limited to data associated or affected by instrument failures, procedural problems, M&TE problems, or human performance problems that affect the calibration data. If adjustments or elimination of data points were made during the conditioning process, these changes were limited to one of the following seven categories:

1) Data Transcription Errors. The review identified typographical data entry error. The data point was adjusted to correct the error.

2) Technician Data Entry Error. The review identified an obvious transposition error by the technician entering data. The data point was eliminated based on the data entry error.

3) Equipment Replacement. The review identified that a new instrument was installed or modified. The data point "as-found" data was zeroed because this data would not be reflective of drift. Any repetitive instrument failures would be identified in the surveillance test history review. When the new instrument reflected a new design, such that prior drift performance was not comparable, all prior data was excluded.

4) Chronic Equipment Failure. The review of the data indicated repetitive bad data points for a single instrument with excessive changes in the input/output relationship, while all other instruments in the same application did not exhibit the same characteristics. This instrument's data was eliminated based on a unique instrument problem, in conjunction with appropriate corrective action (e.g., replacement of the instrument). Any repetitive instrument failures would be identified in the Surveillance Test History review. The CPS trending program will identify such future conditions and require appropriate cause evaluation and replacement.

5) Scaling or Setpoint Changes. Changes in instrument scaling or setpoints can appear in the data set as a larger-than-actual drift point unless the change is detected during the data entry process. These changes were only eliminated where insufficient as-found or as-left data was available (e.g., the as-found test was performed using the new scale or setpoint). Where there was not clear annotation of the change, the data was maintained in the data set.

6) Measurement and Test Equipment Out of Calibration. The review indicated that the instrument was calibrated with out of calibration M&TE. The data point was eliminated based on the fact that the recorded change could not be correlated to the performance of the instrument.

7) Poor Calibration Techniques. The review identified that poor calibration techniques were used. The data point was eliminated based on the fact that the recorded change could not be correlated to the performance of the instrument.

Eliminated or adjusted data points were individually evaluated and independently verified to meet these categories.

Additionally, in certain instances to obtain data reflecting longer calibration intervals combining intervals between which the instrument was not reset or adjusted was also utilized (i.e., utilizing the as-left data from one calibration and the as-found from a future calibration where intervening calibrations made no adjustments). This also had the effect of reducing the number of calibration points and therefore was selectively applied.

Development of Simple Statistics

Microsoft Excel spreadsheets are used to calculate the basic statistics surrounding the drift data (e.g., standard deviations, means, minimums, maximums, variances, and kurtosis), and the general results of the regression analyses. These results are then used for additional analysis. Since it was desired to maintain consistency between CPS and the EGC Stations in the approach and methods used in performing these drift analyses, CPS utilized the same basic Instrumentation Drift Analysis Spreadsheet that was developed and used for the LaSalle County Station instrument drift analyses, which formed the basis for the NRC issued license amendment (Reference 7).

Outlier and Pooling Verification Requirements

While the methodology outlined in Attachment 6 allows using the Critical-T test to remove up to 5% of the population as outliers, CPS has limited outlier removal to no more than one (1) data point within the data set being evaluated. Data that is eliminated based on one of the above seven exclusion criteria before statistical analysis is not counted against this percentage or as a part of the initial data set. Many groups did not contain any outliers, and when Critical-T tests produced more than one outlier in a data set, only the single worst outlier was removed.

When AFAL data from different instrument model numbers was combined into a single group, a pooling analysis was performed to demonstrate that the AFAL data collected for the different instrument model numbers is statistically similar. If the pooling analysis resulted in reasonably close statistics, the difference in model numbers did not show significant difference in data, thereby permitting the two data sets to be pooled together.

Initial Analysis Process

For drift analyses of channels with five (5) calibration points along the instrument span (typical for most CPS calibrations), each of the five calibration points was independently analyzed. After removal of any outliers, the calibration point with the largest mean and standard deviation became the data set used for the remainder of the analysis. In rare cases (e.g., Drift Group 38 - refer to Attachment 7 for identification), the second worst case calibration point was selected since it was determined to more accurately reflect the instrument behavior (i.e., the worst case calibration point contained too few points for valid analysis). Multiple calibration points from the same loop were not combined in the analysis. These worst case values are assumed to apply across the calibrated span of the instruments for the purposes of uncertainty consideration. For certain loops (e.g., area temperature monitors), calibration data appropriate for analysis is collected only at a single trip point. For these loops, the calibration data from the single calibration point was utilized as the data set for analysis.

For statistical analysis to be applied to the actual AFAL data, a minimum of 30 calibration points was required to ensure meaningful results. In several groups, insufficient data was available to meet this criterion. Due to the requirements for pooling similar loops, the relatively small number of calibration intervals that CPS has experienced (having had fewer operating cycles than other facilities applying for 24-month extensions), and due to a number of equipment upgrades within the last 5 cycles of operation that further limit applicable data, several instrument loops did not meet the minimum 30 calibration point criterion. For these groups, statistical analysis of the AFAL data (when performed) did not form the basis for the setpoint calculation drift term. Furthermore, due to the differences in calibration techniques utilized at CPS, and the difficulty in correlating similar loops at other facilities, the attempts to apply data from other sites to increase the sample population to greater than 30 points did not yield applicable data. For the instances where statistical analyses could not be performed, CPS setpoint methodology assumptions for drift values are utilized to support 30 month (i.e., 24 months plus 25% scheduling allowance of TS SR 3.0.2) calibration intervals. The ongoing trend program that is discussed in more detail later will monitor future AFAL results and validate this assumption or cause re-analysis when sufficient data points are available. The calibration surveillances utilizing these assumptions for drift values are discussed in detail for the applicable surveillance in Attachment 5.

Normality

In order to characterize the drift uncertainty, normality and time dependency are analyzed through a series of steps. The drift data is checked through standard statistical means for determination of the normality of the data set. The Chi-Square Goodness of Fit test or either the W or D Prime test is used, depending on sample size. If these approaches do not confirm that the data is normally distributed, then visual examinations are used with a normality plot and coverage analysis to determine if a normal distribution is conservative with respect to the data. The coverage analysis consists of a histogram and a bin-by-bin comparison of actual data to expectations for a normal distribution. In all cases, the CPS data was determined to be normally distributed or conservatively treated as normal.

Time Dependency

The conclusion of the Time Dependency evaluation is determined by the collective evaluation of the results of the Scatter Plot, Binning Analysis, Drift Regression, and Absolute Value of the Drift Regression analyses as generally presented in Attachment 6, Section 2.5.

In order to determine time dependency of the drift data, the data is first plotted as a scatter plot. By visual examination, it can be seen if the drift data seem to increase or decrease over time. Typically, no conclusions can be made from the scatter plot alone.

To further the time dependency analysis, a Binning Analysis is performed as described in Attachment 6, Section 2.5.2.1. The Binning Analysis develops a plot of the mean and standard deviations of the drift data versus the average time interval between calibrations for the subject bins. It also provides all of the binning parameters and statistics that are a part of the Binning Analysis. By visual examination of the plot, it can be seen if the mean of the drift data and the standard deviation seem to increase or decrease over time.

If the Binning Analysis resulted in more than one valid bin, for data within those bins drift regression analyses are performed on raw AFAL data (for time dependency information regarding the mean or bias portion of the drift) and on the absolute value of the AFAL data (to provide time dependency information regarding the random or standard deviation portion of the drift). By visual examination of the plots, it can be seen if either portion of the drift data seems to increase or decrease over time. If the regression analysis output shows an R-squared value greater than 0.3, then that component of the drift should be considered to be linearly time dependent over the range of the calibration intervals included in the analysis. If the regression analysis output shows an R-squared value less than 0.3, but greater than 0.1, then that component of the drift could be linearly time dependent over the range of the calibration intervals included in the analysis. If the regression analysis output shows an R-squared value less than 0.1, then that component of the drift should be considered to be linearly time independent over the range of the calibration intervals included in the analysis.

Tolerance Interval and Drift Characterization

If the results of the Binning Analysis identifies only 1 valid bin, then the bias and random portion of the drift is considered to be normally distributed and <u>time-independent</u>. The bias component of the drift value is determined directly from the mean of the valid bin and must be considered if it exceeds 0.1% full-scale (FS) as determined by the mean of the most populated bin. The random component of the drift value is derived from the standard deviation of the most populated bin and is conservatively multiplied by a tolerance interval factor (k) to obtain a confidence level of 99/95.

If the results of the Binning Analysis identifies more than one valid bin, and if the result of the drift analysis conservatively treats the bias and random portion of the drift as normally distributed and <u>time-independent</u>, the bias and random drift values are determined from the mean and standard deviation of the entire data set chosen. The bias component of the drift value is determined directly from the mean of the final data set and must be considered if it exceeds 0.1% FS. In order to determine the random value of the drift, the standard deviation for the final data set is conservatively multiplied by a tolerance interval factor (k) to obtain the desired confidence level of 95/95.

In order to compute the time-dependent drift bias value, the regression analysis is used to most accurately represent the totality of the data from the significantly populated bins. The mean (i.e., bias portion) of the drift data is determined by application of the slope and intercept of the regression analysis to an extrapolation period of 915 days. The drift values for the time-dependent random portion of the drift term are derived from the adjusted standard deviation values of the drift within the bins defined for the binning analysis through application of the slope and intercept of the regression analysis to an extrapolation period of 915 days. The extrapolated standard deviation is multiplied by a tolerance interval factor (k) to obtain the desired confidence level of 95/95.

For instruments that were recently installed or where the statistical drift methodology could not be applied (e.g., fewer than 30 calibration points available), a different methodology was utilized to demonstrate that the assumed drift was acceptable. For each instrument where the drift methodology was not utilized to evaluate the drift data, a summary of the drift determination methodology is presented in Attachment 5.

Additional Considerations

The NRC Status Report on the Staff review of EPRI Technical Report (TR)-103335 (Reference 14) was evaluated to determine if additional information and analyses were warranted. A summary of CPS positions relative to the Staff review comments is included as Attachment 8.

STEP 3: Confirm that the magnitude of instrument drift has been determined with a high probability and a high degree of confidence for a bounding calibration interval of 30 months for each instrument type (make, model number, and range) and application that performs a safety function. Provide a list of the channels by TS section that identifies these instrument applications.

EVALUATION

In accordance with the methodology described in the previous section, the magnitude of instrument drift has been determined with a high degree of confidence and a high degree of probability (at least 95/95) for a bounding calibration interval of 30 months for each instrument make, model, and range. For instruments not in service long enough to establish a projected drift value or where an insufficient number of calibrations have been performed to utilize the statistical methods (i.e., fewer than 30 calibrations for any given group of instruments), the SR frequency is proposed to be extended to a 24-month interval based on other, more frequent testing or justification obtained from analysis as presented in Attachment 5. The list of affected channels by TS section, including make and model, is provided in Attachment 7.

STEP 4: Confirm that a comparison of the projected instrument drift errors has been made with the values of drift used in the setpoint analysis. If this results in revised setpoints to accommodate larger drift errors, provide proposed TS changes to update trip setpoints. If the drift errors result in revised safety analysis to support existing setpoints, provide a summary of the updated analysis conclusions to confirm that safety limits and safety analysis assumptions are not exceeded.

EVALUATION

The projected drift values were compared to the design allowances as calculated in the associated instrument setpoint analyses. If the projected drift for an instrument fell outside the existing setpoint calculation design allowances, then the analysis of the setpoint, allowable value, and/or analytical limit was reviewed. Setpoint calculations were revised, or will be revised prior to implementation, as necessary, to accommodate appropriate drift values. When the 30-month projected drift value for an instrument could be accommodated within the existing or revised setpoint analysis, the SR frequency was changed to "24 months" with no change to the TS allowable value or licensing basis analytical limit.

However, to support some of the channel calibration changes to a 24-month frequency, setpoint analysis revisions required changes to selected TS allowable values. For TS Table 3.3.6.1-1, Function 5.e, Reactor Vessel Pressure-High, a change to the associated analytical limit is also required to support the corresponding allowable value change. For all other allowable value changes, a change to the safety analysis (analytical limit or other design basis assumption) is not required to support the change. These are discussed in detail with the associated channel calibration surveillance in the "Channel Calibration Change" Section of Attachment 5.

As necessary, CPS setpoint calculations, and affected calibration and functional test procedures, have been revised, or will be revised prior to implementation, to reflect the new 30-month drift values. The revised setpoint calculations were developed in accordance with CPS commitment to the guidance provided in RG 1.105 (Reference 10) as implemented by the CPS setpoint methodology (Reference 11) and the ISA Standard 67.04, 1994 (Reference 12). These calculations determined the instrument loop uncertainty, setpoint, and allowable value for the affected function. The allowable values were determined in a manner suitable to establish limits for their application. As such, the revised allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. In performing the revised setpoint calculations to support any revised allowable values, the use of ISA RP67.04 (Reference 12), Part II, "Method 3" was not utilized.

STEP 5: Confirm that the projected instrument errors caused by drift are acceptable for control of plant parameters to effect a safe shutdown with the associated instrumentation.

EVALUATION

As discussed in the previous sections, the calculated drift values have been compared to drift allowances in the CPS design basis. For instrument loops that provide process variable indication only, an evaluation was performed as discussed in Attachment 5 to verify that the instruments can still be effectively utilized to perform a plant safe shutdown. In no case was a change to the safe shutdown analysis required to support any change to a 24-month frequency.

STEP 6: Confirm that all conditions and assumptions of the setpoint and safety analyses have been checked and are appropriately reflected in the acceptance criteria of plant surveillance procedures for Channel Checks, Channel Functional Tests, and Channel Calibrations.

EVALUATION

Applicable surveillance test procedures are being reviewed and acceptance criteria updated to incorporate the necessary changes resulting from any revision to setpoint calculations. Any necessary changes resulting from the reviews will be incorporated into the instrument surveillance procedures prior to the implementation of the 24 month surveillance test frequency. Existing plant processes ensure that all conditions and assumptions of the setpoint and safety analyses have been checked and are appropriately reflected in the acceptance criteria of plant surveillance procedures for Channel Checks, Channel Functional Tests, and Channel Calibrations.

STEP 7: Provide a summary description of the program for monitoring and assessing the effects of increased calibration surveillance intervals on instrument drift and its effect on safety.

EVALUATION

Instruments with TS calibration surveillance frequencies extended to 24 months will be monitored and trended. As-found and as-left calibration data will be recorded for each 24 month calibration activity. This will identify occurrences of instruments found outside of their allowable value and instruments whose performance is not as assumed in the drift or setpoint analysis. When as-found conditions are outside the allowable value, an evaluation will be performed in accordance with the CPS corrective action program to determine if the assumptions made to extend the calibration frequency are still valid and to evaluate the effect on plant safety.

In addition, the trending program will address calibration as-found data found to be outside of the "as-found tolerance" (AFT). This AFT is based on the expected 30-month drift for the instruments. The trending program will require that any time a calibration as-found value is found outside the AFT, the occurrence will be entered into the CPS corrective action program and the instrument performance evaluated to assure that it is still enveloped by the assumptions in the drift or setpoint analysis. This will allow the trending program to evaluate AFAL values to verify that the performance of the instruments is within expected boundaries and that adverse trends are detected and evaluated. This evaluation will be conducted for three (3) 24-month calibration intervals to ensure the assumptions in the setpoint calculations continue to be valid. If this evaluation indicates that instrument performance is not consistent with assumptions, corrective actions will be taken in accordance with station corrective action program requirements.

Renumbered 18-Month Surveillance Requirements

For channel calibration requirements remaining at 18-month frequency, the applicable surveillance is administratively renumbered by adding a new 18-month surveillance requirement. This editorial presentation preference replaces the current 18-month channel calibration surveillance requirement, allowing the surveillances extended to 24-months to retain current SR numbering.

4.2 Administrative Changes

CPS TS Table 3.0.2-1, "Surveillance Intervals Extended to November 30, 2000," presents a list of individual SRs that had been granted a one-time extension for completing the next required performance. This one-time extension was approved in CPS Amendment Nos. 125 and 129 (dated March 17, 2000 and June 12, 2000, respectively). The extension expired on November 30, 2000. As such, the Table no longer reflects an active requirement. A second administrative change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply. This one time exception was approved in CPS License Amendment 122 (Reference 5). Deletion of these expired allowances is considered an administrative change with no impact on public health and safety.

5.0 REGULATORY ANALYSIS

5.1 NO SIGNIFICANT HAZARDS CONSIDERATION

AmerGen Energy Company (AmerGen), LLC has evaluated whether or not a significant hazards consideration is involved with the proposed amendment to Facility Operating License No. NPF-62 for Clinton Power Station (CPS), Unit 1 by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," discussed below.

The requested change would affect certain Technical Specification (TS) Surveillance Requirement (SR) frequencies that are specified as "18 months" by revising them to "24 months" in accordance with the guidance of Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24 Month Fuel Cycle," dated April 2, 1991. Also consistent with this guidance, a change is proposed to Administrative Controls Section 5.5.7, "Ventilation Filter Testing Program (VFTP)," to address changes to 18 month frequencies that are specified in Regulatory Guide (RG) 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," Revision 2. In order to support some changes to the 18-month frequencies, setpoint analysis revisions result in changes to selected allowable values. For TS Table 3.3.6.1-1, Function 5.e, Reactor Vessel Pressure-High, a change to the associated analytical limit is required to support the corresponding allowable value change. For all other allowable value changes, a change to the safety analysis (analytical limit or other design basis assumption) is not required to support the change.

For instrument functions with channel calibration requirements remaining at 18 months that also have functions within the same instrument Table being extended to 24 months, a new 18-month channel calibration surveillance replaces the existing SR for the 18 month channel calibration (which was revised to accommodate the 24-month frequency). This reflects only an administrative renumbering of the 18 month SR.

An administrative change to remove TS Table 3.0.2-1, "Surveillance Intervals Extended to November 30, 2000," and the reference to it in SR 3.0.2, is also provided. This Table reflects a previously issued one-time surveillance interval extension that expired on November 30, 2000. A second administrative change removes footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. This modification has been completed and the temporary allowable values no longer apply.

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed TS changes involve a change in the surveillance testing intervals and allowable values to facilitate a change in the operating cycle length. The analytical limit increase for the Reactor Vessel Pressure-High function remains conservative with respect to considerations for isolating the Residual Heat Removal-Shut Down Cooling (RHR-SDC) system in the event of a line break and for providing overpressure protection to the low pressure RHR-SDC system piping. Also included in this application are administrative changes to remove Table 3.0.2-1 and the reference to it in SR 3.0.2 (since this implements an expired one-time TS exception), to renumber certain SRs remaining at 18 month frequencies, and to remove footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. The proposed TS changes do not physically impact the plant. The proposed TS changes do not degrade the performance of, or increase the challenges to, any safety systems assumed to function in the accident analysis. The proposed TS changes do not impact the usefulness of the SRs in evaluating the operability of required systems and components, or the way in which the surveillances are performed. In addition, the frequency of surveillance testing is not considered an initiator of any analyzed accident, nor does a revision to the frequency introduce any accident initiators. The specific value of the allowable value is not considered an initiator of any analyzed accident. Therefore, the proposed change does not involve a significant increase in the probability of an accident previously evaluated.

The consequences of a previously evaluated accident are not significantly increased. The proposed change does not affect the performance of any equipment credited to mitigate the radiological consequences of an accident. Evaluation of the proposed TS changes demonstrated that the availability of credited equipment is not significantly affected because of other more frequent testing that is performed, the availability of redundant systems and equipment, and the high reliability of the equipment. Historical review of surveillance test results and associated maintenance records did not find evidence of failures that would invalidate the above conclusions.

The allowable values have been developed in accordance with RG 1.105, "Instrument Setpoints," to ensure that the design and safety analysis limits are satisfied. The methodology used for the development of the allowable values ensures the affected instrumentation remains capable of mitigating design basis events as described in the safety analyses and that the results and radiological consequences described in the safety analyses remain bounding. Therefore, the proposed change does not alter the ability to detect and mitigate events and, as such, does not involve a significant increase in the consequences of an accident previously evaluated.

2. **Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No.

The proposed TS changes involve a change in the surveillance testing intervals and allowable values to facilitate a change in the operating cycle length. The analytical limit increase for the Reactor Vessel Pressure-High function remains conservative with respect to considerations for isolating the RHR-SDC system in the event of a line break and for providing overpressure protection to the low pressure RHR-SDC system piping. Also included in this application are administrative changes to remove Table 3.0.2-1 and the reference to it in SR 3.0.2 since this implements an expired one-time exception, to renumber certain SRs remaining at 18 month frequencies, and to remove footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. The proposed TS changes do not introduce any failure mechanisms of a different type than those previously evaluated, since there are no physical changes being made to the facility. No new or different equipment is being installed. No installed equipment is being operated in a different manner. As a result, no new failure modes are being introduced. The way surveillance tests are performed remains unchanged. A historical review of surveillance test results and associated maintenance records indicated there was no evidence of any failures that would invalidate the above conclusions.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed amendment involve a significant reduction in a margin of safety?**

Response: No.

The proposed TS changes involve a change in the surveillance testing intervals and allowable values to facilitate a change in the operating cycle length. The analytical limit increase for the Reactor Vessel Pressure-High function remains conservative with respect to considerations for isolating the RHR-SDC system in the event of a line break and for providing overpressure protection to the low pressure RHR-SDC system piping. Also included in this application are administrative changes to remove Table 3.0.2-1 and the reference to it in SR 3.0.2 since this implements an expired one-time exception, to renumber certain SRs remaining at 18 month frequencies, and to remove footnotes (a) and (b) from Table 3.3.8.1-1 that applied temporary allowable values until completion of modification to tap settings and degraded voltage setpoints. The impact of these changes on system availability is not significant, based on other more frequent testing that is performed, the existence of redundant systems and equipment, and overall system reliability. Evaluations have shown there is no evidence of time dependent failures that would impact the availability of the systems. The proposed changes do not significantly impact the condition or performance of structures, systems, and components relied upon for accident mitigation. The proposed changes in TS instrumentation allowable values are the result of application of the CPS setpoint methodology using plant specific drift values. The revised allowable values more accurately reflect total instrumentation loop accuracy including drift while continuing to protect any assumed analytical limit. The proposed changes do not result in any hardware changes or in any changes to the analytical limits assumed in accident analyses. Existing operating margin between plant conditions and actual plant setpoints is not significantly reduced due to these changes. The proposed changes do not significantly impact any safety analysis assumptions or results.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, AmerGen concludes that the proposed amendment present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

5.2 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

Regulatory requirement 10 CFR 50.36, "Technical specifications," provides the content required in a licensee's TS. Specifically, 10 CFR 50.36(c)(3) requires that the TS include surveillance requirements. The proposed SR frequency changes continue to support the requirements of 10 CFR 50.36(c)(3) to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation are met.

NRC GL 91-04 provides generic guidance for evaluating a 24 month surveillance test interval for TS SRs. This request for license amendment provides the CPS specific evaluation of each step outlined by the NRC in GL 91-04 and provides a description of the methodology used by CPS to complete the evaluation for each specific TS SR being revised.

The proposed allowable value changes have been evaluated to determine whether applicable regulations and requirements continue to be met. New allowable values have been calculated in accordance with the guidance provided in RG 1.105, "Instrument Setpoints," as implemented by the CPS setpoint methodology, and the Instrument Society of America (ISA) Standard 67.04, 1994. These calculations determine the instrument uncertainties, setpoints, and allowable values for the affected functions. The allowable values have been determined in a manner suitable to establish limits for their application. As such, the revised allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. In performing the revised setpoint calculations to support any revised allowable values described above, ISA RP67.04, Part II, "Method 3" was not utilized. AmerGen has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TS, and do not affect conformance with any General Design Criteria differently than described in the CPS USAR.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

(1) NRC Generic Letter 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991

(2) Regulatory Guide 1.52, "Design, Inspection, and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup Systems in Light-Water-Cooled Nuclear Power Plants," Revision 2, dated March 1978

(3) Letter from U.S. NRC to Mike Reandeau (AmerGen Energy Company, LLC), Amendment No. 125, Clinton Power Station, dated March 17, 2000

(4) Letter from U.S. NRC to Mike Reandeau (AmerGen Energy Company, LLC), Amendment No. 129, Clinton Power Station, dated June 12, 2000

(5) Letter from U.S. NRC to Joseph Sipek (Illinois Power Company), Amendment No. 122, Clinton Power Station, dated March 26, 1999

(6) Letter from Keith R. Jury (AmerGen Energy Company, LLC) to USNRC, "Request for License Amendment Related to Revision of Instrument Channel Trip Setpoint Allowable Values," dated November 11, 2003

(7) Letter from U.S. NRC to Oliver D. Kingsley (Exelon Generation Company, LLC), Amendment Nos. 147 and 133 for LaSalle County Station Units 1 and 2, dated March 30, 2001

(8) Letter from U.S. NRC to J.K. Wood (FirstEnergy Nuclear Operating Company), Amendment No. 115 for Perry Nuclear Power Plant, Unit 1, dated August 29, 2000

(9) Letter from U.S. NRC to H.L. Sumner, Jr. (Southern Nuclear Operating Company), Amendment Nos. 232 and 174 for Edwin I. Hatch Nuclear Plant, Units 1 and 2, dated July 12, 2002

(10) Regulatory Guide 1.105, "Instrument Setpoints," Revision 1, dated November 1976

(11) CI-01.00, "Instrument Setpoint Calculation Methodology," Revision 2

(12) Instrument Society of America (ISA) S67.04, "Setpoints for Nuclear Safety-Related Instrumentation," Part I, and ISA RP67.04, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation," Part II, 1994

(13) EPRI TR-103335, "Statistical Analysis of Instrument Calibration Data," Revision 1, dated October 1998

(14) NRC Status Report on the Staff review of EPRI Technical Report (TR)-103335, Revision 0, Status Report, dated December 1, 1997

ATTACHMENT 2

MARKUP OF PROPOSED TECHNICAL SPECIFICATION PAGE CHANGES

Delete pages: 3.0-6 through 3.0-10

Revise TS Pages:

3.0-4	
3.1-22	3.1-25
3.3-5 thru 3.3-6	3.3-13
3.3-17	3.3-21
3.3-24	3.3-27
3.3-29	3.3-38 thru 3.3-43
3.3-46	3.3-47
3.3-54 thru 3.3-60	3.3-63
3.3-64	3.3-67
3.3-68	3.3-71
3.3-72	3.3-74
3.3-76	3.3-79
3.3-80	3.3-82
3.4-6	3.4-11
3.4-19	
3.5-5	3.5-9
3.5-11	3.5-12
3.6-18	3.6-19a
3.6-23	3.6-25
3.6-27	3.6-27a
3.6-35	3.6-37
3.6-39	3.6-40
3.6-42	3.6-45
3.6-50	3.6-53
3.6-65	3.6-70
3.7-2	3.7-3
3.7-7	3.7-10
3.7-13	
3.8-6	3.8-6a
3.8-7 thru 3.8-10a	3.8-11 thru 3.8-13
3.8-25	3.8-45
5.0-12	

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.1

SRs shall be met during the MODES or other specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on inoperable equipment or variables outside specified limits.

SR 3.0.2

The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. ~~(For each of the SRs listed in Table 3.0.2-1, however, the specified Frequency is met if the SR is performed prior to November 30, 2000. This extension of the test intervals for these SRs is permitted on a one-time basis, effective until November 30, 2000.)~~

For Frequencies specified as "once," the above interval extension does not apply.

If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance.

Exceptions to this Specification are stated in the individual Specifications.

SR 3.0.3

If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the Surveillance. A risk evaluation shall be performed for any Surveillance delayed greater than 24 hours and the risk impact shall be managed.

If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.

(continued)

TABLE 3.0.2-1
Surveillance Intervals Extended to November 30, 2000

TS SURVEILLANCE REQUIREMENT	DESCRIPTION OF SR REQUIREMENT
3.1.7.8	SLCS Injection Operability
3.1.8.3	Scram Discharge Volume vent and drain valve operability
3.3.1.1.12, Table 3.3.1.1-1, Item 11	RPS Reactor Mode Switch - Shutdown Position CHANNEL FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 1.a	RPS IRM Neutron Flux - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 1.b	RPS IRM Inoperative LOGIC SYSTEM FUNCTIONAL TEST.
3.3.1.1.15, Table 3.3.1.1-1, Item 2.a	RPS APRM Neutron Flux - High, Setdown LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 2.b	RPS APRM Flow Biased Simulated Thermal Power - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 2.c	RPS APRM Fixed Neutron Flux - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 2.d	RPS APRM Inoperative LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 3	RPS Reactor Vessel Steam Dome Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 4	RPS Reactor Vessel Water Level - Low, Level 3 LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 5	RPS Reactor Vessel Water Level - High, Level 8 LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 6	RPS Main Steam Isolation Valve - Closure LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 7	RPS Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 8.a	RPS Scram Discharge Volume Water Level - High, Transmitter LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 8.b	RPS Scram Discharge Volume Water Level - High, Float Switch LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 9	RPS Turbine Stop Valve Closure LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 10	RPS Turbine Control Valve Fast Closure, Trip Oil Pressure - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 11	RPS Reactor Mode Switch - Shutdown Position LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.15, Table 3.3.1.1-1, Item 12	RPS Manual Scram LOGIC SYSTEM FUNCTIONAL TEST
3.3.1.1.17, Table 3.3.1.1-1, Item 2.b	RPS APRM Flow Biased Simulated Thermal Power - High RESPONSE TIME TEST
3.3.1.1.17, Table 3.3.1.1-1, Item 2.c	RPS APRM Fixed Neutron Flux - High RESPONSE TIME TEST
3.3.3.1.3, Table 3.3.3.1-1, Item 6	PAM Drywell Area Radiation CHANNEL CALIBRATION
3.3.3.1.3, Table 3.3.3.1-1, Item 7	PAM Penetration Flow Path, Automatic PCIV Position CHANNEL CALIBRATION
3.3.3.2.2	Remote Shutdown System circuit and control switch demonstration
3.3.5.1.4, Table 3.3.5.1-1, Item 2.c	ECCS LPCI B and LPCI C Subsystems, LPCI Pump B Start - Time Delay Logic Card CHANNEL CALIBRATION
3.3.5.1.4, Table 3.3.5.1-1, Item 5.c	ADS Trip System 2, ADS Initiation Timer CHANNEL CALIBRATION
3.3.5.1.4, Table 3.3.5.1-1, Item 5.f	ADS Trip System 2, ADS Drywell Pressure Bypass Timer CHANNEL CALIBRATION

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TABLE 3.0.2-1 (Continued)
Surveillance Intervals Extended to November 30, 2000

TS SURVEILLANCE REQUIREMENT	DESCRIPTION OF SR REQUIREMENT
3.3.5.1.5, Table 3.3.5.1-1, Item 1.a	ECCS LPCI A and LPCS Subsystems, Reactor Vessel Water Level - Low Low Low, Level 1 LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 1.b	ECCS LPCI A and LPCS Subsystems, Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 1.c	ECCS LPCI A and LPCS Subsystems, LPCI Pump A Start - Time Delay Logic Card LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 1.d	ECCS LPCI A and LPCS Subsystems, Reactor Vessel Pressure - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 1.f	ECCS LPCI A and LPCS Subsystems, LPCI Pump A Discharge Flow - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 1.g	ECCS LPCI A and LPCS Subsystems, Manual Initiation LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.a	ECCS LPCI B and LPCI C Subsystems, Reactor Vessel Water Level - Low Low Low, Level 1 LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.b	ECCS LPCI B and LPCI C Subsystems, Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.c	ECCS LPCI B and LPCI C Subsystems, LPCI Pump B Start - Time Delay Logic Card LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.d	ECCS LPCI B and LPCI C Subsystems, Reactor Vessel Pressure - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.e	ECCS LPCI B and LPCI C Subsystems, LPCI Pump B and LPCI Pump C Discharge Flow - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 2.f	ECCS LPCI B and LPCI C Subsystems, Manual Initiation LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.a	ECCS HPCS, Reactor Vessel Water Level - Low Low, Level 2 LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.b	ECCS HPCS, Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.c	ECCS HPCS, Reactor Vessel Water Level - High, Level 8 LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.f	ECCS HPCS, HPCS Pump Discharge Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.g	ECCS HPCS, HPCS System Flow Rate - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 3.h	ECCS HPCS, Manual Initiation LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 4.c	ADS Trip System 1, ADS Initiation Timer LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 4.g	ADS Trip System 1, ADS Drywell Pressure Bypass Timer LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 5.c	ADS Trip System 2, ADS Initiation Timer LOGIC SYSTEM FUNCTIONAL TEST
3.3.5.1.5, Table 3.3.5.1-1, Item 5.f	ADS Trip System 2, ADS Drywell Pressure Bypass Timer LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.5, Table 3.3.6.1-1, Item 3.b	Primary Containment and Drywell Isolation, RCIC System Isolation, RCIC Steam Line Flow - High, Time Delay CHANNEL CALIBRATION
3.3.6.1.6, Table 3.3.6.1-1, Item 1.b	Primary Containment and Drywell Isolation, Main Steam Line Isolation, Main Steam Line Pressure - Low LOGIC SYSTEM FUNCTIONAL TEST

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TABLE 3.0.2-1 (Continued)
Surveillance Intervals Extended to November 30, 2000

TS SURVEILLANCE REQUIREMENT	DESCRIPTION OF SR REQUIREMENT
3.3.6.1.6, Table 3.3.6.1-1, Item 1.d	Primary Containment and Drywell Isolation, , Main Steam Line Isolation, Condenser Vacuum - Low LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.a	Primary Containment and Drywell Isolation, Reactor Vessel Water Level - Low Low, Level 2, LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.d	Primary Containment and Drywell Isolation, Drywell Pressure - High (ECCS Divisions 1 and 2) LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.e	Primary Containment and Drywell Isolation, Reactor Vessel Water Level - Low Low, Level 2 (HPCS NSPS Divisions 3 and 4) LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.f	Primary Containment and Drywell Isolation, Drywell Pressure - High (HPCS NSPS Divisions 3 and 4) LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.g	Primary Containment and Drywell Isolation, Containment Building Fuel Transfer Pool Ventilation Plenum Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.h	Primary Containment and Drywell Isolation, Containment Building Exhaust Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 2.i	Primary Containment and Drywell Isolation, Containment Building Continuous Containment Purge Exhaust Radiation - High
3.3.6.1.6, Table 3.3.6.1-1, Item 2.j	Primary Containment and Drywell Isolation, Reactor Vessel Water Level - Low Low Low, Level 1 LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 3.b	Primary Containment and Drywell Isolation, RCIC System Isolation, RCIC Steam Line Flow - High Time Delay LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 5.d	Primary Containment and Drywell Isolation, RHR System Isolation, Reactor Vessel Water Level - Low Low Low, Level 1 LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.1.6, Table 3.3.6.1-1, Item 5.f	Primary Containment and Drywell Isolation, RHR System Isolation, Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.2.5, Table 3.3.6.2-1, Item 3	Secondary Containment Isolation, Containment Building Fuel Transfer Pool Ventilation Plenum Exhaust Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.2.5, Table 3.3.6.2-1, Item 4	Secondary Containment Isolation, Containment Building Exhaust Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.2.5, Table 3.3.6.2-1, Item 5	Secondary Containment Isolation, Containment Building Continuous Containment Purge Exhaust Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.2.5, Table 3.3.6.2-1, Item 6	Secondary Containment Isolation, Fuel Building Exhaust Radiation - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.3.4, Table 3.3.6.3-1, Item 4	RHR Containment Spray System, Timers, System A and System B CHANNEL CALIBRATION
3.3.6.3.4, Table 3.3.6.3-1, Item 5	RHR Containment Spray System, Timers, System B Only CHANNEL CALIBRATION
3.3.6.3.5, Table 3.3.6.3-1, Item 1	RHR Containment Spray System, Drywell Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.3.5, Table 3.3.6.3-1, Item 2	RHR Containment Spray System, Containment Pressure - High LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.3.5, Table 3.3.6.3-1, Item 3	RHR Containment Spray System, Reactor Vessel Water Level - Low Low Low, Level 1 LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.3.5, Table 3.3.6.3-1, Item 4	RHR Containment Spray System, Timers, System A and System B LOGIC SYSTEM FUNCTIONAL TEST

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TABLE 3.0.2-1 (Continued)
Surveillance Intervals Extended to November 30, 2000

TS SURVEILLANCE REQUIREMENT	DESCRIPTION OF SR REQUIREMENT
3.3.6.3.5, Table 3.3.6.3-1, Item 5	RHR Containment Spray System, Timers, System B Only LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.3.5, Table 3.3.6.3-1, Item 6	RHR Containment Spray System, Manual Initiation LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.4.7, Table 3.3.6.4-1, Item 1	Suppression Pool Makeup System, Drywell Pressure - High, LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.4.7, Table 3.3.6.4-1, Item 2	Suppression Pool Makeup System, Reactor Vessel Water Level - Low Low Low, Level 1, LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.4.7, Table 3.3.6.4-1, Item 3	Suppression Pool Makeup System, Suppression Pool Water Level- Low Low, LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.4.7, Table 3.3.6.4-1, Item 4	Suppression Pool Makeup System, Timer, LOGIC SYSTEM FUNCTIONAL TEST
3.3.6.4.7, Table 3.3.6.4-1, Item 5	Suppression Pool Makeup System, Manual Initiation, LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.3, Table 3.3.8.1-1, Item 1.a	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - 4.16 kV basis CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 1.b	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - Time Delay CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 1.c	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Reset - 4.16 kV basis CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 1.d	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Drop-out - 4.16 kV basis CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 1.e	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage - Time Delay CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 2.a	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - 4.16 kV basis CHANNEL CALIBRATION
3.3.8.1.3, Table 3.3.8.1-1, Item 2.b	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - Time Delay CHANNEL CALIBRATION
3.3.8.1.4, Table 3.3.8.1-1, Item 1.a	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 1.b	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - Time Delay LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 1.c	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Reset - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 1.d	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Drop-out - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 1.e	Loss of Power, Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage - Time Delay LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 2.a	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 2.b	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Loss of Voltage - Time Delay LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 2.c	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Reset - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST

(continued)

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TABLE 3.0.2-1 (Continued)
Surveillance Intervals Extended to November 30, 2000

TS SURVEILLANCE REQUIREMENT	DESCRIPTION OF SR REQUIREMENT
3.3.8.1.4, Table 3.3.8.1-1, Item 2.d	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Drop-out - 4.16 kV basis LOGIC SYSTEM FUNCTIONAL TEST
3.3.8.1.4, Table 3.3.8.1-1, Item 2.e	Loss of Power, Division 3 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage - Time Delay LOGIC SYSTEM FUNCTIONAL TEST
3.5.1.5	ECCS - Operating injection/spray subsystem actuation
3.5.1.8	ECCS - Operating injection/spray subsystem RESPONSE TIME TEST
3.5.2.6	ECCS - Shutdown injection/spray subsystem actuation
3.6.1.3.7	Automatic PCIV actuation
3.6.1.3.11	Excess flow check valve/PCIV actuation
3.6.1.7.3	Automatic RHR Containment Spray valve actuation
3.6.4.2.3	Automatic SCID actuation
3.6.4.3.3	SGT subsystem actuation
3.6.5.3.5	Automatic drywell isolation valve actuation
3.7.2.2	Division 3 Shutdown Service Water subsystem actuation
3.7.3.5	Inleakage verification of the negative pressure portions of the Control Room Ventilation System
3.8.1.8	AC Sources - Alternate Offsite Circuit
3.8.1.9	AC Sources - Load Reject (single largest load)
3.8.1.10	AC Sources - Full Load Reject
3.8.1.11	AC Sources - LOP
3.8.1.12	AC Sources - Auto Start
3.8.1.13	AC Sources - Non-essential Trip Bypass
3.8.1.16	AC Sources - Manual Sync and Load Transfer
3.8.1.17	AC Sources - Test Mode Override on ECCS Initiation Signal
3.8.1.18	AC Sources - Load Sequence Time
3.8.1.19	AC Sources -LOP / ECCS Initiation Signal Auto Start
3.8.4.6	Battery Charger Functional Test
3.8.4.7	Battery Charger Capacity
3.8.11.2	Static VAR Compensator Protection System Functional Test

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SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.1.7.7	Verify each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1220 psig.	In accordance with the Inservice Testing Program
SR 3.1.7.8	Verify flow through one SLC subsystem from pump into reactor pressure vessel.	24 ~~18~~ months on a STAGGERED TEST BASIS
SR 3.1.7.9	Verify all piping between storage tank and pump suction is unblocked.	~~18~~ months 24 AND Once within 24 hours after pump suction piping temperature is restored to ≥ 70°F

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	------------------NOTE------------------ Not required to be met on vent and drain valves closed during performance of SR 3.1.8.2. --- Verify each SDV vent and drain valve is open.	31 days
SR 3.1.8.2	Cycle each SDV vent and drain valve to the fully closed and fully open position.	92 days
SR 3.1.8.3	Verify each SDV vent and drain valve: a. Closes in ≤ 30 seconds after receipt of an actual or simulated scram signal; and b. Opens when the actual or simulated scram signal is reset.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.11	------------------NOTES----------------- 1. Neutron detectors are excluded. 2. For function 2.a, not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. --- Perform CHANNEL CALIBRATION.	184 days
SR 3.3.1.1.12	Perform CHANNEL FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.1.1.13	------------------NOTES----------------- 1. Neutron detectors are excluded. 2. For IRMs, not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. --- Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.1.1.14	Verify the APRM Flow Biased Simulated Thermal Power-High time constant is within the limits specified in the COLR.	~~18~~ 24 months
SR 3.3.1.1.15	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.16	Verify Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.	~~18~~ 24 months
SR 3.3.1.1.17	-----------------NOTES----------------- 1. Neutron detectors are excluded. 2. For Functions 3, 4, and 5 in Table 3.3.1.1-1, the channel sensors are excluded. 3. The STAGGERED TEST BASIS Frequency for each Function shall be determined on a per channel basis. --------------------------------------- Verify the RPS RESPONSE TIME is within limits.	~~18~~ 24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.1.2.4	-----NOTE----- Not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant. ----- Verify count rate is ≥ 3.0 cps.	12 hours during CORE ALTERATIONS <u>AND</u> 24 hours
SR 3.3.1.2.5	-----NOTE----- Not required to be performed until 12 hours after IRMs on Range 2 or below. ----- Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.1.2.6	-----NOTES----- 1. Neutron detectors are excluded. 2. Not required to be performed until 12 hours after IRMs on Range 2 or below. ----- Perform CHANNEL CALIBRATION.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.2.1.4	-----------------NOTE------------------ Not required to be performed until 1 hour after THERMAL POWER is ≤ 16.7% RTP in MODE 1. --------------------------------------- Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.2.1.5	Calibrate the low power setpoint analog trip modules. The Allowable Value shall be > 16.7% RTP and ≤ 29.2% RTP.	92 days
SR 3.3.2.1.6	Verify the RWL high power Function is not bypassed when THERMAL POWER is > 70% RTP.	92 days
SR 3.3.2.1.7	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.2.1.8	-----------------NOTE------------------ Not required to be performed until 1 hour after reactor mode switch is in the shutdown position. --------------------------------------- Perform CHANNEL FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.2.1.9	Verify the bypassing and movement of control rods required to be bypassed in Rod Action Control System (RACS) is in conformance with applicable analyses by a second licensed operator or other qualified member of the technical staff.	Prior to and during the movement of control rods bypassed in RACS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1.1	---------------NOTE--------------- Applicable for each Function in Table 3.3.3.1-1. ---------------------------------- Perform CHANNEL CHECK.	31 days
SR 3.3.3.1.2	---------------NOTE--------------- Only applicable for Function 8 in Table 3.3.3.1-1. ---------------------------------- Perform CHANNEL CALIBRATION.	92 days
SR 3.3.3.1.3	---------------NOTE--------------- Applicable for each Function in Table 3.3.3.1-1 except Function 8. ---------------------------------- Perform CHANNEL CALIBRATION.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.3.2.2	Verify each required control circuit and transfer switch is capable of performing the intended functions.	~~18~~ 24 months
SR 3.3.3.2.3	Perform CHANNEL CALIBRATION for each required instrumentation channel.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.4.1.2	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. TSV Closure: ≤ 7% closed; and b. TCV Fast Closure, Trip Oil Pressure-Low: ≥ 465 psig.	~~18~~ 24 months
SR 3.3.4.1.3	Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.	~~18~~ 24 months
SR 3.3.4.1.4	Verify TSV Closure and TCV Fast Closure, Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.	~~18~~ 24 months
SR 3.3.4.1.5	------------------NOTE------------------ The STAGGERED TEST BASIS Frequency shall be determined on a per Function basis. -- Verify the EOC-RPT SYSTEM RESPONSE TIME is within limits.	24 ~~18~~ months on a STAGGERED TEST BASIS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Remove the associated recirculation pump from service.	6 hours
	OR	
	C.2 Be in MODE 2.	6 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.4.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.4.2.3	Calibrate the trip units.	92 days
SR 3.3.4.2.4	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. Reactor Vessel Water Level-Low Low, Level 2: ≥ -50.0 inches; and b. Reactor Steam Dome Pressure-High: ≤ 1150 psig.	~~18~~ 24 months
SR 3.3.4.2.5	Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTES-----------------------------------

1. Refer to Table 3.3.5.1-1 to determine which SRs apply for each ECCS Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 3.c, 3.f, 3.g, and 3.h; and (b) for up to 6 hours for Functions other than 3.c, 3.f, 3.g, and 3.h, provided the associated Function or the redundant Function maintains ECCS initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.1.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.1.3	Calibrate the analog trip module.	92 days
SR 3.3.5.1.4	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.5.1.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.5.1.6	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.5.1-1 (page 1 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Low Pressure Coolant Injection-A (LPCI) and Low Pressure Core Spray (LPCS) Subsystems					
a. Reactor Vessel Water Level-Low Low Low, Level 1	1,2,3, 4[(a)],5[(a)]	2[(b)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -147.7 inches
b. Drywell Pressure-High	1,2,3	2[(b)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 1.88 psig
c. LPCI Pump A Start-Time Delay Logic Card	1,2,3, 4[(a)],5[(a)]	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 4.5 seconds and ≤ 5.5 seconds
d. Reactor Vessel Pressure-Low (Injection Permissive)	1,2,3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 452 psig and ≤ 478 psig
	4[(a)],5[(a)]	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 452 psig and ≤ 478 psig
e. LPCS Pump Discharge Flow-Low (Bypass)	1,2,3, 4[(a)],5[(a)]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 750 gpm
f. LPCI Pump A Discharge Flow-Low (Bypass)	1,2,3, 4[(a)],5[(a)]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 900 gpm
g. Manual Initiation	1,2,3, 4[(a)],5[(a)]	1	C	SR 3.3.5.1.5	NA

(continued)

(a) When associated subsystem(s) are required to be OPERABLE.

(b) Also required to initiate the associated diesel generator.

Table 3.3.5.1-1 (page 2 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. LPCI B and LPCI C Subsystems					
a. Reactor Vessel Water Level-Low Low Low, Level 1	1,2,3, 4[(a)],5[(a)]	2[(b)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -147.7 inches
b. Drywell Pressure-High	1,2,3	2[(b)]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 1.88 psig
c. LPCI Pump B Start-Time Delay Logic Card	1,2,3, 4[(a)],5[(a)]	1	C	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 4.5 seconds and ≤ 5.5 seconds
d. Reactor Vessel Pressure-Low (Injection Permissive)	1,2,3	4	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 452 psig and ≤ 478 psig
	4[(a)],5[(a)]	4	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 452 psig and ≤ 478 psig
e. LPCI Pump B and LPCI Pump C Discharge Flow-Low (Bypass)	1,2,3, 4[(a)],5[(a)]	1 per pump	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 900 gpm
f. Manual Initiation	1,2,3, 4[(a)],5[(a)]	1	C	SR 3.3.5.1.5	NA

(continued)

(a) When associated subsystem(s) are required to be OPERABLE.

(b) Also required to initiate the associated diesel generator.

Table 3.3.5.1-1 (page 3 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. High Pressure Core Spray (HPCS) System					
a. Reactor Vessel Water Level-Low Low, Level 2	1,2,3, 4[a], 5[a]	4[b]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -47.7 inches
b. Drywell Pressure - High	1,2,3	4[b]	B	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 1.88 psig
c. Reactor Vessel Water Level-High, Level 8	1,2,3, 4[a], 5[a]	2	C	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≤ 54.2 inches
d. RCIC Storage Tank Level-Low	1,2,3, 4[c], 5[c]	2	D	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 2.5 inches
e. Suppression Pool Water Level-High	1,2,3	2	D	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 12 inches
f. HPCS Pump Discharge Pressure-High (Bypass)	1,2,3, 4[a], 5[a]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 120 psig
g. HPCS System Flow Rate-Low (Bypass)	1,2,3, 4[a], 5[a]	1	E	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 500 gpm
h. Manual Initiation	1,2,3, 4[a], 5[a]	1	C	SR 3.3.5.1.5	NA

(continued)

(a) When associated subsystem(s) are required to be OPERABLE.
(b) Also required to initiate the associated diesel generator.
(c) When HPCS is OPERABLE for compliance with LCO 3.5.2, "ECCS-Shutdown," and aligned to the RCIC storage tank while tank water level is not within the limits of SR 3.5.2.2.

Table 3.3.5.1-1 (page 4 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
4. Automatic Depressurization System (ADS) Trip System 1 (Logic A and E)					
a. Reactor Vessel Water Level-Low Low Low, Level 1	1,2(d),3(d)	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -147.7 inches
b. Drywell Pressure-High	1,2(d),3(d)	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 1.88 psig
c. ADS Initiation Timer	1,2(d),3(d)	1	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 117 seconds
d. Reactor Vessel Water Level-Low, Level 3 (Confirmatory)	1,2(d),3(d)	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 8.3 inches
e. LPCS Pump Discharge Pressure-High	1,2(d),3(d)	2	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 125 psig
f. LPCI Pump A Discharge Pressure-High	1,2(d),3(d)	2	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 115 psig
g. ADS Drywell Pressure Bypass Timer	1,2(d),3(d)	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 6.5 minutes
h. Manual Initiation	1,2(d),3(d)	2	G	SR 3.3.5.1.5	NA

(continued)

(d) With reactor steam dome pressure > 150 psig.

Table 3.3.5.1-1 (page 5 of 5)
Emergency Core Cooling System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. ADS Trip System 2 (Logic B and F)					
a. Reactor Vessel Water Level-Low Low Low, Level 1	1,2[(d)],3[(d)]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 ~~SR 3.3.5.1.4~~ SR 3.3.5.1.5 SR 3.3.5.1.6	≥ -147.7 inches
b. Drywell Pressure-High	1,2[(d)],3[(d)]	2	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 1.88 psig
c. ADS Initiation Timer	1,2[(d)],3[(d)]	1	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 117 seconds
d. Reactor Vessel Water Level-Low, Level 3 (Confirmatory)	1,2[(d)],3[(d)]	1	F	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 8.3 inches
e. LPCI Pumps B & C Discharge Pressure-High	1,2[(d)],3[(d)]	2 per pump	G	SR 3.3.5.1.1 SR 3.3.5.1.2 SR 3.3.5.1.3 SR 3.3.5.1.4 SR 3.3.5.1.5	≥ 115 psig
f. ADS Drywell Pressure Bypass Timer	1,2[(d)],3[(d)]	2	G	SR 3.3.5.1.2 SR 3.3.5.1.4 SR 3.3.5.1.5	≤ 6.5 minutes
g. Manual Initiation	1,2[(d)],3[(d)]	2	G	SR 3.3.5.1.5	NA

(d) With reactor steam dome pressure > 150 psig.

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.5.2-1 to determine which SRs apply for each RCIC Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed as follows: (a) for up to 6 hours for Functions 2 and 5; and (b) for up to 6 hours for Functions 1, 3, and 4 provided the associated Function maintains RCIC initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.5.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.5.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.5.2.3	Calibrate the analog trip module.	92 days
SR 3.3.5.2.4	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.5.2.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.5.2.6	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.5.2-1 (page 1 of 1)
Reactor Core Isolation Cooling System Instrumentation

FUNCTION	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level-Low Low, Level 2	4	B	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 ~~SR 3.3.5.2.4~~ SR 3.3.5.2.5 SR 3.3.5.2.6	≥ -47.7 inches
2. Reactor Vessel Water Level-High, Level 8	2	C	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.4 SR 3.3.5.2.5	≤ 52.6 inches
3. RCIC Storage Tank Level-Low	2	D	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.4 SR 3.3.5.2.5	≥ 2.5 inches
4. Suppression Pool Water Level-High	2	D	SR 3.3.5.2.1 SR 3.3.5.2.2 SR 3.3.5.2.3 SR 3.3.5.2.4 SR 3.3.5.2.5	≤ -3 inches
5. Manual Initiation	1	C	SR 3.3.5.2.5	NA

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.6.1-1 to determine which SRs apply for each Primary Containment and Drywell Isolation Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains isolation capability.

	SURVEILLANCE	FREQUENCY
SR 3.3.6.1.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.1.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.1.3	Calibrate the analog trip module.	92 days
SR 3.3.6.1.4	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.6.1.5	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.6.1.6	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.6.1.7	---------------NOTE--------------- 1. Channel sensors are excluded. 2. The STAGGERED TEST BASIS Frequency for each Function shall be determined on a per channel basis. -- Verify the ISOLATION SYSTEM RESPONSE TIME for the main steam isolation valves is within limits.	~~18~~ 24 months on a STAGGERED TEST BASIS
SR 3.3.6.1.8	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.6.1-1 (page 1 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Main Steam Line Isolation					
a. Reactor Vessel Water Level-Low Low Low, Level 1	1,2,3	4	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.7 SR 3.3.6.1.8	≥ -147.7 inches
b. Main Steam Line Pressure-Low	1	4	H	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6 SR 3.3.6.1.7	≥ ~~827~~ psig 841
c. Main Steam Line Flow-High	1,2,3	4	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6 SR 3.3.6.1.7	≤ 284 psid
d. Condenser Vacuum-Low	1,2[(a)], 3[(a)]	4	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 7.6 inches Hg vacuum
e. Main Steam Tunnel Temperature-High	1,2,3	4	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 171°F
f. Main Steam Line Turbine Building Temperature-High	1,2,3	4	G	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	Modules 1-4 ≤ 142°F, Module 5 ≤ 150°F
g. Manual Initiation	1,2,3	4	J	SR 3.3.6.1.6	NA

(continued)

(a) With any turbine stop valve not closed.

Table 3.3.6.1-1 (page 2 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Primary Containment and Drywell Isolation					
a. Reactor Vessel Water Level-Low Low, Level 2	1,2,3	4[b]	K	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
	(c)	4	O	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
b. Drywell Pressure-High	1,2,3	4[b]	K	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 1.88 psig
c. Deleted					
d. Drywell Pressure-High (ECCS Divisions 1 and 2)	1,2,3	4[b]	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 1.88 psig
e. Reactor Vessel Water Level-Low Low, Level 2 (HPCS NSPS Div 3 and 4)	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
f. Drywell Pressure-High (HPCS NSPS Div 3 and 4)	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 1.88 psig

(continued)

(b) Also required to initiate the associated drywell isolation function.

(c) During operations with a potential for draining the reactor vessel.

Table 3.3.6.1-1 (page 3 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
2. Primary Containment and Drywell Isolation (continued)					
g. Containment Building Fuel Transfer Pool Ventilation Plenum Radiation-High	(c), (d)	4	N	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 500 mR/hr
h. Containment Building Exhaust Radiation-High	1,2,3	4[b]	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 400 mR/hr
	(c), (d)	4	N	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 400 mR/hr
i. Containment Building Continuous Containment Purge (CCP) Exhaust Radiation-High	1,2,3	4[b]	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 400 mR/hr
	(c), (d)	4	N	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 400 mR/hr
j. Reactor Vessel Water Level-Low Low Low, Level 1	1,2,3	4[b]	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -147.7 inches
	(c)	4	O	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -147.7 inches
k. Containment Pressure-High	(e)	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 3.0 psid
l. Manual Initiation	1,2,3	2[b]	J	SR 3.3.6.1.6	NA
	(c), (d)	2	N	SR 3.3.6.1.6	NA

(continued)

(b) Also required to initiate the associated drywell isolation function.

(c) During operations with a potential for draining the reactor vessel.

(d) During movement of recently irradiated fuel assemblies in the primary or secondary containment.

(e) MODES 1, 2, and 3 with the associated PCIVs not closed.

Table 3.3.6.1-1 (page 4 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. Reactor Core Isolation Cooling (RCIC) System Isolation					
a. Auxiliary Building RCIC Steam Line Flow-High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 118.5 inches water
b. RCIC Steam Line Flow-High, Time Delay	1,2,3	2	I	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 13 seconds
c. RCIC Steam Supply Line Pressure-Low	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 52 psig
d. RCIC Turbine Exhaust Diaphragm Pressure-High	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 20 psig
e. RCIC Equipment Room Ambient Temperature-High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 207°F
f. Main Steam Line Tunnel Ambient Temperature-High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 171°F
g. Main Steam Line Tunnel Temperature Timer	1,2,3	2	I	SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 28 minutes
h. Reactor Vessel Water Level-Low Low, Level 2	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
i. Drywell RCIC Steam Line Flow - High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 188 inches water

(continued)

Table 3.3.6.1-1 (page 5 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
3. RCIC System Isolation (continued)					
j. Drywell Pressure - High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 1.88 psig
k. Manual Initiation	1,2,3	1	J	SR 3.3.6.1.6	NA
4. Reactor Water Cleanup (RWCU) System Isolation					
a. Differential Flow - High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≤ 66.1 gpm
b. Differential Flow-Timer	1,2,3	2	I	SR 3.3.6.1.2 SR 3.3.6.1.4 SR 3.3.6.1.6	≤ 47 seconds
c. RWCU Heat Exchanger Equipment Room Temperature-High	1,2,3	2 per room	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 205°F
d. RWCU Pump Rooms Temperature-High	1,2,3	2 per room	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 202°F
e. Main Steam Line Tunnel Ambient Temperature-High	1,2,3	2	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 171°F
f. Reactor Vessel Water Level-Low Low, Level 2	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
	(c)	4	O	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -47.7 inches
g. Standby Liquid Control System Initiation	1,2	2	L	SR 3.3.6.1.6	NA
h. Manual Initiation	1,2,3	2	J	SR 3.3.6.1.6	NA
	(c),(d)	2	N	SR 3.3.6.1.6	NA

(continued)

(c) During operations with a potential for draining the reactor vessel.
(d) During movement of recently irradiated fuel assemblies in the primary or secondary containment.

Table 3.3.6.1-1 (page 6 of 6)
Primary Containment and Drywell Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER FUNCTION	CONDITIONS REFERENCED FROM REQUIRED ACTION F.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
5. RHR System Isolation					
a. RHR Heat Exchanger Ambient Temperature-High	1,2,3	2 per room	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 160°F
b. Reactor Vessel Water Level - Low, Level 3	1,2,3[f]	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 8.3 inches
c. Reactor Vessel Water Level - Low, Level 3	3[g],4,5	4[h]	M	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≥ 8.3 inches
d. Reactor Vessel Water Level - Low Low Low, Level 1	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 ~~SR 3.3.6.1.5~~ SR 3.3.6.1.6 SR 3.3.6.1.8	≥ -147.7 inches
e. Reactor Vessel Pressure-High	1,2,3	4	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ ~~110~~ 113 psig
f. Drywell Pressure-High	1,2,3	8	I	SR 3.3.6.1.1 SR 3.3.6.1.2 SR 3.3.6.1.3 SR 3.3.6.1.5 SR 3.3.6.1.6	≤ 1.88 psig
g. Manual Initiation	1,2,3	2	J	SR 3.3.6.1.6	NA

(f) With reactor steam dome pressure greater than or equal to the RHR cut in permissive pressure.

(g) With reactor steam dome pressure less than the RHR cut in permissive pressure.

(h) Only one trip system required in MODES 4 and 5 with RHR Shutdown Cooling System integrity maintained.

SURVEILLANCE REQUIREMENTS

-----NOTES-----

1. Refer to Table 3.3.6.2-1 to determine which SRs apply for each Secondary Containment Isolation Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains secondary containment isolation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.2.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.2.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.2.3	Calibrate the analog trip module.	92 days
SR 3.3.6.2.4	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.6.2.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.6.2.6	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1.	Reactor Vessel Water Level-Low Low, Level 2	1,2,3,(a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 ~~SR 3.3.6.2.4~~ SR 3.3.6.2.5 SR 3.3.6.2.6	≥ -47.7 inches
2.	Drywell Pressure-High	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 1.88 psig
3.	Containment Building Fuel Transfer Pool Ventilation Plenum Exhaust Radiation-High	(a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 500 mR/hr
4.	Containment Building Exhaust Radiation-High	1,2,3, (a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 400 mR/hr
5.	Containment Building Continuous Containment Purge (CCP) Exhaust Radiation-High	1,2,3, (a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 400 mR/hr
6.	Fuel Building Exhaust Radiation-High	1,2,3, (c)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 17 mR/hr
7.	Manual Initiation	1,2,3, (a),(b)	1	SR 3.3.6.2.5	NA

(a) During operations with a potential for draining the reactor vessel.

(b) During movement of recently irradiated fuel assemblies in the primary or secondary containment.

(c) During movement of recently irradiated fuel assemblies in the fuel building.

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.6.3-1 to determine which SRs apply for each RHR Containment Spray System Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains RHR containment spray initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.3.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.3.3	Calibrate the analog trip module.	92 days
SR 3.3.6.3.4	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.6.3.5	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.6.3.6	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.6.3-1 (page 1 of 1)
RHR Containment Spray System Instrumentation

FUNCTION	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Drywell Pressure-High	2	B	SR 3.3.6.3.1 SR 3.3.6.3.2 SR 3.3.6.3.3 SR 3.3.6.3.4 SR 3.3.6.3.5	≤ 1.88 psig
2. Containment Pressure-High	2	B	SR 3.3.6.3.1 SR 3.3.6.3.2 SR 3.3.6.3.3 SR 3.3.6.3.4 SR 3.3.6.3.5	≤ 22.4 psia
3. Reactor Vessel Water Level-Low Low Low, Level 1	2	B	SR 3.3.6.3.1 SR 3.3.6.3.2 SR 3.3.6.3.3 ~~SR 3.3.6.3.4~~ SR 3.3.6.3.5 SR 3.3.6.3.6	≥ -147.7 inches
4. Timers, System A and System B	1	C	SR 3.3.6.3.2 SR 3.3.6.3.4 SR 3.3.6.3.5	606 seconds ≥ ~~10.10 minutes~~ and ≤ ~~10.23 minutes~~ 614 seconds
5. Timer, System B Only	1	C	SR 3.3.6.3.2 SR 3.3.6.3.4 SR 3.3.6.3.5	≤ 90.6 seconds
6. Manual Initiation	1	C	SR 3.3.6.3.5	NA

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.6.4-1 to determine which SRs apply for each SPMU Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains SPMU initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.6.4.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.6.4.2	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.4.3	Calibrate the analog trip module.	92 days
SR 3.3.6.4.4	Calibrate the analog comparator unit.	92 days
SR 3.3.6.4.5	Perform CHANNEL CALIBRATION.	92 days
SR 3.3.6.4.6	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.6.4.7	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months
SR 3.3.6.4.8	Perform CHANNEL CALIBRATION.	18 months

Table 3.3.6.4-1 (page 1 of 1)
Suppression Pool Makeup System Instrumentation

FUNCTION	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Drywell Pressure-High	2	B	SR 3.3.6.4.1 SR 3.3.6.4.2 SR 3.3.6.4.3 SR 3.3.6.4.6 SR 3.3.6.4.7	≤ 1.88 psig
2. Reactor Vessel Water Level-Low Low Low, Level 1	2	B	SR 3.3.6.4.1 SR 3.3.6.4.2 SR 3.3.6.4.3 ~~SR 3.3.6.4.6~~ SR 3.3.6.4.7 SR 3.3.6.4.8	≥ -147.7 inches
3. Suppression Pool Water Level-Low Low	2	B	SR 3.3.6.4.1 SR 3.3.6.4.2 SR 3.3.6.4.4 SR 3.3.6.4.6 SR 3.3.6.4.7	≥ 29 inches
4. Timer	1	C	SR 3.3.6.4.2 SR 3.3.6.4.5 SR 3.3.6.4.7	≤ 30 minutes
5. Manual Initiation	2	C	SR 3.3.6.4.7	NA

SURVEILLANCE REQUIREMENTS

------------------------------------NOTE------------------------------------
When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours, provided the associated Function maintains LLS or relief initiation capability, as applicable.

SURVEILLANCE		FREQUENCY
SR 3.3.6.5.1	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.6.5.2	Calibrate the analog trip module.	92 days
SR 3.3.6.5.3	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. Relief Function Low: 1103 ± 15 psig Medium: 1113 ± 15 psig High: 1123 ± 15 psig b. LLS Function Low open: 1033 ± 15 psig close: 926 ± 15 psig Medium open: 1073 ± 15 psig close: 936 ± 15 psig High open: 1113 ± 15 psig close: 946 ± 15 psig	~~18~~ 24 months
SR 3.3.6.5.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Place one Control Room Ventilation subsystem in the high radiation mode of operation.	1 hour
	<u>OR</u>	
	B.2 Declare associated Control Room Ventilation subsystem inoperable.	1 hour

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.7.1-1 to determine which SRs apply for each Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains Control Room Ventilation initiation capability.

SURVEILLANCE	FREQUENCY
SR 3.3.7.1.1 Perform CHANNEL CHECK.	12 hours
SR 3.3.7.1.2 Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.7.1.3 Perform CHANNEL CALIBRATION.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Refer to Table 3.3.8.1-1 to determine which SRs apply for each LOP Function.

2. When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 2 hours provided the associated Function maintains DG initiation capability.

SURVEILLANCE		FREQUENCY
SR 3.3.8.1.1	Deleted	
SR 3.3.8.1.2	Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.8.1.3	Perform CHANNEL CALIBRATION.	~~18~~ 24 months
SR 3.3.8.1.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.	~~18~~ 24 months

Table 3.3.8.1-1 (page 1 of 1)
Loss of Power Instrumentation

FUNCTION	REQUIRED CHANNELS PER DIVISION	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Divisions 1 and 2 - 4.16 kV Emergency Bus Undervoltage			
a. Loss of Voltage - 4.16 kV basis	6	SR 3.3.8.1.3 SR 3.3.8.1.4	≥ 2345 V and ≤ 3395 V
b. Loss of Voltage - Time Delay	6	SR 3.3.8.1.3 SR 3.3.8.1.4	≤ ~~10~~ 5.0 seconds
c. Degraded Voltage Reset - 4.16 kV basis	2	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ ~~4090~~ 4102.2 V and ≤ ~~4111~~ 4109.3 V ~~(a)~~
d. Degraded Voltage Drop-out - 4.16 kV basis	2	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ 4051 V ~~and ≤ 4093 V~~ ~~(b)~~
e. Degraded Voltage-Time Delay	1	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ 14 seconds and ≤ 16 seconds
2. Division 3 - 4.16 kV Emergency Bus Undervoltage			
a. Loss of Voltage - 4.16 kV basis	4	SR 3.3.8.1.3 SR 3.3.8.1.4	≥ 2345 V and ≤ 2730 V
b. Loss of Voltage - Time Delay	1	SR 3.3.8.1.3 SR 3.3.8.1.4	≤ 3.0 seconds
c. Degraded Voltage Reset - 4.16 kV basis	2	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ ~~4090~~ 4102.2 V and ≤ ~~4111~~ 4109.3 V ~~(a)~~
d. Degraded Voltage Drop-out - 4.16 kV basis	2	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ 4051 V ~~and ≤ 4093 V~~ ~~(b)~~
e. Degraded Voltage - Time Delay	1	SR 3.3.8.1.2 SR 3.3.8.1.3 SR 3.3.8.1.4	≥ ~~14~~ 13.2 seconds and ≤ ~~16~~ 16.8 seconds

~~(a) This value is to be used after release for operation (RFO) of the corresponding plant modification Prior to RFO of the corresponding plant modification of the Degraded Voltage Reset - 4.16 kV basis.. Allowable Value shall be ≥ 3876 V and ≤ 3901 V.~~

~~(b) This value is to be used after release for operation (RFO) of the corresponding plant modification. Prior to RFO of the corresponding plant modification the Degraded Voltage Drop-out - 4.16 kV basis Allowable Value shall be ≥ 3848 V and ≤ 3876 V.~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.8.2.1	-----------------NOTE------------------ Only required to be performed prior to entering MODE 2 or 3 from MODE 4, when in MODE 4 for ≥ 24 hours. --------------------------------------- Perform CHANNEL FUNCTIONAL TEST.	184 days
SR 3.3.8.2.2	Perform CHANNEL CALIBRATION. The Allowable Values shall be: a. Overvoltage Bus A ≤ 127.3 V Bus B ≤ 126.7 V b. Undervoltage Bus A ≥ 115.0 V Bus B ≥ 114.7 V c. Underfrequency (with time delay ≤ 4.0 seconds) Bus A ≥ 57 Hz Bus B ≥ 57 Hz	~~18~~ 24 months
SR 3.3.8.2.3	Perform a system functional test.	~~18~~ 24 months

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.2 Flow Control Valves (FCVs)

LCO 3.4.2 A recirculation loop FCV shall be OPERABLE in each operating recirculation loop.

APPLICABILITY: MODES 1 and 2.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each FCV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or two required FCVs inoperable.	A.1 Lock up the FCV.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.4.2.1 Verify each FCV fails "as is" on loss of hydraulic pressure at the hydraulic unit.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.4.4.1	Verify the safety function lift setpoints of the required S/RVs are as follows: Number of S/RVs — Setpoint (psig) 7 — 1165 ± 34.9 5 — 1180 ± 35.4 4 — 1190 ± 35.7 Following testing, lift settings shall be within ± 1%.	In accordance with the Inservice Testing Program
SR 3.4.4.2	-------------------NOTE------------------- Valve actuation may be excluded. -- Verify each required relief function S/RV actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months
SR 3.4.4.3	-------------------NOTE------------------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -- Verify each required S/RV actuator strokes when manually actuated.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.7.1	Perform CHANNEL CHECK of required drywell atmospheric monitoring system.	12 hours
SR 3.4.7.2	Perform CHANNEL FUNCTIONAL TEST of required leakage detection instrumentation.	31 days
SR 3.4.7.3	Perform CHANNEL CALIBRATION of required leakage detection instrumentation.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.1.5	-------------------NOTE------------------- Vessel injection/spray may be excluded. -- Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months
SR 3.5.1.6	-------------------NOTE------------------- Valve actuation may be excluded. -- Verify the ADS actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months
SR 3.5.1.7	-------------------NOTE------------------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -- Verify each ADS valve actuator strokes when manually actuated.	~~18~~ 24 months
SR 3.5.1.8	-------------------NOTE------------------- ECCS actuation instrumentation is excluded. -- Verify the ECCS RESPONSE TIME for each ECCS injection/spray subsystem is within limits.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.5	Verify each required ECCS pump develops the specified flow rate with the specified pump differential pressure. SYSTEM / FLOW RATE / PUMP DIFFERENTIAL PRESSURE LPCS ≥ 5010 gpm ≥ 290 psid LPCI ≥ 5050 gpm ≥ 113 psid HPCS ≥ 5010 gpm ≥ 363 psid	In accordance with the Inservice Testing Program
SR 3.5.2.6	-------------------NOTE------------------- Vessel injection/spray may be excluded. -- Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	Verify the RCIC System piping is filled with water from the pump discharge valve to the injection valve.	31 days
SR 3.5.3.2	Verify each RCIC System manual, power operated, and automatic valve in the flow path, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.5.3.3	------------------NOTE------------------ Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -- Verify, with RCIC steam supply pressure ≤ 1045 psig and ≥ 920 psig, the RCIC pump can develop a flow rate ≥ 600 gpm against a system head corresponding to reactor pressure.	92 days
SR 3.5.3.4	------------------NOTE------------------ Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -- Verify, with RCIC steam supply pressure ≤ 150 psig and ≥ 135 psig, the RCIC pump can develop a flow rate ≥ 600 gpm against a system head corresponding to reactor pressure.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.3.5	-------------------NOTE------------------- Vessel injection may be excluded. -- Verify the RCIC System actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.4	Verify the isolation time of each power operated and each automatic PCIV, except MSIVs, is within limits.	In accordance with the Inservice Testing Program
SR 3.6.1.3.5	------------------NOTE------------------ Only required to be met in MODES 1, 2, and 3. ------------------------------------ Perform leakage rate testing for each primary containment purge valve with resilient seals.	Once within 92 days after opening the valve <u>AND</u> In accordance with the Primary Containment Leakage Rate Testing Program
SR 3.6.1.3.6	Verify the isolation time of each MSIV is ≥ 3 seconds and ≤ 5 seconds.	In accordance with the Inservice Testing Program
SR 3.6.1.3.7	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	~~18~~ 24 months

(continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.11	----------------NOTE-------------------- Only required to be met in MODES 1, 2, and 3. --------------------------------------- Verify that the combined leakage rate for both primary containment feedwater penetrations is ≤ 3 gpm when pressurized to ≥ 1.1 P_a.	In accordance with the Primary Containment Leakage Rate Testing Program.
SR 3.6.1.3.12	Verify each instrumentation line excess flow check primary containment isolation valve actuates within the required range.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.6.1	-------------------NOTE------------------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. -- Verify each LLS valve actuator strokes when manually actuated.	~~18~~ 24 months
SR 3.6.1.6.2	-------------------NOTE------------------- Valve actuation may be excluded. -- Verify the LLS System actuates on an actual or simulated automatic initiation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.7.1	-----------------NOTE------------------ RHR containment spray subsystems may be considered OPERABLE during alignment and operation for decay heat removal when below the RHR cut in permissive pressure in MODE 3 if capable of being manually realigned and not otherwise inoperable. -------------------------------------- Verify each RHR containment spray subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.1.7.2	Verify each RHR pump develops a flow rate of $\geq$ 3800 gpm on recirculation flow through the associated heat exchanger to the suppression pool.	In accordance with the Inservice Testing Program
SR 3.6.1.7.3	Verify each RHR containment spray subsystem automatic valve in the flow path actuates to its correct position on an actual or simulated automatic initiation signal.	~~18~~ months 24
SR 3.6.1.7.4	Verify each spray nozzle is unobstructed.	Following activities that could result in nozzle blockage

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.1.8.2	Verify electrical continuity of each inboard MSIV LCS subsystem heater element circuitry.	31 days
SR 3.6.1.8.3	Perform a system functional test of each MSIV LCS subsystem.	~~18~~ 24 months

3.6 CONTAINMENT SYSTEMS

3.6.1.9 Feedwater Leakage Control System (FWLCS)

LCO 3.6.1.9 Two FWLCS subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One FWLCS subsystem inoperable.	A.1 Restore FWLCS subsystem to OPERABLE status.	30 days
B. Two FWLCS subsystems inoperable.	B.1 Restore one FWLCS subsystem to OPERABLE status.	7 days
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.9.1	Perform a system functional test of each FWLCS subsystem.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.4.1	Verify upper containment pool water level is: a. ≥ el. 825 ft 6 inches; b. ≥ el. 825 ft 10 inches when the inclined fuel transfer pool to steam dryer storage pool gate is not open; and c. ≥ el. 827 ft 1 inch when the reactor cavity to steam dryer storage pool gate is not open. OR d. Reactor cavity pool level ≥ el. 824 ft 7 inches in MODE 3 with reactor pressure less than 235 psig. OR e. Suppression pool water level ≥ 19 ft 9 inches in MODE 3 with reactor pressure less than 235 psig.	24 hours
SR 3.6.2.4.2	Verify upper containment pool water temperature is ≤ 120°F.	24 hours
SR 3.6.2.4.3	Verify each SPMU subsystem manual, power operated, and automatic valve that is not locked, sealed, or otherwise secured in position is in the correct position.	31 days
SR 3.6.2.4.4	------------------NOTE------------------ Actual makeup to the suppression pool may be excluded. -- Verify each SPMU subsystem automatic valve actuates to the correct position on an actual or simulated automatic initiation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.3.1.1	Perform a system functional test for each primary containment hydrogen recombiner.	~~18~~ 24 months
SR 3.6.3.1.2	Visually examine each primary containment hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.	~~18~~ 24 months
SR 3.6.3.1.3	Perform a resistance to ground test for each heater phase.	~~18~~ 24 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.3.2.1	Energize each primary containment and drywell hydrogen igniter division and perform current versus voltage measurements to verify required igniters in service.	184 days
SR 3.6.3.2.2	------------------NOTE------------------ Not required to be performed until 92 days after discovery of four or more igniters in the division inoperable. -- Energize each primary containment and drywell hydrogen igniter division and perform current versus voltage measurements to verify required igniters in service.	92 days
SR 3.6.3.2.3	Verify each required igniter in inaccessible areas develops sufficient current draw for a ≥ 1700°F surface temperature.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.3.2.4	Verify each required igniter in accessible areas develops a surface temperature of ≥ 1700°F.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.3.3.1	Operate each Containment/Drywell Hydrogen Mixing System.	92 days
SR 3.6.3.3.2	Verify each Containment/Drywell Hydrogen Mixing System flow rate is ≥ 800 scfm.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.4.1.3	Verify one door in each access to secondary containment is closed, except during normal entry and exit.	31 days
SR 3.6.4.1.4	Verify each standby gas treatment (SGT) subsystem will draw down the secondary containment to $\geq$ 0.25 inch of vacuum water gauge within the time required.	~~18~~ 24 months on a STAGGERED TEST BASIS
SR 3.6.4.1.5	Verify each SGT subsystem can maintain $\geq$ 0.25 inch of vacuum water gauge in the secondary containment for 1 hour at a flow rate $\leq$ 4400 cfm.	~~18~~ 24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.2.1	------------------NOTES------------------ 1. Valves, dampers, and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for SCIDs that are open under administrative controls. --- Verify each secondary containment isolation manual valve, damper, and blind flange that is required to be closed during accident conditions is closed.	31 days
SR 3.6.4.2.2	Verify the isolation time of each power operated and each automatic SCID is within limits.	92 days
SR 3.6.4.2.3	Verify each automatic SCID actuates to the isolation position on an actual or simulated automatic isolation signal.	~~18~~ 24 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Two SGT subsystems inoperable during movement of recently irradiated fuel assemblies in the primary or secondary containment, or during OPDRVs.	E.1	Suspend movement of recently irradiated fuel assemblies in the primary and secondary containment.	Immediately
	<u>AND</u>		
	E.2	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.4.3.1	Operate each SGT subsystem for ≥ 10 continuous hours with heaters operating.	31 days
SR 3.6.4.3.2	Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3	Verify each SGT subsystem actuates on an actual or simulated initiation signal.	~~18~~ 24 months
SR 3.6.4.3.4	Verify each SGT filter cooling bypass damper can be opened and the fan started.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.5.3.3	-------------------NOTES------------------ 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for drywell isolation valves that are open under administrative controls. -- Verify each required drywell isolation manual valve and blind flange that is required to be closed during accident conditions is closed.	Prior to entering MODE 2 or 3 from MODE 4, if not performed in the previous 92 days
SR 3.6.5.3.4	Verify the isolation time of each required power operated and each required automatic drywell isolation valve is within limits.	In accordance with the Inservice Testing Program
SR 3.6.5.3.5	Verify each required automatic drywell isolation valve actuates to the isolation position on an actual or simulated isolation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.5.6.1	-----------------NOTES------------------ 1. Not required to be met for drywell post-LOCA vacuum relief valves open during Surveillances. 2. Not required to be met for drywell post-LOCA vacuum relief valves open when performing their intended function. --------------------------------------- Verify each drywell post-LOCA vacuum relief valve is closed.	7 days
SR 3.6.5.6.2	Perform a functional test of each drywell post-LOCA vacuum relief valve.	31 days
SR 3.6.5.6.3	Verify the opening pressure differential of each drywell post-LOCA vacuum relief valve is ≤ 0.2 psid.	~~18~~ 24 months

Actions (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met. OR Division 1 and 2 SX subsystems inoperable.	C.1 Be in MODE 3. AND C.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.1.1	Verify UHS water volume is ≥ 593 acre-ft.	In accordance with UHS Erosion, Sediment Monitoring, and Dredging Program
SR 3.7.1.2	Verify each required SX subsystem manual, power operated, and automatic valve in the flow path servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.1.3	Verify each SX subsystem actuates on an actual or simulated initiation signal.	~~18~~ 24 months

3.7 PLANT SYSTEMS

3.7.2 Division 3 Shutdown Service Water (SX) Subsystem

LCO 3.7.2 The Division 3 SX subsystem shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Division 3 SX subsystem inoperable.	A.1 Declare High Pressure Core Spray System inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify each required Division 3 SX subsystem manual, power operated, and automatic valve in the flow path servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.2	Verify the Division 3 SX subsystem actuates on an actual or simulated initiation signal.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.3.4	Verify each Control Room Ventilation subsystem actuates on an actual or simulated initiation signal.	~~18~~ 24 months
SR 3.7.3.5	Verify the air inleakage rate of the negative pressure portions of the Control Room Ventilation System is ≤ 650 cfm.	~~18~~ 24 months
SR 3.7.3.6	Verify each Control Room Ventilation subsystem can maintain a positive pressure of ≥ 1/8 inch water gauge relative to adjacent areas during the high radiation mode of operation at a flow rate of ≤ 3000 cfm.	24 ~~18~~ months on a STAGGERED TEST BASIS

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Required Action and associated Completion Time of Condition B not met during movement of irradiated fuel assemblies in the primary or secondary containment, during CORE ALTERATIONS, or during OPDRVs.	------------NOTE------------ LCO 3.0.3 is not applicable. ----------------------------		
	E.1	Suspend movement of irradiated fuel assemblies in the primary and secondary containment.	Immediately
	AND		
	E.2	Suspend CORE ALTERATIONS.	Immediately
	AND		
	E.3	Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Verify each control room AC subsystem has the capability to remove the assumed heat load.	~~18~~ 24 months

3.7 PLANT SYSTEMS

3.7.6 Main Turbine Bypass System

LCO 3.7.6 The Main Turbine Bypass System shall be OPERABLE.

APPLICABILITY: THERMAL POWER ≥ 21.6% RTP.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Main Turbine Bypass System inoperable.	A.1	Restore Main Turbine Bypass System to OPERABLE status.	2 hours
B. Required Action and associated Completion Time not met.	B.1	Reduce THERMAL POWER to < 21.6% RTP.	4 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.6.1	Verify one complete cycle of each main turbine bypass valve.	31 days
SR 3.7.6.2	Perform a system functional test.	~~18~~ 24 months
SR 3.7.6.3	Verify the TURBINE BYPASS SYSTEM RESPONSE TIME is within limits.	~~18~~ 24 months

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.8.1.7	------------------NOTE------------------ All DG starts may be preceded by an engine prelube period. -- Verify each DG starts from standby condition and achieves: a. In ≤ 12 seconds, voltage ≥ 4084 V and frequency ≥ 58.8 Hz; and b. Steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days
SR 3.8.1.8	------------------NOTE------------------ This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. -- Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	------------------NOTE------------------ 1. Credit may be taken for unplanned events that satisfy this SR. 2. If performed with DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. -- Verify each DG rejects a load greater than or equal to its associated single largest post accident load and following load rejection, the engine speed is maintained less than nominal plus 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is lower.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.10	------------------NOTE------------------- Credit may be taken for unplanned events that satisfy this SR. --- Verify each DG operating at a power factor ≤ 0.9 does not trip and voltage is maintained ≤ 5000 V for DG 1A and DG 1B and ≤ 5824 V for DG 1C during and following a load rejection of a load ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.11	------------------NOTES------------------ 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. --- Verify on an actual or simulated loss of offsite power signal: a. De-energization of emergency buses; b. Load shedding from emergency buses for Divisions 1 and 2; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 12 seconds, 2. energizes auto-connected shutdown loads, 3. maintains steady state voltage ≥ 4084 V and ≤ 4580 V, 4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes.	~~18~~ 24 months (continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.12	-------------------NOTES------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. --- Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each DG auto-starts from standby condition and: a. In ≤ 12 seconds after auto-start and during tests, achieves voltage ≥ 4084 V and frequency ≥ 58.8 Hz; b. Achieves steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and c. Operates for ≥ 5 minutes.	~~18~~ 24 months
SR 3.8.1.13	-------------------NOTE------------------- Credit may be taken for unplanned events that satisfy this SR. --- Verify each DG's automatic trips are bypassed on an actual or simulated ECCS initiation signal except: a. Engine overspeed; b. Generator differential current; and c. Overcrank for DG 1A and DG 1B.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.14	------------------NOTES------------------ 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. Credit may be taken for unplanned events that satisfy this SR. --- Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 4062 kW for DG 1A, ≥ 4069 kW for DG 1B, and ≥ 2310 kW for DG 1C; and b. For the remaining hours of the test loaded ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.15	-----------------------NOTE----------------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C. Momentary transients outside of the load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. --- Verify each DG starts and achieves: a. In ≤ 12 seconds, voltage ≥ 4084 V and frequency ≥ 58.8 Hz and b. Steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.16	-------------------NOTE------------------- This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. -- Verify each DG: a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power; b. Transfers loads to offsite power source; and c. Returns to ready-to-load operation.	~~18~~ 24 months
SR 3.8.1.17	-------------------NOTE------------------- Credit may be taken for unplanned events that satisfy this SR. -- Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ECCS initiation signal overrides the test mode by: a. Returning DG to ready-to-load operation; and b. Automatically energizing the emergency loads from offsite power.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.18	---------------------NOTE---------------- This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. --- Verify the sequence time is within ± 10% of design for each load sequence timer.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.19	-------------------NOTES------------------- 1. All DG starts may be preceded by an engine prelube period. 2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. -- Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses for Divisions 1 and 2; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 12 seconds, 2. energizes auto-connected emergency loads, 3. achieves steady state voltage ≥ 4084 V and ≤ 4580 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	~~18~~ 24 months

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	7 days
SR 3.8.4.2	Verify each Division 1 and 2 battery charger supplies ≥ 300 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours and each Division 3 and 4 battery charger supplies ≥ 100 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours. <u>OR</u> Verify each battery charger can recharge the battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.	~~18~~ 24 months
SR 3.8.4.3	-------------------NOTES------------------ 1. The modified performance discharge test in SR 3.8.6.6 may be performed in lieu of SR 3.8.4.3. 2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. --- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	 ~~18~~ 24 months

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.11.1	For each required SVC Protection System, perform a local, visual check of the SVC system control and status panel to confirm satisfactory operation.	24 hours
SR 3.8.11.2	Perform a system functional test of each SVC protection subsystem, including breaker actuation.	~~18~~ 24 months

5.5 Programs and Manuals (continued)

5.5.7 Ventilation Filter Testing Program (VFTP)

A program shall be established to implement the following required testing of Engineered Safety Feature (ESF) filter ventilation systems at the frequencies specified in Regulatory Guide 1.52, Revision 2.

INSERT 5.0-12

a. Demonstrate for each of the ESF systems that an inplace test of the high efficiency particulate air (HEPA) filters shows a penetration and system bypass < 0.05% when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the system flowrate specified below ± 10%:

ESF Ventilation System	Flowrate
SGTS	4,000 cfm
Control Room Ventilation (CRV) Makeup Filter	3,000 cfm

b. Demonstrate for each of the ESF systems that an inplace test of the charcoal adsorber shows a penetration and system bypass less than specified below when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the system flowrate specified below ± 10%:

ESF Ventilation System	Flowrate	Penetration and Bypass
SGTS	4,000 cfm	0.05%
CRV Makeup Filter	3,000 cfm	0.05%
CRV Recirculation Filter	64,000 cfm	2%

c. Demonstrate for each of the ESF systems that a laboratory test of a sample of the charcoal adsorber, when obtained as described in Regulatory Guide 1.52, Revision 2, shows the methyl iodide penetration less than the value specified below when tested in accordance with ASTM D3803-1989 at a temperature of 30 °C and a relative humidity of 70%:

ESF Ventilation System	Penetration
SGTS	0.175%
CRV Makeup Filter	0.175%
CRV Recirculation Filter	6%

(continued)

ATTACHMENT 2

INSERT 5.0-12

[5.5.7 Ventilation Filter Testing Program]

. . . , except that testing specified at a frequency of 18 months is required at a frequency of 24 months

FYI ONLY
NO CHANGES
THIS PAGE

5.5.7 Ventilation Filter Testing Program (VFTP) (continued)

d. Demonstrate for each of the ESF systems that the pressure drop across the combined HEPA filters and the charcoal adsorbers is < 6.0 inches water gauge when tested in accordance with Regulatory Guide 1.52, Revision 2, and ANSI N510-1980 at the system flowrate specified below ± 10%:

ESF Ventilation System	Flowrate
SGTS	4,000 cfm
CRV Makeup Filter	3,000 cfm

e. Demonstrate that the heaters for each of the ESF systems dissipate the value specified below when tested in accordance with ANSI N510-1980:

ESF Ventilation System	Wattage
SGTS	18.0 kW
CRV Makeup Filter	14.4 kW

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the VFTP test frequencies.

5.5.8 Explosive Gas and Storage Tank Radioactivity Monitoring Program

This program provides controls for potentially explosive gas mixtures contained in the main condenser offgas treatment system and the quantity of radioactivity contained in unprotected outdoor liquid storage tanks.

The program shall include:

a. The limits for concentrations of hydrogen in the main condenser offgas treatment system and a surveillance program to ensure the limits are maintained. Such limits shall be appropriate to the system's design criteria (i.e., whether or not the system is designed to withstand a hydrogen explosion); and

(continued)

ATTACHMENT 3

MARKUP OF PROPOSED TECHNICAL SPECIFICATION BASES PAGES
(For Information Only)

Revised TS Bases Pages

B 3.1-43	B 3.1-47 thru 48
B 3.3-27 thru 30	B 3.3-38
B 3.3-48	B 3.3-59
B 3.3-64	B 3.3-73 thru 74
B 3.3-84	B 3.3-120 thru 121
B 3.3-133 thru 134	B 3.3-171 thru 173
B 3.3-184 thru 185	B 3.3-189
B 3.3-195 thru 196	B 3.3-206 thru 207
B 3.3-213 thru 214	B 3.3-224
B 3.3-225a	B3.3-226
B 3.3-229	B 3.3-235 thru 236
B 3.4-11	B 3.4-21 thru 22
B 3.4-38	
B 3.5-11	B 3.5-12
B 3.5-14	B 3.5-25 thru 26
B 3.6-26	B 3.6-28a
B 3.6-38	B 3.6-42 thru 43
B 3.6-47	B 3.6-47c
B 3.6-65	B 3.6-70 thru 71
B 3.6-76 thru 77	B 3.6-82
B 3.6-88a	B 3.6-95
B 3.6-100 thru 101	B 3.6-121
B 3.6-132	
B 3.7-6	B 3.7-9
B 3.7-15 thru 16	B 3.7-21
B 3.7-27	
B 3.8-9	B 3.8-17 thru 18
B 3.8-19a	B 3.8-21 thru 3.8-30
B 3.8-56 thru 57	B 3.8-97

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.7.8 and SR 3.1.7.9

These Surveillances ensure that there is a functioning flow path from the boron solution storage tank to the RPV, including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every ~~36~~ 48 months, at alternating ~~18~~ 24 month intervals.

The Surveillance may be performed in separate steps to prevent injecting boron into the RPV. An acceptable method for verifying flow from the pump to the RPV is to pump demineralized water from a test tank through one SLC subsystem and into the RPV. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance test ~~when performed at the 18 month Frequency~~; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

Demonstrating that all piping between the boron solution storage tank and the suction inlet to the injection pumps is unblocked ensures that there is a functioning flow path for injecting the sodium pentaborate solution. An acceptable method for verifying that the suction piping is unblocked is to pump from the storage tank to the test tank. Following this test, the piping will be drained and flushed with demineralized water. The ~~18~~ 24 month Frequency is acceptable since there is a low probability that the subject piping will be blocked due to precipitation of the boron from solution in the piping. This is especially true in light of the daily temperature verification of this piping required by SR 3.1.7.3. However, if, in performing SR 3.1.7.3, it is determined that the temperature of this piping has fallen below the specified minimum, SR 3.1.7.9 must be performed once within 24 hours after the piping temperature is restored to ≥ 70°F.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1

During normal operation, the SDV vent and drain valves should be in the open position (except when performing SR 3.1.8.2) to allow for drainage of the SDV piping. Verifying that each valve is in the open position ensures that the SDV vent and drain valves will perform their intended function during normal operation. This SR does not require any testing or valve manipulation; rather, it involves verification that the valves are in the correct position. The 31 day Frequency is based on engineering judgment and is consistent with the procedural controls governing valve operation, which ensure correct valve positions. Improper valve position (closed) would not affect the isolation function.

SR 3.1.8.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures that the valve will function properly during a scram. The 92 day Frequency is based on operating experience and takes into account the level of redundancy in the system design.

SR 3.1.8.3

SR 3.1.8.3 is an integrated test of the SDV vent and drain valves to verify total system performance. After receipt of a simulated or actual scram signal, the closure of the SDV vent and drain valves is verified. The closure time of 30 seconds after a receipt of a scram signal is based on the bounding leakage case evaluated in the accident analysis. Similarly, after receipt of a simulated or actual scram reset signal, the opening of the SDV vent and drain valves is verified. The LOGIC SYSTEM FUNCTIONAL TEST in LCO 3.3.1.1 and the scram time testing of control rods in LCO 3.1.3, "Control Rod OPERABILITY," overlap this Surveillance to provide complete testing of the assumed safety function. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.1.8.3 (continued)

the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~; therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to SDV vent and drain valve closing time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).

REFERENCES

1. USAR, Section 4.6.1.1.2.4.2.5.
2. 10 CFR 100.
3. NUREG-0803, "Generic Safety Evaluation Report Regarding Integrity of BWR Scram System Piping," August 1981.
4. Calculation IP-0-0017.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.9 and SR 3.3.1.1.12 (continued)

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

SR 3.3.1.1.10

The calibration of analog trip modules provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.1.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days for SR 3.3.1.1.10 is based on the reliability analysis of Reference 9.

SR 3.3.1.1.11 and SR 3.3.1.1.13

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

Note 1 states that neutron detectors are excluded from CHANNEL CALIBRATION because of the difficulty of simulating a meaningful signal. Changes in neutron detector sensitivity are compensated for by performing the 7 day calorimetric calibration (SR 3.3.1.1.2) and the 1000 MWD/T LPRM calibration against the TIPs (SR 3.3.1.1.8). A second Note is provided that requires the APRM and the IRM SRs to be performed within 12 hours of entering MODE 2 from MODE 1.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.11 and SR 3.3.1.1.13 (continued)

Testing of the MODE 2 APRM and IRM Functions cannot be performed in MODE 1 without utilizing jumpers, lifted leads, or movable links. This Note allows entry into MODE 2 from MODE 1 if the associated Frequency is not met per SR 3.0.2. Twelve hours is based on operating experience and in consideration of providing a reasonable time in which to complete the SR. The Frequency of SR 3.3.1.1.11 and SR 3.3.1.1.13 is based upon the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.1.1.14

The Average Power Range Monitor Flow Biased Simulated Thermal Power-High Function uses an electronic filter circuit to generate a signal proportional to the core THERMAL POWER from the APRM neutron flux signal. This filter circuit is representative of the fuel heat transfer dynamics that produce the relationship between the neutron flux and the core THERMAL POWER. The filter time constant is specified in the COLR and must be verified to ensure that the channel is accurately reflecting the desired parameter.

The Frequency of ~~18~~ 24 months is based on engineering judgment and reliability of the components.

With regard to filter time constant values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 11).

SR 3.3.1.1.15

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The functional testing of control rods, in LCO 3.1.3, "Control Rod OPERABILITY," and SDV vent and drain valves, in LCO 3.1.8, "Scram Discharge Volume (SDV) Vent and Drain Valves," overlaps this Surveillance to provide complete testing of the assumed safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.1.1.15 (continued)

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

SR 3.3.1.1.16

This SR ensures that scrams initiated from the Turbine Stop Valve Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure-Low Functions will not be inadvertently bypassed when THERMAL POWER is ≥ 33.3% RTP. This involves calibration of the bypass channels. Adequate margins for the instrument setpoint methodology are incorporated into the actual setpoint.

If any bypass channel setpoint is nonconservative such that the Functions are bypassed at ≥ 33.3% RTP (e.g., due to open main steam line drain(s), main turbine bypass valve(s) or other reasons), then the affected Turbine Stop Valve Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure-Low Functions are considered inoperable. Alternatively, the bypass channel can be placed in the conservative condition (nonbypass). If placed in the nonbypass condition, this SR is met and the channel is considered OPERABLE.

The Frequency of ~~18~~ 24 months is based on engineering judgment and reliability of the components.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.17

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. The RPS RESPONSE TIME acceptance criteria are included in plant Surveillance procedures.

As noted, neutron detectors are excluded from RPS RESPONSE TIME testing because the principles of detector operation virtually ensure an instantaneous response time. In addition, for Functions 3, 4, and 5, the associated sensors are not required to be response time tested. For these Functions, response time testing for the remaining channel components, including the ATMs, is required. This allowance is supported by Reference 10. RPS RESPONSE TIME tests are conducted on an 18 month STAGGERED TEST BASIS. Note 3 of SR 3.3.1.1.17 requires STAGGERED TEST BASIS Frequency for each Function to be determined separately based on the four channels as specified in Table 3.3.1.1-1. This Frequency is based on the logic interrelationships of the various channels required to produce an RPS scram signal.

Therefore, staggered testing results in response time verification of these devices every 18 months. This Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience, which shows that random failures of instrumentation components causing serious time degradation, but not channel failure, are infrequent.

With regard to RPS RESPONSE TIME values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.2.5 (continued)

The Note to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability. The SR must be performed in MODE 2 within 12 hours of entering MODE 2 with IRMs on Range 2 or below. The allowance to enter the Applicability with the 31 day Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability and the inability to perform the Surveillance while at higher power levels. Although the Surveillance could be performed while on IRM Range 3, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the SRMs being otherwise verified to be OPERABLE (i.e., satisfactorily performing the CHANNEL CHECK) and the time required to perform the Surveillances.

SR 3.3.1.2.6

Performance of a CHANNEL CALIBRATION verifies the performance of the SRM detectors and associated circuitry. The Frequency considers the plant conditions required to perform the test, the ease of performing the test, and the likelihood of a change in the system or component status. The neutron detectors are excluded from the CHANNEL CALIBRATION because they cannot readily be adjusted. The detectors are fission chambers that are designed to have a relatively constant sensitivity over the range, and with an accuracy specified for a fixed useful life.

The Note to the Surveillance allows the Surveillance to be delayed until entry into the specified condition of the Applicability. The SR must be performed in MODE 2 within 12 hours of entering MODE 2 with IRMs on Range 2 or below. The allowance to enter the Applicability with the ~~18~~ 24 month Frequency not met is reasonable, based on the limited time of 12 hours allowed after entering the Applicability and the inability to perform the Surveillance while at higher power levels. Although the Surveillance could be performed while on IRM Range 3, the plant would not be expected to maintain steady state operation at this power level. In this event, the 12 hour Frequency is reasonable, based on the SRMs being otherwise verified to be OPERABLE (i.e., satisfactorily

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.2.1.8 (continued)

the shutdown position, since testing of this interlock with the reactor mode switch in any other position cannot be performed without using jumpers, lifted leads, or movable limits. This allows entry into MODES 3 and 4 if the 24 ~~18~~ month Frequency is not met per SR 3.0.2. The 1 hour allowance is based on operating experience and in consideration of providing a reasonable time in which to complete the SRs.

The 24 ~~18~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

SR 3.3.2.1.9

LCO 3.1.3 and LCO 3.1.6 may require individual control rods to be bypassed in RACS to allow insertion of an inoperable control rod or correction of a control rod pattern not in compliance with BPWS. With the control rods bypassed in the RACS, the RPC will not control the movement of these bypassed control rods. Individual control rods may also be required to be bypassed to allow continuous withdrawal for determining the location of leaking fuel assemblies or adjustment of control rod speed. To ensure the proper bypassing and movement of those affected control rods, a second licensed operator or other qualified member of the technical staff must verify the bypassing and movement of these control rods is in conformance with applicable analyses. Compliance with this SR allows the RPC and RWL to be OPERABLE with these control rods bypassed.

REFERENCES

1. USAR, Section 7.6.1.7.
2. USAR, Section 15.4.2.
3. NEDE-24011-P-A, "General Electric Standard Application for Reload Fuel" (latest approved revision).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.3.1.2 and SR 3.3.3.1.3

For all Functions except the drywell and containment hydrogen and oxygen analyzers, a CHANNEL CALIBRATION is performed every ~~18~~ 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop including the sensor. The test verifies that the channel responds to the measured parameter with the necessary range and accuracy. The Frequency is based on operating experience and consistency with the typical industry refueling cycles.

The CHANNEL CALIBRATION of the Primary Containment and Drywell Area Radiation Functions consists of an electronic calibration of the channel, not including the detector, for range decades above 10 R per hour and a one point calibration check of the detector below 10 R per hour with an installed or portable gamma source.

For the hydrogen and oxygen analyzers, a CHANNEL CALIBRATION is performed every 92 days. This calibration is performed using an integral gas supply containing hydrogen, oxygen, and inert components in concentrations consistent with the manufacturer's recommendations.

REFERENCES

1. Regulatory Guide 1.97, "Instrumentation for Light-Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," Revision 3, May 1983.
2. SSER 5, Section 7.5.3.1.
3. USAR, Table 7.1-13.
4. USAR Section 7.5.1.4.2.4.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.3.2.1 (continued)

outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. As specified in the Surveillance, a CHANNEL CHECK is only required for those channels that are normally energized.

The Frequency is based upon plant operating experience that demonstrates channel failure is rare.

SR 3.3.3.2.2

SR 3.3.3.2.2 verifies each required Remote Shutdown System transfer switch and control circuit performs the intended function. This verification is performed from the remote shutdown panel and locally, as appropriate. Operation of the equipment from the remote shutdown panel and the local control stations are not necessary. The Surveillance can be satisfied by performance of a continuity check. This will ensure that if the control room becomes inaccessible, the plant can be placed and maintained in MODE 3 from the remote shutdown panel and the local control stations. However, this Surveillance is not required to be performed only during a plant outage. Operating experience demonstrates that Remote Shutdown System control channels usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

SR 3.3.3.2.3

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. The test verifies the channel responds to measured parameter values with the necessary range and accuracy.

The ~~18~~ 24 month Frequency is based upon operating experience and is consistent with the typical industry refueling cycle.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 19.
2. Operational Requirements Manual, Attachment 1.
3. NUREG-0853, "Safety Evaluation Report Related to the Operation of Clinton Power Station, Unit No. 1," Supplement No. 6, July 1986, Section 7.4.3.1.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.1.3

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The system functional test of the pump breakers is included as a part of this test, overlapping the LOGIC SYSTEM FUNCTIONAL TEST, to provide complete testing of the associated safety function. Therefore, if a breaker is incapable of operating, the associated instrument channels would also be inoperable.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance test ~~when performed at the 18 month Frequency~~.

SR 3.3.4.1.4

This SR ensures that an EOC-RPT initiated from the TSV Closure and TCV Fast Closure, Trip Oil Pressure-Low Functions will not be inadvertently bypassed when THERMAL POWER is ≥ 33.3% RTP. This involves calibration of the bypass channels. Adequate margins for the instrument setpoint methodologies are incorporated into the actual setpoint. If any bypass channel's setpoint is nonconservative such that the Functions are bypassed at ≥ 33.3% RTP (e.g., due to open main steam line drain(s), main turbine bypass valve(s) or other reasons), the affected TSV Closure and TCV Fast Closure, Trip Oil Pressure-Low Functions are considered

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1.4 (continued)

inoperable. Alternatively, the bypass channel can be placed in the conservative condition (nonbypass). If placed in the nonbypass condition, this SR is met and the channel considered OPERABLE.

The Frequency of ~~18~~ 24 months has shown that channel bypass failures between successive tests are rare.

SR 3.3.4.1.5

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. The EOC-RPT SYSTEM RESPONSE TIME acceptance criteria are included in applicable plant procedures and include an assumed RPT breaker interruption time of 80 milliseconds. This assumed RPT breaker interruption time is validated by the performance of periodic mechanical timing checks, contact wipe and erosion checks, and high potential tests on each breaker in accordance with plant procedures at least once per ~~18~~ 24 months. The acceptance criterion for the RPT breaker mechanical timing check shall be ≤ 41 milliseconds (for trip coil TC2).

EOC-RPT SYSTEM RESPONSE TIME tests are conducted on an ~~18~~ 24 month STAGGERED TEST BASIS. The Note requires STAGGERED TEST BASIS Frequency to be determined on a per Function basis. This is accomplished by testing all channels of one Function every ~~18~~ 24 months on an alternating basis such that both Functions are tested every ~~36~~ 48 months. This Frequency is based on the logic interrelationships of the various channels required to produce an EOC-RPT signal. Response times cannot be determined at power because operation of final actuated devices is required. Therefore, this Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience, which shows that random failures of instrumentation components that cause serious response time degradation, but not channel failure, are infrequent occurrences.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)	SR 3.3.4.2.5 The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required trip logic for a specific channel. The system functional test of the pump breakers, included as part of this Surveillance, overlaps the LOGIC SYSTEM FUNCTIONAL TEST to provide complete testing of the assumed safety function. Therefore, if a breaker is incapable of operating, the associated instrument channel(s) would be inoperable. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.
REFERENCES	1. USAR, Section 7.7.1.25.2

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.1.2 (continued)

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analyses of Reference 4.

SR 3.3.5.1.3

The calibration of ATMs provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be not within its required Allowable Value specified in Table 3.3.5.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analyses. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than the setting accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 4.

SR 3.3.5.1.4 and SR 3.3.5.1.6

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequencies ~~of SR 3.3.5.1.4 is~~ are based upon the assumption of the magnitude of equipment drift in the setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.5.1.5

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.1, LCO 3.5.2, LCO 3.7.2, LCO 3.8.1, and LCO 3.8.2 overlaps this Surveillance to provide complete testing of the assumed safety function.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for unplanned transients if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 5.2.2.
2. USAR, Section 6.3.
3. USAR, Chapter 15.
4. NEDC-30936-P-A, "BWR Owners' Group Technical Specification Improvement Analyses for ECCS Actuation Instrumentation, Part 2," December 1988.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2.2 (continued)

be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 2.

SR 3.3.5.2.3

The calibration of analog trip modules provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.5.2-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be re-adjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 2.

SR 3.3.5.2.4 and SR 3.3.5.2.6

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter with the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequenc~~y is~~ ies are based on the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.5.2.5

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.5.3 overlaps this Surveillance to provide complete testing of the safety function.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.5.2.5 (continued)

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 15.4.9.

2. NEDE-770-06-2, "Addendum to Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," February 1991.

3. USAR, Section 5.4.6.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.1 (continued)

The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the channels required by the LCO.

SR 3.3.6.1.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. For series Functions, a separate CHANNEL FUNCTIONAL TEST is not required for each Function, provided each Function is tested. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency is based on reliability analysis described in References 5 and 6.

SR 3.3.6.1.3

The calibration of analog trip modules consists of a test to provide a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.6.1-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of References 5 and 6.

, SR 3.3.6.1.5,

SR 3.3.6.1.4 and SR 3.3.6.1.7 8

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.4 and SR 3.3.6.1.8 (continued)

responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency of SR 3.3.6.1.4 and SR 3.3.6.1.8 ~~is~~ based on the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.1.6

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required isolation logic for a specific channel. The system functional testing performed on PCIVs in LCO 3.6.1.3 and on drywell isolation valves in LCO 3.6.5.3 overlaps this Surveillance to provide complete testing of the assumed safety function. (Likewise, system functional testing performed pursuant to LCO 3.7.1 overlaps this Surveillance to provide complete testing for verifying automatic actuation capability for the Division 1 and 2 SX subsystems.) The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified 18-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

SR 3.3.6.1.7

This SR ensures that the individual channel response times are less than or equal to the maximum values assumed in the accident analysis. Testing is performed only on channels where the assumed response time does not correspond to the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.1.7 (continued)

diesel generator (DG) start time. For channels assumed to respond within the DG start time, sufficient margin exists in the 12 second start time when compared to the typical channel response time (milliseconds) so as to assure adequate response without a specific measurement test. The instrument response times must be added to the MSIV closure times to obtain the ISOLATION SYSTEM RESPONSE TIME. ISOLATION SYSTEM RESPONSE TIME acceptance criteria are included in applicable plant procedures.

As noted, the associated sensors are not required to be response time tested. Response time testing for the remaining channel components, including the ATMs, is required. This is supported by Reference 7.

Note 2 to SR 3.3.6.1.7 requires the STAGGERED TEST BASIS Frequency for each Function to be determined seperately based on the number of channels as specified on Table 3.3.6.1-1. This Frequency is based on the logic interrelationships of the various channels required to produce an isolation signal.

ISOLATION SYSTEM RESPONSE TIME tests are conducted on an 24 ~~18~~ month STAGGERED TEST BASIS. This Frequency is consistent with the typical industry refueling cycle and is based upon plant operating experience that shows that random failures of instrumentation components causing serious response time degradation, but not channel failure, are infrequent.

With regard to ISOLATION SYSTEM RESPONSE TIME values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 8).

REFERENCES

1. USAR, Section 6.2.
2. USAR, Chapter 15.
3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.
4. USAR, Section 9.3.5.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.2.3 (continued)

The Frequency of 92 days is based on the reliability analysis of References 3 and 4.

SR 3.3.6.2.4 and SR 3.3.6.2.6

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency is based upon the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.2.5

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required isolation logic for a specific channel. The system functional testing, performed on SCIDs and the SGT System in LCO 3.6.4.2 and LCO 3.6.4.3, respectively, overlaps this Surveillance to provide complete testing of the assumed safety function.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified 18-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.3.6.2.5 (continued) Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.
REFERENCES	1. USAR, Section 6.2.3. 2. USAR, Chapter 15. 3. NEDO-31677-P-A, "Technical Specification Improvement Analysis for BWR Isolation Actuation Instrumentation," July 1990. 4. NEDC-30851-P-A Supplement 2, "Technical Specifications Improvement Analysis for BWR Isolation Instrumentations Common to RPS and ECCS Instrumentation," March 1989. 5. USAR, Section 7.3.1.1.2. 6. USAR, Section 7.1.2.1.11. 7. USAR, Section 7.3.1.1.9.2. 8. USAR, Section 7.6.1.2.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

2. Containment Pressure—High (continued)

This ensures that no single instrument failure can preclude the RHR containment spray function.

The Containment Pressure—High Allowable Value is chosen to ensure the primary containment design pressure is not exceeded.

3. Reactor Vessel Water Level—Low Low Low, Level 1

Low reactor pressure vessel (RPV) water level indicates that a break of the RCPB may have occurred and the capability to maintain the primary containment pressure within design limits may be threatened. The RHR Containment Spray System mitigates the consequences of the steam leaking from the drywell directly into the containment airspace, bypassing the suppression pool.

Reactor vessel water level signals are initiated from four level transmitters that sense the difference between the pressure due to a constant column of water (reference leg) and the pressure due to the actual water level (variable leg) in the vessel. Four channels of Reactor Vessel Water Level—Low Low Low, Level 1 (two per trip system) are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the RHR containment spray function.

The Reactor Vessel Water Level—Low Low Low, Level 1 Allowable Value is chosen to be the same as the ECCS Reactor Vessel Water Level—Low Low Low, Level 1 Allowable Value (LCO 3.3.5.1) since this could be indicative of a LOCA. The Allowable Value is referenced from an instrument zero of 520.62 inches above RPV zero.

4, 5. System A and System B Timers

The purpose of the System A and System B timers is to delay automatic initiation of the RHR Containment Spray System for approximately ~~10 minutes~~ 600 seconds after low pressure coolant injection (LPCI) initiation to give the LPCI System time to fulfill its ECCS function in response to a LOCA. The time delay is needed since the RHR Containment Spray System utilizes the same pumps as the LPCI subsystem (RHR pumps).

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.3.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure the entire channel will perform the intended function. For Series Functions, a separate CHANNEL FUNCTIONAL TEST is not required for each Function, provided each Function is tested. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based upon the reliability analysis of Reference 3.

SR 3.3.6.3.3

The calibration of analog trip modules provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.6.3-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology, but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based upon the reliability analysis of Reference 3.

SR 3.3.6.3.4 and SR 3.3.6.3.6

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequenc~~y is~~ies are based on the assumption of the magnitude of equipment drift in the setpoint analysis.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.3.5

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.6.1.7, "Residual Heat Removal (RHR) Containment Spray," overlaps this Surveillance to provide complete testing of the assumed safety function.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 7.3.1.1.4.
2. USAR, Section 6.2.1.1.5.
3. GENE-770-06-1, "Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," February 1991.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.4.2

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure the entire channel will perform the intended function. For Series Functions, a separate CHANNEL FUNCTIONAL TEST is not required for each Function, provided each Function is tested. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions.

Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 3.

SR 3.3.6.4.3 and SR 3.3.6.4.4

The calibration of analog trip modules and analog comparator units provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in Table 3.3.6.4-1. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 3.

SR 3.3.6.4.5, SR 3.3.6.4.6, and SR 3.3.6.4.~~6~~8

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.4.5 and SR 3.3.6.4.6 (continued)

The Frequency ~~of SR 3.3.6.4.5 and SR 3.3.6.4.6 is~~ based on the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.4.7

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required initiation logic for a specific channel. The system functional testing performed in LCO 3.6.2.4, "Suppression Pool Makeup (SPMU) System," overlaps this Surveillance to provide complete testing of the assumed safety function.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified 18-month Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 7.3.1.1.10

2. USAR, Section 6.2.7.

3. GENE-770-06-1, "Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," February 1991.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.5.2

The calibration of analog trip modules provides a check of the actual trip setpoints. The channel must be declared inoperable if the trip setting is discovered to be less conservative than the Allowable Value specified in SR 3.3.6.5.3. If the trip setting is discovered to be less conservative than accounted for in the appropriate setpoint methodology but is not beyond the Allowable Value, the channel performance is still within the requirements of the plant safety analysis. Under these conditions, the setpoint must be readjusted to be equal to or more conservative than accounted for in the appropriate setpoint methodology.

The Frequency of 92 days is based on the reliability analysis of Reference 3.

SR 3.3.6.5.3

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency is based upon the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.6.5.4

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required actuation logic for a specific channel. The system functional testing performed for S/RVs in LCO 3.4.4 and LCO 3.6.1.6 overlaps this Surveillance to provide complete testing of the assumed safety function.

The Self Test System may be utilized to perform this testing for those components that it is designed to monitor. Those portions of the solid-state logic not monitored by the Self Test System may be tested at the frequency recommended by the manufacturer, rather than at the specified ~~18~~ 24-month

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.6.5.4 (continued)

Frequency. The frequencies recommended by the manufacturer are based on mean time between failure analysis for the components in the associated circuits.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 5.2.2.
2. USAR, Section 7.3.1.1.1.4.2.
3. GENE-770-06-1, "Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," February 1991.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

the measured output value of the process parameter exceeds the setpoint, the associated device (e.g., undervoltage relay) changes state. The analytic limits are derived from the limiting values of the process parameters obtained from the safety analysis. The Allowable Values are derived from the analytic limits, corrected for calibration, process, and some of the instrument errors. The trip setpoints are then determined accounting for the remaining instrument errors (e.g., drift). The trip setpoints derived in this manner provide adequate protection because instrumentation uncertainties, process effects, calibration tolerances, instrument drift, and severe environment errors (for channels that must function in harsh environments as defined by 10 CFR 50.49) are accounted for.

The specific Applicable Safety Analyses, LCO, and Applicability discussions are listed below on a Function by Function basis.

<u>4.16 kV Emergency Bus Undervoltage</u>

<u>1.a, 1.b, 2.a, 2.b. 4.16 kV Emergency Bus Undervoltage (Loss of Voltage)</u>

Loss of voltage on a 4.16 kV emergency bus indicates that offsite power may be completely lost to the respective emergency bus and is unable to supply sufficient power for proper operation of the applicable equipment. Therefore, the power supply to the bus is transferred from offsite power to DG power when the voltages on the bus and the two offsite power supplies drop below the Loss of Voltage Function Allowable Values (loss of voltage with a short time delay). This ensures that adequate power will be available to the required equipment.

The Bus Undervoltage Allowable Values are low enough to prevent inadvertent power supply transfer, but high enough to ensure power is available to the required equipment. The Time Delay Allowable Values are long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment. The time delay specified for the Divisions 1 and 2 4.16 kV Emergency Bus Loss of Voltage Functions corresponds to a voltage ~~at the 120 volt Basis trip setpoint of ≥ 67 volts and 97~~ of 0 volts. ~~Lower~~ Higher voltage conditions will result in ~~decreased~~ increased trip times.

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.c, 1.d, 1.e, 2.c, 2.d, 2.e. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) (continued)

sufficient magnitude to start the degraded voltage timers. If the degraded voltage relays do not reset, which requires the voltage to be restored to a level above the relay reset setpoint, the bus undervoltage time delay relays will trip, resulting in bus transfer to the DGs. Thus, the relay reset (pick-up) setpoint must be high enough to ensure adequate voltage for the safety-related loads.

The Allowable Values are as determined within IP Calculation 19-AN-19 (Ref. 5). The basis for the reset Allowable Value upper limit is the avoidance of shifting to the onsite source when the offsite source is acceptable as specified within GDC 17. The basis for the reset Allowable Value lower limit is the minimum voltage required to support the LOCA loads. ~~The basis for the dropout Allowable Value upper limit is the practical limit of the reset Allowable Value lower limit.~~ The basis for the dropout Allowable Value lower limit ensures adequate voltage to start plant equipment under non-LOCA loading conditions. Because of the voltage transient experienced at the start of a LOCA, the specified Degraded Voltage drop-out Allowable Value lower limit provides significant margin to the setting required to mitigate a LOCA. This value was selected based on other licensing basis events discussed in USAR, Section 8.3.1.1.2 (Ref. 1) and calculated in IP Calculation 19-AN-19.

The upper and lower Allowable Values specified for ~~each of~~ the degraded voltage ~~drop-out and~~ reset (pick-up) functions constitute an allowable band for ~~each~~ function. Apparent overlap between the drop-out band and the reset band for each function is due to allowance for setpoint drift. True overlap between the drop-out and reset function, particularly if the drop-out and reset points can drift or be biased independent of each other, would constitute an unacceptable condition due to the potential for relay chatter or unacceptable relay operation. However, due to the design of the Asea-Brown-Boveri 27N degraded voltage relays, instrument bias and drift associated with the relay drop-out is not independent of the associated with the relay reset. These solid-state relays are designed with a fixed but adjustable deadband. (The reset is set first, then the drop-out is set via a potentiometer.) Allowable ~~bands~~ are specified to allow for drift in either direction, but the drop-out and reset points cannot overlap.

this

values

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

1.c, 1.d, 1.e, 2.c, 2.d, 2.e. 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) (continued)

The Time Delay Allowable Values are long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that sufficient power is available to the required equipment.

Two channels of 4.16 kV Emergency Bus Undervoltage (Degraded Voltage) Function per associated emergency bus for Divisions 1, 2, and 3 are only required to be OPERABLE when the associated DG is required to be OPERABLE to ensure that no single instrument failure can preclude the DG function. (Two channels input to each of the Division 1, 2, and 3 DGs. The Degraded Voltage Function logic for each Division inputs to a single time delay relay. Thus, only one time delay channel is associated with each Division.) Refer to LCO 3.8.1 and LCO 3.8.2 for Applicability Bases for the DGs.

~~Footnotes (a) and (b) to Table 3.3.8.1-1 identify that the TS changes are not effective until RFO of the corresponding plant modification. Modification AP-048 establishes the transformer tap settings and degraded voltage relay setpoints.~~

ACTIONS

A Note has been provided to modify the ACTIONS related to LOP instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition discovered to be inoperable or not within limits will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable LOP instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable LOP instrumentation channel.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.8.1.3

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency is based on the assumption of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.8.1.4

The LOGIC SYSTEM FUNCTIONAL TEST demonstrates the OPERABILITY of the required actuation logic for a specific channel. The system functional testing performed in LCO 3.8.1 and LCO 3.8.2 overlaps this Surveillance to provide complete testing of the assumed safety functions.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.

REFERENCES

1. USAR, Section 8.3.1.1.2.
2. USAR, Section 5.2.2.
3. USAR, Section 6.3.3.
4. USAR, Chapter 15.
5. IP Calculation 19-AN-19.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.8.2.1 (continued)

Surveillance. The 184 day Frequency and the Note in the Surveillance are based on guidance provided in Generic Letter 91-09 (Ref. 2).

SR 3.3.8.2.2

CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

The Frequency is based upon the assumption of an ~~18~~ 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.8.2.3

Performance of a system functional test demonstrates a required system actuation (simulated or actual) signal. The logic of the system will automatically trip open the associated power monitoring assembly circuit breaker. Only one signal per power monitoring assembly is required to be tested. This Surveillance overlaps with the CHANNEL CALIBRATION to provide complete testing of the safety function. The system functional test of the Class 1E circuit breakers is included as part of this test to provide complete testing of the safety function. If the breakers are incapable of operating, the associated electric power monitoring assembly would be inoperable.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the

(continued)

BASES

SURVEILLANCE REQUIREMENTS	SR 3.3.8.2.3 (continued) Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~.
REFERENCES	1. USAR, Section 8.3.1.1.3.1. 2. NRC Generic Letter 91-09, "Modification of Surveillance Interval for the Electric Protective Assemblies in Power Supplies for the Reactor Protection System."

BASES

ACTIONS (continued)

B.1

If the FCVs are not deactivated, (locked up) and cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours. This brings the unit to a condition where the flow coastdown characteristics of the recirculation loop are not important. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.2.1

Hydraulic power unit pilot operated isolation valves located between the servo valves and the common "open" and "close" lines are required to close in the event of a loss of hydraulic pressure. When closed, these valves inhibit FCV motion by blocking hydraulic pressure from the servo valve to the common open and close lines as well as to the alternate subloop. This Surveillance verifies FCV lockup on a loss of hydraulic pressure as assumed in the design basis LOCA analyses.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.2 (continued)

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes valve actuation. This prevents an RPV pressure blowdown.

SR 3.4.4.3

A manual actuation of each required S/RV (those valves removed and replaced to satisfy SR 3.4.4.1) is performed to verify that the valve is functioning properly. This SR can be demonstrated by one of two methods. If performed by Method 1, plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements (Ref. 6), prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If performed by Method 2, valve OPERABILITY has been demonstrated for all installed S/RVs based upon the successful operation of a test sample of S/RVs.

1. Manual actuation of the S/RV with verification of the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or any other method suitable to verify steam flow (e.g., tailpipe temperature or acoustic monitoring). Adequate reactor steam pressure must be available to perform this test to avoid damaging the valve. Also, adequate flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this test. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.3 (continued)

2. The sample population of S/RVs tested to satisfy SR 3.4.4.1 will also be stroked in the relief mode during "as-found" testing to verify proper operation of the S/RV. The successful performance of the test sample of S/RVs provides reasonable assurance that the remaining installed S/RVs will perform in a similar fashion. After the S/RVs are replaced, the relief-mode actuator of the newly-installed S/RVs will be uncoupled from the S/RV stem, and cycled to ensure that no damage has occurred to the S/RV during transportation and installation. Following cycling, the relief-mode actuator is recoupled and the proper positioning of the stem nut is independently verified.

This verifies that each replaced S/RV will properly perform its intended function. If the valve fails to actuate due only to the failure of the solenoid but is capable of opening on overpressure, the safety function of the S/RV is considered OPERABLE.

The ~~18~~ 24 month Frequency was developed based on the S/RV tests required by the ASME Boiler and Pressure Vessel Code, Section XI (Ref. 1). Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. ASME, Boiler and Pressure Vessel Code, Section III and XI.

2. USAR, Section 5.2.2.

3. USAR, Section 15.

4. NEDC-32202P, "SRV Setpoint Tolerance and Out-of-Service Analysis for Clinton Power Station, "August 1993."

5. Calculation IP-0-0032.

6. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, Part 1.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.7.1 (continued)

gives reasonable confidence that the channel is operating properly. The Frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

SR 3.4.7.2

This SR requires the performance of a CHANNEL FUNCTIONAL TEST of the required RCS leakage detection instrumentation. The test ensures that the monitors can perform their function in the desired manner. The test also verifies the relative accuracy of the instrumentation. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical Specifications and non-Technical Specifications tests at least once per refueling interval with applicable extensions. The Frequency of 31 days considers instrument reliability, and operating experience has shown it proper for detecting degradation.

SR 3.4.7.3

This SR requires the performance of a CHANNEL CALIBRATION of the required RCS leakage detection instrumentation channels. The calibration verifies the accuracy of the instrumentation, including the instruments located inside the drywell. The Frequency of ~~18~~ 24 months is a typical refueling cycle and considers channel reliability. Operating experience has proven this Frequency is acceptable.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 30.
2. Regulatory Guide 1.45.
3. USAR, Section 5.2.5.2.2.
4. GEAP-5620, "Failure Behavior in ASTM A106B Pipes Containing Axial Through—Wall Flaws," April 1968.
5. NUREG-75/067, "Investigation and Evaluation of Cracking in Austenitic Stainless Steel Piping of Boiling Water Reactor Plants," October 1975.
6. USAR, Section 5.2.5.5.3.
7. USAR, Section 5.2.5.9.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.4 (continued)

The pump flow rates are verified with a pump differential pressure that is sufficient to overcome the RPV pressure expected during a LOCA. The pump outlet pressure is adequate to overcome the elevation head pressure between the pump suction and the vessel discharge, the piping friction losses, and RPV pressure present during LOCAs. These values may be established during pre-operational testing. The Frequency for this Surveillance is in accordance with the Inservice Testing Program requirements.

With regard to pump flow rates and differential pressures values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Refs. 17, 18, 19).

SR 3.5.1.5

The ECCS subsystems are required to actuate automatically to perform their design functions. This Surveillance test verifies that, with a required system initiation signal (actual or simulated), the automatic initiation logic of HPCS, LPCS, and LPCI will cause the systems or subsystems to operate as designed, including actuation of the system throughout its emergency operating sequence, automatic pump startup, and actuation of all automatic valves to their required positions. This Surveillance also ensures that the HPCS System will automatically restart on an RPV low water level (Level 2) signal received subsequent to an RPV high water level (Level 8) trip and that the suction is automatically transferred from the RCIC storage tank to the suppression pool. The LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1, "Emergency Core Cooling System (ECCS) Instrumentation," overlaps this Surveillance to provide complete testing of the assumed safety function.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5 (continued)

was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes vessel injection/spray during the Surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the test line, coolant injection into the RPV is not required during the Surveillance.

SR 3.5.1.6

The ADS designated S/RVs are required to actuate automatically upon receipt of specific initiation signals. A system functional test is performed to demonstrate that the mechanical portions of the ADS function (i.e., solenoids) operate as designed when initiated either by an actual or simulated initiation signal, causing proper actuation of all the required components. SR 3.5.1.7 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1 overlap this Surveillance to provide complete testing of the assumed safety function.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes valve actuation. This prevents an RPV pressure blowdown.

SR 3.5.1.7

A manual actuation of each required ADS valve (those valves removed and replaced to satisfy SR 3.4.4.1) is performed to verify that the valve is functioning properly. This SR can be demonstrated by one of two methods. If performed by Method 1, plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements (Ref. 21), prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.5.1.8

This SR ensures that the ECCS RESPONSE TIMES are within limits for each of the ECCS injection and spray subsystems. The response time limits (i.e., $\leq$42 seconds for the LPCI subsystems, $\leq$41 seconds for the LPCS subsystem, and $\leq$27 seconds for the HPCS system) are specified in applicable surveillance test procedures. This SR is modified by a Note which identifies that the associated ECCS actuation instrumentation is not required to be response time tested. This is supported by Reference 15.

Response time testing of the remaining subsystem components is required. However, of the remaining subsystem components, the time for each ECCS pump to reach rated speed is not directly measured in the response time tests. The time(s) for the ECCS pumps to reach rated speed is bounded, in all cases, by the time(s) for the ECCS injection valve(s) to reach the full-open position. Plant-specific calculations show that all ECCS motor start times at rated voltage are less than two seconds. In addition, these calculations show that under degraded voltage conditions, the time to rated speed is less than five seconds.

ECCS RESPONSE TIME tests are conducted every ~~18~~ 24 months. The 24 ~~18~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to ECCS RESPONSE TIME values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 20).

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.3.3 and SR 3.5.3.4

The RCIC pump flow rates ensure that the system can maintain reactor coolant inventory during pressurized conditions with the RPV isolated. The flow tests for the RCIC System are performed at two different pressure ranges such that system capability to provide rated flow is tested both at the higher and lower operating ranges of the system. Additionally, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the RCIC System diverts steam flow. Since the required reactor steam pressure must be available to perform SR 3.5.3.3 and SR 3.5.3.4, sufficient time is allowed after adequate pressure and flow are achieved to perform these SRs. Reactor startup is allowed prior to performing the low pressure Surveillance because the reactor pressure is low and the time to satisfactorily perform the Surveillance is short. The reactor pressure is allowed to be increased to normal operating pressure since it is assumed that the low pressure test has been satisfactorily completed and there is no indication or reason to believe that RCIC is inoperable. Therefore, these SRs are modified by Notes that state the Surveillances are not required to be performed until 12 hours after the reactor steam pressure and flow are adequate to perform the test.

A 92 day Frequency for SR 3.5.3.3 is consistent with the Inservice Testing Program requirements. The ~~18~~ 24 month Frequency for SR 3.5.3.4 is based on the need to perform this Surveillance under the conditions that apply just prior to or during startup from a plant outage. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to RCIC steam supply pressure values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 5).

With regard to the measured reactor pressure and flow rate values obtained pursuant to SR 3.5.3.3, as read from plant instrumentation assumed in Reference 5, are considered to be nominal values and therefore do not require compensation for instrument indication uncertainties.

With regard to the measured reactor pressure and flow rate values obtained pursuant to SR 3.5.3.4, the values as read from plant indication instrumentation are not considered to be nominal values with respect to instrument uncertainties. This requires additional margin to be added to the limit to compensate for instrument uncertainties, for implementation in the associated plant procedures (Ref. 5).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.3.5

The RCIC System is required to actuate automatically to perform its design function. This Surveillance verifies that with a required system initiation signal (actual or simulated) the automatic initiation logic of RCIC will cause the system to operate as designed, including actuation of the system throughout its emergency operating sequence, automatic pump startup and actuation of all automatic valves to their required positions. This Surveillance test also ensures that the RCIC System will automatically restart on an RPV low water level (Level 2) signal received subsequent to an RPV high water level (Level 8) trip and that the suction is automatically transferred from the RCIC storage tank to the suppression pool. The LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.2, "Reactor Core Isolation Cooling (RCIC) System Instrumentation," overlaps this Surveillance to provide complete testing of the assumed safety function.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes vessel injection during the Surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the test line, coolant injection into the RPV is not required during the Surveillance.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 33.
2. USAR, Section 5.4.6.
3. Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCO's for ECCS Components," December 1, 1975.
4. USAR, Section 15.4.9.
5. Calculation 01RI15.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.1.3.6

Verifying that the full closure isolation time of each MSIV is within the specified limits is required to demonstrate OPERABILITY. The full closure isolation time test ensures that the MSIV will isolate in a time period that does not exceed the times assumed in the DBA analyses. The Frequency of this SR is in accordance with the Inservice Testing Program.

With regard to isolation time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 10).

SR 3.6.1.3.7

Automatic PCIVs close on a primary containment isolation signal to prevent leakage of radioactive material from primary containment following a DBA. This SR ensures that each automatic PCIV will actuate to its isolation position on a primary containment isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.1.6 overlaps this SR to provide complete testing of the safety function. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.1.3.8

This SR ensures that the leakage rate of secondary containment bypass leakage paths is less than the specified leakage rate. This provides assurance that the assumptions in the radiological evaluations of References 1, 2, and 3 are met. The leakage rate of each bypass leakage path is assumed to be the maximum pathway leakage (leakage through the worse of the two isolation valves) unless the penetration is isolated by use of one closed and de-activated automatic valve, closed manual valve, or blind flange. In this case, the leakage rate of the isolated bypass leakage path is assumed to be the actual pathway

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.1.3.11

This SR ensures that the combined leakage rate of the primary containment feedwater penetrations is less than the specified leakage rate. The leakage rate is based on water as the test medium since these penetrations are designed to be sealed by the FWLCS. The 3 gpm leakage limit has been shown by testing and analysis to bound the condition following a DBA LOCA where, for a limited time, both air and water are postulated to leak through this pathway. The leakage rate of each primary containment feedwater penetration is assumed to be the maximum pathway leakage, i.e., the leakage through the worst of the two isolation valves [either 1B21-F032A(B) or 1B21-F065A(B)] in each penetration. This provides assurance that the assumptions in the radiological evaluations of References 1 and 2 are met (Ref. 15).

Dose associated with leakage (both air and water) through the primary containment feedwater penetrations is considered to be in addition to the dose associated with all other secondary containment bypass leakage paths.

The Frequency is in accordance with the Primary Containment Leakage Rate Testing Program.

A Note is added to this SR which states that the primary containment feedwater penetrations are only required to meet this leakage limit in Modes 1, 2, and 3. In other conditions, the Reactor Coolant System is not pressurized and specific primary containment leakage limits are not required.

SR 3.6.1.3.12

This SR requires a demonstration that each instrumentation line excess flow check valve (EFCV) which communicates to the reactor coolant pressure boundary (Ref. 16) is OPERABLE by verifying that the valve activates within the required flow range. For instrument lines connected to reactor coolant pressure boundary, the EFCVs serve as an additional flow restrictor to the orifices that are installed inside the drywell (Ref. 14). The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.1.6.1 (continued)

proper positioning of the stem nut is independently verified. This verifies that each replaced S/RV will properly perform its intended function.

The Frequency of the required relief-mode actuator testing is based on the tests required by ASME OM Part 1 (Ref. 2), as implemented by the Inservice Testing Program of Specification 5.5.6. The testing Frequency required by the Inservice Testing Program is based on operating experience and valve performance. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.1.6.2

The LLS designed S/RVs are required to actuate automatically upon receipt of specific initiation signals. A system functional test is performed to verify that the mechanical portions (i.e., solenoids) of the automatic LLS function operate as designed when initiated either by an actual or simulated automatic initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.5.4 overlaps this SR to provide complete testing of the safety function.

The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes valve actuation. This prevents a reactor pressure vessel pressure blowdown.

REFERENCES

1. USAR, Section 5.2.2.2.3.

2. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, Part 1.

SURVEILLANCE REQUIREMENTS

SR 3.6.1.7.1 (continued)

A Note has been added to this SR that allows RHR containment spray subsystems to be considered OPERABLE during alignment to and operation in the RHR shutdown cooling mode when below the RHR cut in permissive pressure in MODE 3, if capable of being manually realigned and not otherwise inoperable. At these low pressures and decay heat levels (the reactor is shut down in MODE 3), a reduced complement of subsystems should provide the required containment pressure mitigation function thereby allowing operation of an RHR shutdown cooling loop when necessary.

SR 3.6.1.7.2

Verifying each RHR pump develops a flow rate ≥ 3800 gpm while operating in the suppression pool cooling mode with flow through the associated heat exchanger ensures that pump performance has not degraded below the required flow rate during the cycle. It is tested in the pool cooling mode to demonstrate pump OPERABILITY without spraying down equipment in primary containment. Although this SR is satisfied by running the pump in the suppression pool cooling mode, the test procedures that satisfy this SR include appropriate acceptance criteria to account for the higher pressure requirements resulting from aligning the RHR System in the containment spray mode. The Frequency of this SR is in accordance with the Inservice Testing Program.

SR 3.6.1.7.3

This SR verifies that each RHR containment spray subsystem automatic valve actuates to its correct position upon receipt of an actual or simulated automatic actuation signal. Actual spray initiation is not required to meet this SR. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.3.5 overlaps this SR to provide complete testing of the safety function. (24) The ~~18~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.1.7.3 (continued)

~~the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.1.7.4

This Surveillance is performed following activites that could result in nozzle blockage to verify that the spray nozzles are not obstructed and that flow will be provided when required. Such activities may include a loss of foreign material control (of if it cannot be assured), following a major configuration change, or following an inadvertent actuation of containment spray. This Surveillance is normally performed by an air or smoke flow test. The Frequency is adequate due to the passive nozzle design and its normally dry state and has been shown to be acceptable through operating experience.

REFERENCES

1. USAR, Section 6.2.1.1.5.
2. ASME, Boiler and Pressure Vessel Code, Section XI.
3. USAR, Section 5.4.7

SURVEILLANCE REQUIREMENTS

SR 3.6.1.8.3

A system functional test is performed to ensure that the MSIV LCS will operate through its operating sequence. This includes verifying that the automatic positioning of the valves and the operation of each interlock and timer are correct, that the blowers start and develop the required flow rate (i.e., ≥ 100 scfm for the inboard system and ≥ 200 scfm for the outboard system) and the necessary vacuum (i.e., ≥ 15 inches-water gauge), and the upstream heaters meet current (i.e., 7.4 to 9.2 amperes per phase) draw requirements (which may also be used to verify electrical continuity in SR 3.6.1.8.2). The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to flow rate, vacuum, and current values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).

REFERENCES

1. USAR, Section 6.7.
2. USAR, Section 15.6.5.
3. Calculation IP-0-0069.
4. Calculation IP-0-0070.

BASES (continued)

ACTIONS (continued)	C.1 and C.2 If the inoperable FWLCS subsystem cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.
SURVEILLANCE REQUIREMENTS	SR 3.6.1.9.1 A system functional test of each FWLCS subsystem is performed to ensure that each FWLCS subsystem will operate through its operating sequence. This includes verifying automatic positioning of valves and operation of each interlock, and that the necessary check valves open. Adequacy of the associated RHR pumps to deliver FWLCS flow rates required to meet the assumptions made in the supporting analyses concurrent with other modes was demonstrated during acceptance testing of the system after installation. Periodic verification of the capabilities of the RHR pumps is performed under SR 3.5.1.4. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.
REFERENCES	1. USA, Section 15.6.5.

SURVEILLANCE REQUIREMENTS

SR 3.6.2.4.3 (continued)

The Frequency of 31 days is justified because the valves are operated under procedural control and because improper valve position would affect only a single subsystem. This Frequency has been shown to be acceptable through operating experience.

SR 3.6.2.4.4

This SR requires a verification that each SPMU subsystem automatic valve actuates to its correct position on receipt of an actual or simulated automatic initiation signal. This includes verification of the correct automatic positioning of the valves and of the operation of each interlock and timer. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.4.7 overlaps this SR to provide complete testing of the safety function. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note that excludes make up to the suppression pool. Since all active components are testable, makeup to the suppression pool is not required.

REFERENCES

1. USAR, Section 6.2.
2. USAR, Chapter 15.
3. USAR, Section 6.2.7.
4. Calculation IP-0-0074.
5. Calculation IP-0-0075.
6. Calculation IP-M-0662.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.3.1.1

Performance of a system functional test for each primary containment hydrogen recombiner ensures that the recombiners are OPERABLE and can attain and sustain the temperature necessary for hydrogen recombination. In particular, this SR requires verification that the reaction chamber temperature increases to ≥ 1150°F in 2 hours and that the reaction chamber is maintained ≥ 1177°F and ≤ 1223° for ≥ 2 hours. These verifications are required to check the capability of the recombiner to properly function.

Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to reaction chamber temperature values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 5).

SR 3.6.3.1.2

This SR ensures that there are no physical problems that could affect primary containment hydrogen recombiner operation. Since the recombiners are mechanically passive, except for the blower assemblies, they are subject to only minimal mechanical failure. The only credible failures involve loss of power, blockage of the internal flow path, missile impact, etc. A visual inspection is sufficient to determine abnormal conditions that could cause such failures.

Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.3.1.3

This SR requires performance of a resistance to ground test of each heater phase to ensure that there are no detectable grounds in any heater phase. This is accomplished by verifying that the resistance to ground for any heater phase is ≥ 10,000 ohms when this SR is performed within 2 hours following the performance of SR 3.6.3.1.1.

Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency.~~ Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to heater resistance values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 5).

REFERENCES

1. 10 CFR 50.44.
2. 10 CFR 50, Appendix A, GDC 41.
3. Regulatory Guide 1.7.
4. USAR, Section 6.2.5.
5. Calculation IP-0-0076.

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.3.2.1 and SR 3.6.3.2.2

These SRs verify that there are no physical problems that could affect the igniter operation. Since the igniters are mechanically passive, they are not subject to mechanical failure. The only credible failures are loss of power or burnout. The verification that each required igniter is energized is performed by circuit current versus voltage measurement.

The Frequency of 184 days has been shown to be acceptable through operating experience because of the low failure occurrence, and provides assurance that hydrogen burn capability exists between the more rigorous ~~18~~ 24 month Surveillances. Operating experience has shown these components usually pass the Surveillance when performed at a 184 day Frequency. Additionally, these surveillances must be performed every 92 days if four or more igniters in any division are inoperable. The 92 day Frequency was chosen, recognizing that the failure occurrence is higher than normal. Thus, decreasing the Frequency from 184 days to 92 days is a prudent measure, since only two more inoperable igniters (for a total of six) will result in an inoperable igniter division. SR 3.6.3.2.2 is modified by a Note that indicates that the Surveillance is not required to be performed until 92 days after four or more igniters in the division are discovered to be inoperable.

With regard to circuit current and voltage values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.3.2.3 and SR 3.6.3.2.4

These functional tests are performed every ~~18~~ 24 months to verify system OPERABILITY. The current draw to develop a surface temperature of ≥ 1700°F is verified for igniters in inaccessible areas, e.g., in a high radiation area. Additionally, the surface temperature of each accessible igniter is measured to be ≥ 1700°F to demonstrate that a temperature sufficient for ignition is achieved. The 24 ~~18~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency.~~ Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to current draw and surface temperature values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 4).

REFERENCES

1. 10 CFR 50.44.
2. 10 CFR 50, Appendix A, GDC 41.
3. USAR, Section 6.2.5.
4. Calculation IP-0-0076.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.3.3.2

Verifying that each Containment/Drywell Hydrogen Mixing System flow rate is ≥ 800 scfm ensures that each system is capable of maintaining drywell hydrogen concentrations below the flammability limit. In practice, verifying that the system differential pressure is less than 4.4 psid with the compressor running ensures that the system flow rate is greater than 800 scfm. Operating experience has shown that these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to system differential pressure values used to verify the required system flow rate as read from plant indication instrumentation, the procedural limit is considered to be not nominal and therefore requires compensation for instrument indication uncertainties (Ref. 3).

REFERENCES

1. Regulatory Guide 1.7.
2. USAR, Section 6.2.5.
3. Calculation IP-0-0076.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.1.4 and SR 3.6.4.1.5 (continued)

shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

With regard to drawdown time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Refs. 4, 5).

REFERENCES

1. USAR, Section 15.6.5.
2. USAR, Section 15.7.4.
3. Calculation IP-0-0082.
4. Calculation IP-0-0083.
5. Calculation IP-0-0084.
6. Calculation 3C10-1079-001.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.2.3

Verifying that each automatic SCID closes on a secondary containment isolation signal is required to prevent leakage of radioactive material from secondary containment following a DBA or other accident. This SR ensures that each automatic SCID will actuate to the isolation position on a secondary containment isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. USAR, Section 15.6.5.
2. USAR, Section 6.2.3.
3. USAR, Section 15.7.4.
4. Calculation IP-0-0085.

ACTIONS

E.1 and E.2 (continued)

position. Also, if applicable, actions must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Action must continue until OPDRVs are suspended.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.3.1

Operating each SGT subsystem from the main control room for ≥ 10 continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters on (automatic heater cycling to maintain temperature) for ≥ 10 continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

With regard to operating time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 9).

SR 3.6.4.3.2

This SR verifies that the required SGT filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing HEPA filter performance, charcoal adsorber bypass leakage and efficiency, minimum system flow rate, combined HEPA filter and charcoal adsorber pressure drop, and heater dissipation. The frequencies for performing the SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4) and include testing initially, after 720 hours of system operation, once per ~~18~~ 24 months, and following painting, fire, or chemical release in any ventilation zone communicating with the system. The laboratory test results will be

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.4.3.2 (continued)

verified to be within limits within 31 days of removal of the sample from the system. Additional information is discussed in detail in the VFTP.

With regard to filter testing values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 10).

SR 3.6.4.3.3

This SR requires verification that each SGT subsystem automatically starts upon receipt of an actual or simulated initiation signal.

The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.4.3.4

This SR requires verification that the SGT filter cooling bypass damper can be opened and the fan started. This ensures that the ventilation mode of SGT System operation is available. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.5.3.5

Verifying that each automatic drywell isolation valve closes on a drywell isolation signal is required to prevent bypass leakage from the drywell following a DBA. This SR ensures each automatic drywell isolation valve will actuate to its isolation position on a drywell isolation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.1.6 overlaps this SR to provide complete testing of the safety function. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power, since isolation of penetrations would eliminate cooling water flow and disrupt the normal operation of many critical components. Operating experience has shown these components usually pass this Surveillance ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. USAR, Section 6.2.4.
2. CPS ISI Manual.
3. Calculation IP-0-0091.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.5.6.3

Verification of the drywell post-LOCA vacuum relief valve opening differential pressure of ≤ 0.2 psid is necessary to ensure that the safety analysis assumptions for drywell vacuum relief are valid. The safety analysis assumes that the drywell post-LOCA vacuum relief valves will start opening when the drywell pressure is approximately 0.2 psid less than the containment and will be fully open when this differential pressure is 0.5 psid. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for violating the drywell boundary. Operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

REFERENCES

1. USAR, Section 6.2.

SURVEILLANCE REQUIREMENTS

SR 3.7.1.2 (continued)

Isolation of the SX subsystem to components or systems does not necessarily affect the OPERABILITY of the associated SX subsystem. As such, when all SX pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the associated SX subsystem needs to be evaluated to determine if it is still OPERABLE. Alternatively, it is acceptable and conservative to declare an SX subsystem inoperable when a branch connection is isolated or a supported ventilation system is inoperable.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.1.3

This SR verifies that the automatic isolation valves of the Division 1 and 2 SX subsystems will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by use of an actual or simulated initiation signal and is performed with the plant shut down. This SR also verifies the automatic start capability of the SX pump in each subsystem. Operating experience has shown that these components usually pass the SR ~~when performed on the 18 month Frequency~~. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

REFERENCES

1. Regulatory Guide 1.27, Revision 2, January 1976.
2. USAR, Section 9.2.1.2.
3. USAR, Table 9.2-3.
4. USAR, Section 6.2.1.1.3.3.
5. USAR, Chapter 15.
6. USAR, Section 6.2.2.3.
7. USAR, Table 6.2-2.
8. Calculation IP-0-0095.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1 (continued)

Isolation of the Division 3 SX subsystem to components or systems does not necessarily affect the OPERABILITY of the Division 3 SX subsystem. As such, when the Division 3 SX pump, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the Division 3 SX subsystem needs to be evaluated to determine if it is still OPERABLE. Alternatively, it is acceptable and conservative to declare an SX subsystem inoperable when a branch connection is isolated or a supported ventilation system is inoperable.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.2.2

This SR verifies that the automatic isolation valves of the Division 3 SX subsystem will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by use of an actual or simulated initiation signal and is performed with the plant shut down. This SR also verifies the automatic start capability of the Division 3 SX pump.

Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

REFERENCES

1. USAR, Section 9.2.1.2.

2. USAR, Chapter 6.

3. USAR, Chapter 15.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1 and SR 3.7.3.2 (continued)

With regard to subsystem operation time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 8, 9).

SR 3.7.3.3

This SR verifies that the required Control Room Ventilation System testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing HEPA filter performance, charcoal adsorber bypass leakage and efficiency, minimum system flow rate (scfm), combined HEPA filter and charcoal adsorber pressure drop, and heater dissipation. The frequencies for performing the Control Room Ventilation System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 4) and include testing initially, after 720 hours of system operation, once per ~~18~~ 24 months, and following painting, fire, or chemical release in any ventilation zone communicating with the system. The laboratory test results will be verified to be within limits within 31 days of removal of the sample from the system. Additional information is discussed in detail in the VFTP.

With regard to filter testing parameter values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Refs. 10, 11).

SR 3.7.3.4

This SR verifies that each Control Room Ventilation subsystem starts and operates on an actual or simulated high radiation initiation signal. While this Surveillance can be performed with the reactor at power, operating experience has shown these components usually pass the Surveillance ~~when performed at the 18 month Frequency~~, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.3.5

This SR verifies the integrity of the negative pressure portions of the Control Room Ventilation System ductwork located outside the main control room habitability boundary between fan OVCO4CA(B) and isolation dampers OVCO3YA(B) inclusive and fire dampers OVCO42YA(E), OVCO42YB(F), OVCO42YC(G), and OVCO42YD(H). In addition, the integrity of the recirculation filter housing flexible connection to fan OVCO3A(B) must be verified. This testing ensures the unfiltered inleakage (scfm) into the main control room habitability boundary is within the analysis assumptions. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, this Frequency is concluded to be acceptable from a reliability standpoint.

With regard to unfiltered inleakage values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is not considered to be a nominal value with respect to instrument uncertainties. This requires additional margin to be added to the limit to compensate for instrument uncertainties, for implementation in the associated plant procedures (Ref. 12).

SR 3.7.3.6

This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper function of the Control Room Ventilation System. During the high radiation mode of operation, the Control Room Ventilation System is designed to slightly pressurize the control room to ≥ 1/8 inches water gauge positive pressure with respect to adjacent areas to prevent unfiltered inleakage. The Control Room Ventilation System is designed to maintain this positive pressure at a flow rate of ≤ 3000 scfm to the control room in the high radiation mode. The Frequency of ~~18~~ 24 months on a STAGGERED TEST BASIS is consistent with ~~industry practice~~ the refueling cycle and other filtration system SRs.

With regard to control room positive pressure and flow rate values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is not considered to be a nominal value with respect to instrument uncertainties. This requires additional margin to be added to the limit to compensate for instrument uncertainties, for implementation in the associated plant procedures (Ref. 13).

BASES

ACTIONS

E.1, E.2, and E.3 (continued)

During movement of irradiated fuel assemblies in the primary or secondary containment, during CORE ALTERATIONS, or during OPDRVs, if the Required Action and associated Completion Time of Condition B is not met, action must be taken to immediately suspend activities that present a potential for releasing radioactivity that might require operation of the Control Room Ventilation System in the high radiation mode. This places the unit in a condition that minimizes risk.

If applicable, CORE ALTERATIONS and handling of irradiated fuel in the primary and secondary containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE REQUIREMENTS

SR 3.7.4.1

This SR verifies that the heat removal capability of the system is sufficient to remove the control room heat load assumed in the safety analysis. The SR consists of a combination of testing and calculation. The ~~18~~ 24 month Frequency is appropriate since significant degradation of the Control Room AC System is not expected over this time period.

With regard to heat removal capability values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 3).

REFERENCES

1. USAR, Section 6.4.
2. USAR, Section 9.4.1.
3. Calculation IP-0-0102.

SURVEILLANCE REQUIREMENTS

SR 3.7.6.1

Cycling each main turbine bypass valve through one complete cycle of full travel demonstrates that the valves are mechanically OPERABLE and will function when required. The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.6.2

The Main Turbine Bypass System is required to actuate automatically to perform its design function. This SR demonstrates that, with the required system initiation signals, the valves will actuate to their required position. The ~~18~~ 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the 24 ~~18~~ month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

SR 3.7.6.3

This SR ensures that the TURBINE BYPASS SYSTEM RESPONSE TIME is in compliance with the assumptions of the appropriate safety analysis. The response time limits (bypass valve begins to open in ≤ 0.1 seconds and 80% of turbine bypass system capacity is established in ≤ 0.3 seconds) are specified in applicable surveillance test procedures. The 24 ~~18~~ month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown the 24 ~~18~~ month Frequency, which is based on the refueling cycle, is acceptable from a reliability standpoint.

With regard to TURBINE BYPASS SYSTEM RESPONSE TIME values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 3).

BASES

ACTIONS (continued)

B.4

In Condition B, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E distribution system. Although Condition B applies to a single inoperable DG, several Completion Times are specified for this Condition.

The first Completion Time applies to an inoperable Division 3 DG. The 72-hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA during this period. This Completion Time begins only "upon discovery of an inoperable Division 3 DG" and, as such, provides an exception to the normal "time zero" for beginning the allowed outage time "clock" (i.e., for beginning the clock for an inoperable Division 3 DG when Condition B may have already been entered for another equipment inoperability and is still in effect).

The second Completion Time (14 days) applies to an inoperable Division 1 or 2 DG and is a risk-informed allowed out-of-service time (AOT) based on a plant-specific risk analysis performed to establish this AOT for the Division 1 and 2 DGs.

The evaluation that supports this Completion Time considered both planned and unplanned DG outage time. Based on this evaluation, it is intended that use of the full, 14-day completion time would be limited to once per DG per cycle (~~18~~ 24 months) to perform a planned DG overhaul.

To mitigate increased risk during the period beyond 72 hours and up to 14 days, the following actions must be completed prior to exceeding 72 hours:

- Verification that the RAT and ERAT are operable.
- Verification of the correct breakers alignment and indicated power availability for each offsite circuit.
- The DG extended Completion Time will not be entered for scheduled maintenance purposes if severe weather conditions are expected.
- Additional elective equipment maintenance or testing that requires the equipment to be removed from service will be evaluated and activities that yield unacceptable results will be avoided.
- The condition of the offsite power supply and switchyard, including transmission lines and ring bus breakers, will be evaluated.
- No elective maintenance will be scheduled within the switchyard that would challenge the RAT connection or offsite power availability.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.8

Transfer of each 4.16 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit. The 24 ~~18~~ month Frequency of the Surveillance is based on engineering judgment taking into consideration the plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR ~~when performed on the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject a load equivalent to at least as large as the largest single load while maintaining a specified margin to the overspeed trip.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

The referenced load for DG 1A is the low pressure core spray pump; for DG 1B, the residual heat removal (RHR) pump; and for DG 1C the HPCS pump. The Shutdown Service Water (SX) pump values are not used as the largest load since the SX supplies cooling to the associated DG. If this load were to trip, it would result in the loss of the DG. The use of larger loads for reference purposes is acceptable. This Surveillance may be accomplished by:

1) Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest load while paralleled to offsite power, or while supplying the bus, or

2) Tripping its associated single largest load with the DG supplying the bus.

As required by IEEE-308 (Ref. 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The ~~18~~ 24 month Frequency is consistent with the refuel cycle recommendations of Regulatory Guide ~~1.108~~ 1.9 (Ref. ~~9~~ 15).

This SR has been modified by two Notes. The intent of Note 1 is to indicate that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.10 (continued)

While the DG is not expected to experience this transient during an event and continue to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

The ~~18~~ 24 month Frequency 1.9 is consistent with the refuel cycle recommendation of Regulatory Guide ~~1.108~~ (Ref. ~~2~~) and is intended to be consistent with expected fuel cycle 15 lengths.

This SR has been modified by a Note. The intent of the Note is to indicate that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Testing performed for this SR is normally conducted with the DG being tested (and the associated safety-related distribution subsystem) connected to one offsite source, while the remaining safety-related (and non-safety related) distribution systems are aligned to the other offsite source (or unit auxiliary transformers). This minimizes the possibility of common cause failure resulting from offsite/grid voltage perturbations.

This Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite of grid perturbations.

With regard to DG load and voltage values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 23).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11 (continued)

full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of the connection and loading of these loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of ~~18~~ 24 months is consistent with the refuel cycle recommendations of Regulatory Guide ~~1.108~~ 1.9 (Ref. ~~8~~ 15), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions mean that the lube oil is heated by the jacket water and continuously circulated through a portion of the system as recommended by the vendor. Engine jacket water is heated by an immersion heater and circulates through the system by natural circulation. This allowance is not intended to impose a maximum limit on engine temperatures. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time (12 seconds) from the design basis actuation signal (LOCA signal) and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability.

With regard to DG start time, required voltage and frequency values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is not considered to be a nominal value with respect to instrument uncertainties. This requires additional margin to be added to the limit to compensate for instrument uncertainties, for implementation in the associated plant procedures (Refs. 16, 17, 18, 21, 22).

The Frequency of ~~18~~ 24 months takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions mean that the lube oil is heated by the jacket water and continuously circulated through a portion of the system as recommended by the vendor. Engine jacket water is heated by an immersion heater and circulates through the system by natural circulation. This allowance is not intended to impose a maximum limit on engine temperatures. The reason for Note 2 is that during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12 (continued)

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.13

This Surveillance demonstrates that DG non-critical protective functions (e.g., high jacket water temperature) are bypassed on an ECCS initiation test signal and critical protective functions trip the DG to avert substantial damage to the DG unit. The non-critical trips are bypassed during DBAs and provide alarms on abnormal engine conditions. These alarms provide the operator with necessary information to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The ~~18~~ 24 month Frequency is based on engineering judgment, taking into consideration plant conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR ~~when performed at the 18 month Frequency~~. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

The SR is modified by a Note. The intent of the Note is to indicate that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.13 (continued)

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.14

Regulatory Guide 1.9, Revision 3 (Ref. 15) requires demonstration once per ~~18~~ 24 months that the DGs can start and run continuously at or near full-load capability for an interval of not less than 24 hours. The DGs are to be loaded equal to or greater than 105 percent of the continuous rating for at least 2 hours and equal to or greater than 90 percent of the continuous rating for the remaining hours of the test (i.e., 22 hours) (Ref. 15). The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience.

The ~~18~~ 24 month Frequency is consistent with the refuel cycle recommendations of Regulatory Guide 1.9, Revision 3 (Ref. 15); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by two Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test. The intent of Note 2 is to indicate that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.14 (continued)

1) *Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and*

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Testing performed for this SR is normally conducted with the DG being tested (and the associated safety-related distribution subsystem) connected to one offsite source, while the remaining safety-related (and non-safety related) distribution systems are aligned to the other offsite source (or unit auxiliary transformers). This minimizes the possibility of common cause failures resulting from offsite/grid voltage perturbations.

With regard to DG loading capability values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 19).

SR 3.8.1.15

This Surveillance , and demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 12 seconds. The 12 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA.

With regard to DG loading values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 19).

With regard to DG start time, frequency and voltage values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is not considered to be a nominal value with respect to instrument uncertainties. This requires additional margin to be added to the limit to compensate for instrument uncertainties, for implementation in the associated plant procedures (Refs. 16, 17, 18, 21, 22).

The ~~18~~ 24 month Frequency is consistent with the refuel cycle is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5). recommendations of Regulatory Guide 1.9, Revision 3 (Ref. 15).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15 (continued)

This SR has been modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The requirement that the diesel has operated for at least 2 hours at full load conditions (i.e., equal to or greater than 90 percent of the continuous rating) prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and load transfer from the DG to each offsite power source can be made and that the DG can be returned to ready-to-load status when offsite power is restored. It also ensures that the undervoltage logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready-to-load status when the DG is at rated speed and voltage, the output breaker is open and can receive an auto-close signal on bus undervoltage, and the load sequence timers are reset.

Portions of the synchronization circuit are associated with the DG and portions with the offsite circuit. If a failure in the synchronization requirement of the Surveillance occurs, depending on the specific affected portion of the synchronization circuit, either the DG or the associated offsite circuit is declared inoperable. [1.9]

The Frequency of ~~18~~ [24] months is consistent with the [refuel cycle] recommendations of Regulatory Guide ~~1.108~~ (Ref. ~~9~~), ~~paragraph 2.a.(6),~~ [15] and takes into consideration plant conditions required to perform the Surveillance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.16 (continued)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

SR 3.8.1.17 <from next pg> and

Demonstration of the test mode override ensures that the DG availability under accident conditions is not compromised as the result of testing. Except as clarified below for the Division 3 DG, interlocks to the LOCA sensing circuits cause the DG to automatically reset to ready-to-load operation if an ECCS initiation signal is received during operation in the test mode. Ready-to-load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2), as further amplified by IEEE 387, sections 5.6.1 and 5.6.2. (Clarification regarding conformance of the Division 3 DG design to these standards is provided in the USAR, Chapter 8 (Reference 2).)

Automatic switchover from the test mode to ready-to-load operation for the division 3 DG is also demonstrated, as described above, by ensuring that DG control logic automatically resets in response to a LOCA signal during the test mode and confirming that ready-to-load operation is attained (as evidenced by the DG running with the output breaker open). However, with the DG governor initially operating in a "droop" condition during the test mode, operator action may be required to reset the governor for

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

ready-to-load operation in order to complete the surveillance for the Division 3 DG. Resetting the governor ensures that the DG will supply the Division 3 bus at the required frequency in the event of a LOCA and a loss of offsite power while the DG is in a droop condition during the test mode.

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading is not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

⟨INSERT ON PREVIOUS PG⟩

The ~~18~~ 24 month Frequency ~~is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8)~~; takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

is consistent with the refuel cycle recommendations of Regulatory Guide 1.9 (Ref. 15)

This SR has been modified by a Note. The intent of this note is to indicate that credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

Testing performed for this SR is normally conducted with the DG being tested (and the associated safety-related distribution subsystem) connected to one offsite source, while the remaining safety-related (and non-safety related) distribution systems are aligned to the other offsite source (or unit auxiliary transformers). This minimizes the possibility of common cause failures resulting from offsite/grid voltage perturbations.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18

Under accident conditions with a loss of offsite power, loads are sequentially connected to the bus by the load sequencing logic (except for Division 3 which has no load sequence timers). The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The 10% load sequence time tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

and

The Frequency of ~~18~~ 24 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.

is consistent with the refuel cycle recommendations of Regulatory Guide 1.9 (Ref. 15)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance during these MODES may perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

With regard to sequence time values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 24).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. For load shedding effected via shunt trips that are actuated in response to a LOCA signal (i.e., "ECCS initiation signal"), this surveillance includes verification of the shunt trips (for Divisions 1 and 2 only) in response to LOCA signals originating in the ECCS initiation logic as well as the Containment and Reactor Vessel Isolation and Control System actuation logic. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of ~~18~~ 24 months takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of ~~18~~ 24 months.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions mean that the lube oil is heated by the jacket water and continuously circulated through a portion of the system as recommended by the vendor. Engine jacket water is heated by an immersion heater and circulates through the system by natural circulation. This allowance is not intended to impose a maximum limit on engine temperatures. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge plant safety systems. Credit may be taken for unplanned events that satisfy this SR. Examples of unplanned events may include:

(continued)

FYI ONLY - NO CHANGES

BASES

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. USAR, Chapter 8.
3. Regulatory Guide 1.9, Revision 2.
4. USAR, Chapter 6.
5. USAR, Chapter 15.
6. Regulatory Guide 1.93.
7. Generic Letter 84-15, July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18.
9. Regulatory Guide 1.108.
10. Regulatory Guide 1.137.
11. ANSI C84.1, 1982.
12. NUMARC 87-00, Revision 1, August 1991.
13. IEEE Standard 308.
14. IP Calculation 19-AN-19.
15. Regulatory Guide 1.9, Revision 3.
16. Calculation IP-C-0050.
17. Calculation IP-C-0051.
18. Calculation IP-C-0054.
19. Calculation IP-0-0114.
20. Calculation IP-C-0111.
21. Calculation IP-0-0106.
22. Calculation IP-0-0143.
23. Calculation IP-0-0110.
24. Calculation IP-0-0116.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.2

This SR verifies the design capacity of the battery chargers. According to Regulatory Guide 1.32 (Ref. 9), the battery charger supply is recommended to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and duration ensure that these requirements can be satisfied. This SR provides two options. One option requires that each battery charger be capable of supplying 300 amps for Divisions 1 and 2 (100 amps for Divisions 3 and 4) at the minimum established float voltage for 4 hours. The ampere requirements are based on the output rating of the chargers. The voltage requirements are based on the charger voltage level after a response to a loss of AC power. The time period is sufficient for the charger temperature to have stabilized and to have been maintained for at least 2 hours.

The other option requires that each battery charger be capable of recharging the battery after a service test coincident with supplying the largest coincident demands of the various continuous steady state loads (irrespective or the status of the plant during which these demands occur). This level of loading may not normally be available following the battery service test and will need to be supplemented with additional loads. The duration for this test may be longer than the charger sizing criteria since the battery recharge is affected by float voltage, temperature, and the exponential decay in charging current. The battery is recharged when the measured charging current is $\leq$ 2 amps.

The Surveillance Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these ~~18~~ 24 month intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

With regard to minimum required amperes and duration values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 12).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

<u>SR 3.8.4.3</u>

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length are established with a dummy load that corresponds to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of ~~18~~ 24 months is ~~consistent with~~ an exception to the recommendations of Regulatory Guide 1.32 (Ref. 9) and Regulatory Guide 1.129 (Ref. 10), which state that the battery service test should be performed during refueling operations or at some other outage, with intervals between tests not to exceed 18 months.

This SR is modified by two Notes. Note 1 allows the performance of a modified performance discharge test SR 3.8.6.6 in lieu of SR 3.8.4.3. This substitution is acceptable because SR 3.8.6.6 represents an equivalent test of battery capability as SR 3.8.4.3. The reason for Note 2 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. Examples of unplanned events may include:

1) Unexpected operational events which cause the equipment to perform the function specified by this Surveillance, for which adequate documentation of the required performance is available; and

2) Post maintenance testing that requires performance of this Surveillance in order to restore the component to OPERABLE, provided the maintenance was required, or performed in conjunction with maintenance required to maintain OPERABILITY or reliability.

With regard to battery capacity values obtained pursuant to this SR, as read from plant indication instrumentation, the specified limit is considered to be a nominal value and therefore does not require compensation for instrument indication uncertainties (Ref. 11).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.11.2 (continued)

equipment. System functional testing should thus include satisfactory operation of the associated relays and testing of the sensors for which failure modes would be undetected. As a minimum, SVC protection subsystem actuation capability should be verified for response to signals, actual or simulated, corresponding to the following potential SVC failure modes or conditions:

(1) Overvoltage
(2) Undervoltage
(3) Phase Unbalance
(4) Harmonics
(5) Overcurrent

The ~~18~~ 24-month Frequency is based on ~~manufacturer's recommendations.~~ the refueling cycle

REFERENCES

1. 10CFR50, Appendix A, GDC 17.
2. USAR, Chapter 8.

ATTACHMENT 4
Commitments

LIST OF COMMITMENTS

The following table identifies those actions committed to by AmerGen Energy Company, LLC (AmerGen), in this document. Any other statements in this submittal are provided for information purposes and are not to be considered commitments.

COMMITMENT	Due Date/Event
(1) Any necessary revisions to setpoint calculations, calibration and functional test procedures, to incorporate drift evaluation results will be prepared prior to implementation of this amendment request.	Upon implementation of the License Amendment
(2) The ongoing drift trending program will monitor future as-found/as-left (AFAL) results for three 24-month cycles.	Upon implementation of the License Amendment
(3) When insufficient data points are available to apply a statistical drift value, the ongoing drift trending program will validate the drift assumptions or cause re-analysis when sufficient data points are available.	Upon implementation of the License Amendment
(4) CPS is committing to replacing one turbine control valve control oil pressure switch (1C71N005A) in the Spring 2006 refueling outage (Work Order # 631766).	Completion of Spring 2006 Refueling Outage
(5) SR 3.3.1.1.13 for Function 10, Turbine Control Valve Fast Closure, Trip Oil Pressure-Low, will conservatively establish the procedural as-found tolerance (AFT) to monitor these channels until adequate assurance that 30-month drift remains within the assumption of the analyses.	Upon implementation of the License Amendment
(6) Procedural acceptance criteria are being administratively controlled to the following more restrictive proposed allowable values until approved: - Table 3.3.6.1-1, Function 1.b, $\geq$ 841 psig - Table 3.3.8.1-1, Function 1.b, $\leq$ 5.0 seconds - Table 3.3.8.1-1, Functions 1.c and 2.c, $\geq$ 4102.2 V and $\leq$ 4109.3 V	Implemented
(7) Revise PMRQ # 157451 and PMRQ # 157487 to change the frequency from once every 6 years to annually for dampers 0VC03YA and 0VC03YB	Upon implementation of the License Amendment

BACKGROUND

Technical Specification (TS) Surveillance Requirement (SR) frequency changes are required to accommodate a 24-month fuel cycle for Clinton Power Station (CPS). The proposed changes associated with this submittal were evaluated in accordance with the guidance provided in NRC Generic Letter (GL) 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24-Month Fuel Cycle," dated April 2, 1991. GL 91-04 provides NRC Staff guidance that identifies the types of information that must be addressed when proposing extensions of TS SR frequency intervals from 18 months to 24 months.

Historical surveillance test data and associated maintenance records were reviewed in evaluating the effect of these changes on safety. In addition, the licensing basis was reviewed to ensure it was not invalidated. Based on the results of these reviews, it is concluded that there is no adverse effect on plant safety due to increasing the surveillance test intervals from 18 to 24 months with the continued application of the SR 3.0.2 25% grace period.

GL 91-04 addressed steam generator inspections, which are not applicable to CPS and therefore are not discussed in this submittal. Additionally, the GL addressed interval extensions to leak rate testing pursuant to 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," which is also not addressed by the CPS submittal because individual leak testing requirements have been replaced by the Primary Containment Leakage Rate Testing Program.

EVALUATION

In GL 91-04, the NRC provided generic guidance for evaluating a 24 month surveillance test interval for TS SRs. Attachment 1 of this submittal defines each step outlined by the NRC in GL 91-04 and provides a description of the methodology used by CPS to complete the evaluation for each specific TS SR line item. This methodology utilized in the CPS drift analysis is the same standard methodology used by Exelon Generation Company (Exelon), LLC to justify extensions for a 24-month fuel cycle for LaSalle County Station Units 1 and 2, and was subsequently found to be acceptable by the NRC in the Safety Evaluation for Amendments 147 and 133, issued on March 30, 2001. The Exelon methodology is provided for reference in Attachment 6.

For each of the identified surveillances, an effort was made to retrieve the five most recent surveillance test performances through the Spring 2002 refueling outage (i.e., approximately seven years of history). This provided approximately three 30-month surveillance periods of data to identify any repetitive problems. It has been concluded, based on engineering judgement, that three 30 month periods provide adequate performance test history. In some instances, additional surveillance performances were included when insufficient data was available for adequate statistical analysis of instrument drift. Further references to performance history reflect evaluations of the five most recent performances available through the Spring 2002 outage, unless otherwise stated.

In addition to evaluating the historical drift associated with current 18-month calibrations, the failure history of each 18-month surveillance was also evaluated. With the extension of the testing frequency to 24 months, there will be a longer period between each surveillance performance. If a failure that results in the loss of the associated safety function should occur during the operating cycle that would only be detected by the performance of the 18-month TS SR, then the increase in the surveillance testing interval might result in a decrease in the associated function's availability. Furthermore, potential common failures of similar components tested by different surveillances were also evaluated. This additional evaluation determined whether there is evidence of repetitive failures among similar plant components.

The surveillance failures detailed with each SR exclude failures that:
(a) Did not impact a TS safety function or TS operability);
(b) Are detectable by required testing performed more frequently than the 18 month surveillance being extended; or
(c) Where the cause can be attributed to an associated event such as a preventative maintenance task, human error, previous modification or previously existing design deficiency, or that were subsequently re-performed successfully with no intervening corrective maintenance (e.g., plant conditions or malfunctioning measurement and test equipment (M&TE) may have caused aborting the test performance).

These categories of failures are not related to potential unavailability due to testing interval extension, and are therefore not listed or further evaluated in this submittal.

The following sections summarize the results of the failure history evaluation. The evaluation confirmed that the impact on system availability, if any, would be small as a result of the change to a 24-month testing frequency.

The proposed TS changes related to GL 91-04 test interval extensions have been divided into two categories. The categories are: (A) changes to surveillances other than channel calibrations, identified as "Non-Calibration Changes" and (B) changes involving the channel calibration frequency identified as "Channel Calibration Changes."

A. Non-Calibration Changes

For the non-calibration 18-month surveillances, GL 91-04 requires the following information to support conversion to a 24-month frequency:

1) Licensees should evaluate the effect on safety of the change in surveillance intervals to accommodate a 24-month fuel cycle. This evaluation should support a conclusion that the effect on safety is small.
2) Licensees should confirm that historical maintenance and surveillance data do not invalidate this conclusion.
3) Licensees should confirm that the performance of surveillances at the bounding surveillance interval limit provided to accommodate a 24-month fuel cycle would not invalidate any assumption in the plant licensing basis.

In consideration of these confirmations, GL 91-04 provides that licensees need not quantify the effect of the change in surveillance intervals on the availability of individual systems or components.

The following non-calibration TS SRs are proposed for revision to a 24-month frequency. The associated qualitative evaluation is provided for each of these changes, which concludes that the effect on plant safety is small, that the change does not invalidate any assumption in the plant licensing basis, and that the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. These conclusions have been validated by a review of the surveillance test history at CPS as summarized below for each SR.

TS 3.1.7 Standby Liquid Control (SLC) System

SR 3.1.7.8 Verify flow through one SLC subsystem from pump into reactor pressure vessel.
SR 3.1.7.9 Verify all piping between storage tank and pump suction is unblocked.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The flow path through one SLC subsystem is verified per SR 3.1.7.8 during every refueling outage on a staggered test basis. This test could inadvertently cause a reactor transient if performed with the unit operating. Therefore, to decrease the potential impact of the test, it is performed during outage conditions. In addition, the flow path through the heat traced piping between the storage tank and pump suction is verified per SR 3.1.7.9 during every refueling outage.

The SLC system is designed so that all active components are redundant so that no single failure in one of these components would cause or prevent initiation of the SLC system. The SLC pumps are tested in accordance with the Inservice Testing Program per SR 3.1.7.7 to verify operability. Similarly, the temperature of the sodium pentaborate solution in the storage tank and the temperature of the pump suction piping are verified to be ≥70°F every 24 hours in accordance with SR 3.1.7.2 and SR 3.1.7.3 to preclude precipitation of the boron solution. If the temperature in the pump suction piping drops below 70°F, then the flow path through one SLC subsystem must be verified per SR 3.1.7.9 within 24 hours of the temperature being restored to ≥70°F. In addition, SR 3.1.7.4 verifies the continuity of the charge in the explosive valves. These more frequent tests ensure that the SLC system remains operable during the operating cycle. Based on the inherent system and component reliability and the testing performed during the operating cycle, the impact, if any, from this change on system availability is small.

A review of the surveillance history verified that this subsystem had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the subsystem checks required by the other TS surveillances and the history of the subsystem failures, the impact of this change on safety, if any, is small.

TS 3.1.8 Scram Discharge Volume (SDV) Vent and Drain Valves

SR 3.1.8.3 Verify each SDV vent and drain valve:
a. Closes in ≤ 30 seconds after receipt of an actual or simulated scram signal; and
b. Opens when the actual or simulated scram signal is reset.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This SR ensures that the SDV vent and drain valves close in ≤ 30 seconds after receipt of an actual or simulated scram signal and open when the actual or simulated scram signal is reset. SR 3.1.8.2 requires that the SDV vent and drain valves be cycled fully closed and fully open every 92 days during the operating cycle, which ensures that the mechanical components and a portion of the valve logic remain operable. Additionally, it has been previously accepted that the failure rate of components is dominated by the mechanical components, not by the logic systems (refer to specific discussion in the Logic System Functional Test (LSFT) section below). A review of the applicable CPS surveillance history demonstrated that the logic subsystem for the scram discharge volume vent and drain valves had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the manual cycling of the valves to ensure that the valves are operable, as required by SR 3.1.8.2, and the history of logic subsystem performance, the impact of this change on safety, if any, is small.

3.3.1.1 Reactor Protection System (RPS) Instrumentation

SR 3.3.1.1.14 Verify the APRM Flow Biased Simulated Thermal Power-High time constant is within the limits specified in the COLR.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The Average Power Range Monitor (APRM) Flow Biased Simulated Thermal Power-High function uses an electronic filter circuit to generate a signal proportional to the core thermal power from the APRM neutron flux signal. Operation of the circuits associated with this trip function are verified more frequently by Channel Check (i.e., SR 3.3.1.1.1), verification of the absolute difference between APRM channels (i.e., SR 3.3.1.1.2), verification of the flow signal (i.e., SR 3.3.1.1.3), Channel Functional Test (i.e., SR 3.3.1.1.9), and Channel Calibration (i.e., SR 3.3.1.1.11). This testing ensures that a significant portion of the circuitry is operating properly and will detect significant failures of this circuitry.

A review of the surveillance history demonstrated that this circuit had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the checks required by the other TS surveillances and the history of the circuit failures, the impact of this change on safety, if any, is small.

LOGIC SYSTEM FUNCTIONAL TESTS (LSFTs) and SELECTED CHANNEL FUNCTIONAL TESTS

3.3.1.1 Reactor Protection System (RPS) Instrumentation

SR 3.3.1.1.12 Perform CHANNEL FUNCTIONAL TEST.
(This test is essentially a Logic System Functional Test for the Reactor Mode Switch scram circuit. The justification for extending LSFTs is also valid for the extension of this SR.)
SR 3.3.1.1.15 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.2.1 Control Rod Block Instrumentation

SR 3.3.2.1.8 Perform CHANNEL FUNCTIONAL TEST.
(This test is essentially a Logic System Functional Test for the Reactor Mode Switch rod block circuit. The justification for extending LSFTs is also valid for the extension of this SR.)

3.3.3.2 Remote Shutdown System

SR 3.3.3.2.2 Verify each required control circuit and transfer switch is capable of performing the intended functions.
(This test is essentially a Logic System Functional Test for the transfer circuits associated with shifting indication and control from the control room to the remote shutdown panel. The justification for extending LSFTs is also valid for the extension of this SR.)

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation

SR 3.3.4.1.3 Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.

3.3.4.2 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation

SR 3.3.4.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST, including breaker actuation.

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

SR 3.3.5.1.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

SR 3.3.5.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.1 Primary Containment and Drywell Isolation Instrumentation

SR 3.3.6.1.6 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.2 Secondary Containment Isolation Instrumentation

SR 3.3.6.2.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.3 Residual Heat Removal (RHR) Containment Spray System Instrumentation

SR 3.3.6.3.5 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.4 Suppression Pool Makeup (SPMU) System Instrumentation

SR 3.3.6.4.7 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.6.5 Relief and Low-Low Set (LLS) Instrumentation

SR 3.3.6.5.4 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.8.1 Loss of Power (LOP) Instrumentation

SR 3.3.8.1.4 Perform LOGIC SYSTEM FUNCTIONAL TEST.

3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

SR 3.3.8.2.3 Perform a system functional test.

(This test is essentially a Logic System Functional Test for the RPS Electric Power Monitor circuits. The justification for extending LSFTs is also valid for this SR.)

3.8.11 Static VAR Compensator (SVC) Protection Systems

SR 3.8.11.2 Perform a system functional test of each SVC protection subsystem, including breaker actuation.

(This system functional test of each SVC Protection System is performed to ensure that each SVC protection subsystem will actuate to automatically open the associated SVC main circuit breakers in response to signals associated with SVC failure modes that could potentially damage or degrade plant equipment. System functional testing includes satisfactory operation of the associated relays and testing of the sensors for which failure modes would be undetected. As such, this test is essentially a Logic System Functional Test for the SVC Protection Systems. The justification for extending LSFTs is also valid for the extension of this SR.)

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period.

Extending the surveillance test interval for the LSFTs and selected functional tests is acceptable because the functions are verified to be operating properly by the performance of more frequent Channel Checks, Channel Functional Tests, analog trip module calibration, and visual confirmation of satisfactory operation (as applicable). This more frequent testing ensures that a major portion of the circuitry is operating properly and will detect significant failures within the instrument loop. Additionally, all of the above actuation instrumentation and logic, controls, monitoring capabilities, and protection systems, are designed to meet applicable reliability, redundancy, single failure, and qualification standards and regulations as described in the CPS Updated Safety Analysis Report (USAR). As such, these functions are designed to be highly reliable. Furthermore, as stated in the August 2, 1993 NRC Safety Evaluation Report relating to extension of the Peach Bottom Atomic Power Station, Unit Numbers 2 and 3 surveillance intervals from 18 to 24 months:

> "Industry reliability studies for boiling water reactors (BWRs), prepared by the BWR Owners Group (NEDC-30936P) show that the overall safety systems' reliabilities are not dominated by the reliabilities of the logic systems, but by that of the mechanical components, (e.g., pumps and valves), which are consequently tested on a more frequent basis. Since the probability of a relay or contact failure is small relative to the probability of mechanical component failure, increasing the Logic System Functional Test interval represents no significant change in the overall safety system unavailability."

A review of the applicable CPS surveillance history demonstrated that the logic systems for these functions had only five failures of the TS functions that would have been detected solely by the periodic performance of one of the above SRs.

(a) A failure associated with SR 3.3.3.2.2 was experienced with the remote shutdown panel (RSP) Shutdown Service Water isolation valve 1SX014B control switch on October 1, 2000. This RSP control switch is a GE type CR2940 switch. One additional control switch failure was identified for all surveillances over the evaluation period. This failure involved a different switch type than the switch failure experienced with the RSP control switch. The Shutdown Service Water pump 1SX01PA control switch failure on October 16, 1996 (documented later under SR 3.7.1.3) involved an Electroswitch type 20K. Since the switch types are unique and only two failures were identified in a large population of control switches over the evaluation period, these failures are not indicative of a repetitive or time-based failure problem.

(b) Two Agastat relay failures occurred for the above SRs:
   (1) A failure associated with SR 3.3.6.1.6 was experienced with relay 1E31AK05B in the Containment Isolation system on March 31, 1995 that impacted Division 2 RCIC isolation.
   (2) A failure associated with SR 3.3.6.4.7 was experienced with relay 1UAYSM503C on March 3, 1995 that prevented one Suppression Pool Makeup dump valve from opening.

   Agastat relay failures were also reviewed for commonality. Only one other failure was identified for all surveillances over the evaluation period: Relay 1E32N606 in the Main Steam Isolation Valve (MSIV) Leakage Control system on May 14, 1992 (discussed in a later subsection associated with system functional testing). All three failures involved contacts not closing, however, these failures were not related by system or surveillance requirement. Since only three failures were identified over the evaluation period and based on the large population of Agastat relays, the failures are not indicative of a repetitive failure problem. These failures are considered unique in that the surveillance test history indicates that it is not repetitive and not related to a time based failure mechanism.

(c) A failure associated with SR 3.3.6.1.6 was experienced with a fuse on April 28, 2002 that impacted the Division 1 RCIC isolation logic. This was the only fuse-related problem in the failure review scope for all surveillances over the evaluation period. As such, this failure is not indicative of a repetitive failure problem.

It is also noted that there were two failures discussed above of SR 3.3.6.1.6 related to RCIC, but they involved different failure mechanisms and impacted independent and redundant isolation Divisions. The potential impact on loss of containment isolation availability is deemed insignificant.

(d) A failure associated with SR 3.3.6.5.4 was experienced with a solder joint connection on April 5, 2002 that impacted Division 2 Automatic Depressurization System (ADS)/Safety Relief Valve (SRV) LSFT. Connection and solder failures were also reviewed for commonality. Only two failures were identified in the failure review scope for all surveillances over the evaluation period. The failure documented here and failure of SR 3.3.3.1.3 for the Drywell Area Radiation post-accident monitoring function, documented in the "Channel Calibration Changes" section, involve load driver card connections. However, these failures are not related by system or surveillance requirement. Since only two connection failures were identified over the evaluation period and based on the large population of connectors, the failures are not indicative of a repetitive failure problem.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of portions of the circuits, and the history of logic system performance, the impact of this change on safety, if any, is small.

RESPONSE TIME TESTS

3.3.1.1 Reactor Protection System (RPS) Instrumentation
SR 3.3.1.1.17 Verify the RPS RESPONSE TIME is within limits.

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation
SR 3.3.4.1.5 Verify the EOC-RPT SYSTEM RESPONSE TIME is within limits.

3.3.6.1 Primary Containment and Drywell Isolation Instrumentation
SR 3.3.6.1.7 Verify the ISOLATION SYSTEM RESPONSE TIME for the main steam isolation valves is within limits.

The "on a staggered test basis" surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. Extending the interval between response time tests is acceptable because the functions are verified to be operating properly throughout the operating cycle by the performance of Channel Checks and Channel Functional Tests (as applicable). This testing ensures that a significant portion of the circuitry is operating properly and will detect significant failures of this circuitry. Additional justification for extending the surveillance test interval is that these functions, including the actuating logic, are designed to be single failure proof and, therefore, are highly reliable.

Furthermore, the CPS TS Bases (as well as the Improved Standard TS, NUREG-1434) states that the frequency of response time testing is based in part "upon plant operating experience, which shows that random failures of instrumentation components causing serious time degradation, but not channel failure, are infrequent."

A review of the applicable CPS surveillance history demonstrated that the logic systems for these functions had two previous failures of TS required system response times that would have been detected solely by the periodic performance of these SRs.

(a) Failures associated with SR 3.3.1.1.17 and SR 3.3.4.1.5 were experienced due to a digital signal conditioner card on May 12, 1997. (These surveillances are common to Turbine Stop and Control Valve closure trip for RPS and EOC-RPT tested under the same procedure.) No other signal conditioner card failures within the failure review scope for all surveillances over the evaluation period were identified.

(b) A failure associated with SR 3.3.6.1.7 was experienced for an MSIV isolation system response time on October 1, 1993. This failure was associated with a dampening potentiometer being out of adjustment. No other dampening potentiometer failures within the failure review scope for all surveillances over the evaluation period were identified.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of portions of the circuits, and the history of logic system performance, the impact of this change on safety, if any, is small.

3.4.2 Flow Control Valves (FCVs)

SR 3.4.2.1 Verify each FCV fails "as is" on loss of hydraulic pressure at the hydraulic unit.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. Hydraulic power unit pilot operated lock out valves (i.e., pilot operated check valves) are required to close on a loss of recirculation FCV hydraulic pressure. When closed, these valves inhibit FCV motion and preclude potentially excessive rate-of-change in reactor power from uncontrolled recirculation FCV movement. This surveillance verifies the FCV fails "as-is" on a loss of hydraulic pressure. Due to the nature of the check valve function in this application, there are no definable drift components or any time based conditions that could appreciably change during the operating cycle.

A review of the applicable CPS surveillance history demonstrated that the hydraulic power unit pilot operated lock out valves had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the reliability of the check valves and history of system performance, the impact of this change on safety, if any, is small.

3.4.4 Safety/Relief Valves (S/RVs)

SR 3.4.4.2 Verify each required relief function S/RV actuates on an actual or simulated automatic initiation signal.
SR 3.4.4.3 Verify each required S/RV actuator strokes when manually actuated.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The required relief function S/RVs are required to actuate automatically upon receipt of specific initiation signals. A system functional test (i.e., SR 3.4.4.2) is performed to verify the mechanical portions (i.e., solenoids) of the automatic relief function operate as designed when initiated either by an actual or simulated initiation signal. A manual actuation of each required S/RV (i.e., SR 3.4.4.3) is performed to verify that the valve is functioning properly. The LSFT in SR 3.3.6.5.4 overlaps this SR to provide complete testing of the safety function. Valve operability and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. This verification proves that the valve was actually functioning when installed and that the mechanical valve components were in good condition. The valves are normally tested prior to or soon after startup; any failure of actual valve function would be noted and corrected prior to extended plant operation.

A review of the applicable CPS surveillance history demonstrated that the S/RVs had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.5.1 / 3.5.2 ECCS-Operating / ECCS-Shutdown

SR 3.5.1.5 Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.
SR 3.5.1.6 Verify the ADS actuates on an actual or simulated automatic initiation signal.
SR 3.5.1.7 Verify each ADS valve actuator strokes when manually actuated.
SR 3.5.1.8 Verify the ECCS RESPONSE TIME for each ECCS injection/spray subsystem is within limits.
SR 3.5.2.6 Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. These ECCS and ADS functional tests ensure that a system initiation signal (actual or simulated) to the automatic initiation logic will cause the systems or subsystems to operate as designed within assumed response times. The ECCS network has built-in redundancy so that no single active failure prevents accomplishing the safety function of the ECCS. The pumps and valves associated with ECCS are tested quarterly in accordance with the Inservice Testing (IST) Program and SR 3.5.1.4 (some valves may have independent IST relief justifying less frequent testing). This testing ensures that the major components of the systems are capable of performing their design function. The tests proposed to be extended need to be performed during outage conditions since they have the potential to initiate an unplanned transient if performed during operating conditions.

A review of the applicable CPS surveillance history demonstrated that ECCS had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.5.3 RCIC System

SR 3.5.3.4 Verify, with RCIC steam supply pressure ≤ 150 psig and ≥ 135 psig, the RCIC pump can develop a flow rate ≥ 600 gpm against a system head corresponding to reactor pressure.

SR 3.5.3.5 Verify the RCIC System actuates on an actual or simulated automatic initiation signal.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. These RCIC functional tests ensure that the system will operate as designed. The pumps and valves associated with RCIC system are tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). This testing ensures that the major components of the systems are capable of performing their design function.

A review of the applicable CPS surveillance history demonstrated that RCIC had no previous failures of these TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

SR 3.6.1.3.7 Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.

SR 3.6.1.3.12 Verify each instrumentation line excess flow check primary containment isolation valve actuates within the required range.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. During the operating cycle, SR 3.6.1.3.4 requires automatic PCIV isolation times to be verified in accordance with the Inservice Testing Program. Stroke testing of PCIVs tests a significant portion of the PCIV circuitry as well as the mechanical function, which will detect failures of this circuitry or failures with valve movement. The frequency of this testing is typically quarterly, unless approved relief has been granted justifying less frequent testing.

A review of the CPS surveillance test history demonstrated five previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. The failures involve only the excess flow check valves (EFCVs); no other PCIV failure that would have been detected solely by the periodic performance of these SRs was discovered.

(a) A failure associated with SR 3.6.1.3.12 was experienced when 1CM066 due to a failure to close on August 20, 1998. The valve was removed, cleaned, re-installed, and tested satisfactory.

(b) A failure associated with SR 3.6.1.3.12 was experienced when 1CM067 failed to close within acceptable limit of < 5 psig on October 26, 1996. This valve was replaced. Note that this acceptance criterion has since been replaced with a 1 gpm acceptance criterion.

(c) A failure associated with SR 3.6.1.3.12 was experienced when 1CM066 failed to close within acceptable limit of < 5 psig on October 24, 1996. This valve was replaced. Note that this acceptance criterion has since been replaced with a 1 gpm acceptance criterion.

(d) A failure associated with SR 3.6.1.3.12 was experienced when 1CM066 failed to close within acceptable limit of < 5 psig on March 22, 1995. This valve was replaced. Note that this acceptance criterion has since been replaced with a 1 gpm acceptance criterion.

(e) A failure associated with SR 3.6.1.3.12 was experienced when 1CM067 failed to close within acceptable limit of < 5 psig on March 18, 1992. This valve was replaced. Note that this acceptance criterion has since been replaced with a 1 gpm acceptance criterion.

Since the October 1996 failures, the methods used to test EFCVs and the associated acceptance criterion have been revised to more appropriately monitor EFCV performance. Current testing increases flow through the instrument line to measure the flow that actuates the EFCV (with a procedural acceptance criterion of ≤ 1 gpm). Prior to December 1996, the differential pressure required to actuate the EFCV was monitored. Since the change in testing method, there has been only one EFCV failure during SR 3.6.1.3.12 (on August 20, 1998), providing assurance that the EFCV function is being adequately maintained. As described in CPS USAR Section 1.8, Conformance to NRC Regulatory Guides, instrument lines associated with these PCIV-EFCVs are also designed with a flow-restricting orifice and designed in accordance with Safety Guide 11, Instrument Lines Penetrating Primary Reactor Containment.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

<u>3.6.1.6 Low-Low Set (LLS) Valves</u>

SR 3.6.1.6.1 Verify each LLS valve actuator strokes when manually actuated.
SR 3.6.1.6.2 Verify the LLS System actuates on an actual or simulated automatic initiation signal.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. Extending the surveillance test interval for these functional tests is acceptable because the functions are verified to be operating properly by the performance of more frequent Channel Functional Tests (i.e., SR 3.3.6.5.1) and analog trip module calibrations (i.e., SR 3.3.6.5.2). This more frequent testing ensures that a major portion of the circuitry is operating properly and will detect significant failures within the instrument loop. Additionally, the LLS valves (i.e., safety/relief valves assigned to the LLS logic) are designed to meet applicable reliability, redundancy, single failure, and qualification standards and regulations as described in the CPS USAR. As such, these functions are designed to be highly reliable.

A review of surveillance test history verified that the LLS valves had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.1.7 Residual Heat Removal (RHR) Containment Spray System

SR 3.6.1.7.3 Verify each RHR Containment Spray subsystem automatic valve in the flow path actuates to its correct position on an actual or simulated initiation signal.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The Containment Spray System has built-in redundancy so that no single active failure prevents the Containment Spray function. The pumps and valves associated with Containment Spray are tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). This testing ensures that the major components of the systems are capable of performing their design function. Since most of the components and associated circuits are tested on a more frequent basis, this testing would indicate any degradation to the Containment Spray System which would result in an inability to start based on a demand signal.

Furthermore, a review of the applicable CPS surveillance history demonstrated that the Containment Spray System had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.1.8 Main Steam Isolation Valve (MSIV) Leakage Control System (LCS)

SR 3.6.1.8.3 Perform a system functional test of each MSIV LCS subsystem.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. A system functional test is performed to ensure that the MSIV LCS will operate through its operating sequence. This includes verifying that the automatic positioning of the valves and the operation of each interlock and timer are correct, that the blowers start and develop the required flow rate and the necessary vacuum, and the upstream heaters meet current draw requirements.

SR 3.6.1.8.1 verifies blower operation every 31 days. SR 3.6.1.8.2 verifies heater element electrical continuity every 31 days. MSIV LCS valves are stroke tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). This more frequent testing ensures that the major components of the systems are capable of performing their design function. Since most of the components and associated circuits are tested on a more frequent basis, this testing would indicate any degradation to the MSIV LCS. Additionally, the MSIV LCS subsystems, including the associated actuating logic, are designed to perform the safety function in the event of any single active failure, and therefore, are highly reliable.

A review of the applicable CPS surveillance history demonstrated that the MSIV LCS had only one previous failure of the TS function that would have been detected solely by the periodic performance of this SR. A failure associated with SR 3.6.1.8.3 was experienced with relay 1E32N606 in the MSIV LCS system on May 14, 1992.

Agastat relay failures were also reviewed for commonality. Only two other failures were identified for all surveillances over the evaluation period: Relay 1E31AK05B in the RCIC system and relay 1UAYSM503C in the Suppression Pool Make-Up system (discussed in an earlier subsection associated with LSFTs). All three failures involved contacts not closing, however, these failures were not related by system or surveillance requirement. Since only three failures were identified over the evaluation period and based on the large population of Agastat relays, the failures are not indicative of a repetitive failure problem. These failures are considered unique in that the surveillance test history indicates that it is not repetitive and not related to a time based failure mechanism.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.1.9 Feedwater Leakage Control System (FWLCS)

SR 3.6.1.9.1 *Perform a system functional test of each FWLCS subsystem.*

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. A system functional test of each FWLCS subsystem is performed to ensure that each FWLCS subsystem will operate through its operating sequence. This includes verifying automatic positioning of valves and operation of each interlock, and that the necessary check valves open. Periodic verification of the capabilities of the RHR pumps is performed more frequently in accordance with the Inservice Testing Program and as required by SR 3.5.1.4. This more frequent testing ensures that the major components of the systems are capable of performing their design function. This testing would indicate degradation to the FWLCS. The test proposed to be extended needs to be performed during outage conditions since it has the potential to initiate an unplanned transient if performed during operating conditions. Additionally, the FWLCS subsystems are designed to perform the safety function in the event of any single active failure, and therefore, are highly reliable.

Furthermore, a review of the applicable CPS surveillance history demonstrated that the FWLCS had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.2.4 Suppression Pool Makeup (SPMU) System

SR 3.6.2.4.4 *Verify each SPMU subsystem automatic valve actuates to the correct position on an actual or simulated automatic initiation signal.*

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This SR requires a verification that each SPMU subsystem automatic valve actuates to its correct position on receipt of an actual or simulated automatic initiation signal. This includes verification of the correct automatic positioning of the valves and of the operation of each interlock and timer. The SPMU system has built-in redundancy so that no single-failure prevents system operation. The valves associated with the SPMU system are tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). Additionally, SPMU functions are verified to be operating properly by the performance of more frequent Channel Checks (i.e., SR 3.3.6.4.1), functional tests (i.e., SR 3.3.6.4.2), and various calibrations (i.e., SRs 3.3.6.4.3, 4, and 5). This more frequent testing ensures that a major portion of the circuitry is operating properly and will detect significant failures within the instrument loop. This more frequent testing would detect major degradation that could impact system operation. Additionally, the test proposed to be extended needs to be performed during outage conditions since they have the potential to initiate an unplanned transient if performed during operating conditions.

A review of the applicable CPS surveillance history demonstrated that the SPMU System had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.3.1 Primary Containment Hydrogen Recombiners

SR 3.6.3.1.1 Perform a system functional test for each primary containment hydrogen recombiner.
SR 3.6.3.1.2 Visually examine each primary containment hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.
SR 3.6.3.1.3 Perform a resistance to ground test for each heater phase.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. Extending the surveillance interval for this verification of recombiner operability is acceptable based on the redundancy of the recombiner system and the availability of alternate hydrogen control systems. Two 100% capacity independent primary containment hydrogen recombiner subsystems are provided. A single recombiner subsystem, in conjunction with the Containment Drywell Hydrogen Mixing System, is capable of maintaining the hydrogen concentration in the drywell and primary containment below the 4.0 volume percent flammability limit. The alternate hydrogen control capabilities are provided by one or more divisions of hydrogen igniters.

A review of the applicable CPS surveillance history demonstrated that the hydrogen recombiners had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on system design and the history of system performance, the impact of this change on safety, if any, is small.

3.6.3.2 Primary Containment and Drywell Hydrogen Igniters

SR 3.6.3.2.3 Verify each required igniter in inaccessible areas develops sufficient current draw for a $\geq$ 1700°F surface temperature.
SR 3.6.3.2.4 Verify each required igniter in accessible areas develops a surface temperature of $\geq$ 1700°F.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The igniters are mechanically passive and are not subject to mechanical failure. Extending the surveillance test interval for these tests is acceptable because the functions are verified to be operating properly by the performance of more frequent current versus voltage measurements every 184 days or 92 days per SR 3.6.3.2.1 or SR 3.6.3.2.2, respectively. These SRs verify there are no physical problems that could affect the igniter operation. The only credible failures are loss of power or burnout. The verification that each required igniter is energized is performed by circuit current versus voltage measurement.

A review of the applicable CPS surveillance history demonstrated that the Hydrogen Igniter System had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.3.3 Containment/Drywell Hydrogen Mixing Systems

SR 3.6.3.3.2 Verify each Containment/Drywell Hydrogen Mixing System flow rate is $\geq$ 800 scfm.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. SR 3.6.3.3.2 requires verification of each subsystem's flow rate. However, SR 3.6.3.3.1 ensures that each system is operable and that all associated controls are functioning properly on a more frequent basis (i.e., 92 days). SR 3.6.3.3.1 also ensures that blockage, compressor failure, or excessive vibration can be detected for corrective action. While SR 3.6.3.3.1 does not verify that system flow rate is acceptable, the test would indicate significant system problems or failures. Furthermore, the containment/drywell hydrogen mixing system has built-in redundancy so that no single-failure prevents system operation.

A review of the applicable CPS surveillance history demonstrated that the Containment/Drywell Hydrogen Mixing System had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.4.1 Secondary Containment

SR 3.6.4.1.4 Verify each standby gas treatment (SGT) subsystem will draw down the secondary containment to $\geq$ 0.25 inch of vacuum water gauge within the time required.

SR 3.6.4.1.5 Verify each SGT subsystem can maintain $\geq$ 0.25 inch of vacuum water gauge in the secondary containment for 1 hour at a flow rate $\leq$ 4400 cfm.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. To ensure that all fission products are treated, the tests required per SR 3.6.4.1.4 and SR 3.6.4.1.5 are performed utilizing one SGT subsystem (on a staggered test basis) to ensure secondary containment boundary integrity. SRs 3.6.4.1.1 (every 24 hours), 3.6.4.1.2 (every 31 days), and 3.6.4.1.3 (every 31 days) provide more frequent assurance that no significant boundary degradation has occurred.

A review of the applicable CPS surveillance history demonstrated that the secondary containment had only one previous failure of the TS functions that would have been detected solely by the periodic performance of these SRs. A failure associated with SR 3.6.4.1.4 was experienced with the B SGT subsystem flow controller 0FCVG104 on August 21, 1996.

Flow controller failures were also reviewed for commonality. Three failures were identified for all surveillances over the entire evaluation period. The SGT flow controller listed here was replaced due to hesitation during calibration. RCIC pump discharge flow controller 1C61R001 was replaced on April 16, 1999 due to the inability to calibrate the deviation meter. RCIC pump discharge flow controller 1E51R600 was replaced on April 9, 1995 due to a broken zero potentiometer. None of these failures share a common failure mode. Since only three failures with no common failure mode were identified over the evaluation period, these failures are not indicative of a repetitive or time-based failure problem.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.4.2 Secondary Containment Isolation Dampers (SCIDs)

SR 3.6.4.2.3 Verify each automatic SCID actuates to the isolation position on an actual or simulated automatic isolation signal.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. During the operating cycle, SR 3.6.4.2.2 requires power-operated and automatic SCID isolation times to be tested (i.e., stroke timed to the closed position) quarterly. The stroke testing of these SCIDs tests a portion of the circuitry and the mechanical function, and provides more frequent testing to detect failures.

A review of surveillance test history verified that SCIDs had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.4.3 Standby Gas Treatment (SGT) System

SR 3.6.4.3.3 Verify each SGT subsystem actuates on an actual or simulated initiation signal.
SR 3.6.4.3.4 Verify each SGT filter cooling bypass damper can be opened and the fan started.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. These SGT functional tests ensure that subsystems operate as designed. The SGT subsystems are redundant so that no single-failure prevents accomplishing the safety function of filtering the discharge from secondary containment, and are therefore reliable. More frequent verification of portions of the SGT function are accomplished by operating each SGT subsystem and heaters every 31 days (i.e., SR 3.6.4.3.1) and by SGT filter testing required by the Ventilation Filter Testing Program (i.e., SR 3.6.4.3.2).

A review of the applicable CPS surveillance history demonstrated that the SGT System had only one previous failure of the TS functions that would have been detected solely by the periodic performance of these SRs. A failure associated with SR 3.6.4.3.3 was experienced when dampers 1VG16YB and 1VG17YB failed to close (closure took 36 minutes) on December 29, 1998. It should be noted that these dampers also have divisionally redundant dampers 1VG16YA and 1VG17YA. While no specific closure time for these dampers is applicable, a conservative review concluded an affect on operability. The failure is unique in that the surveillance test history indicates that the failure is not repetitive and not related to a time based mechanism.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.5.3 Drywell Isolation Valves

SR 3.6.5.3.5 Verify each required automatic drywell isolation valve actuates to the isolation position on an actual or simulated isolation signal.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. During the operating cycle, automatic drywell isolation valve isolation times are tested per SR 3.6.5.3.4 in accordance with the Inservice Testing Program. Stroke testing of drywell isolation valves tests a significant portion of the circuitry as well as the mechanical function, which will detect failures of this circuitry or failures with valve movement. The frequency of this testing is typically quarterly, unless approved relief has been granted justifying less frequent testing.

A review of the applicable CPS surveillance history demonstrated that the drywell isolation valves had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.6.5.6 Drywell Post-LOCA Vacuum Relief System

SR 3.6.5.6.3 Verify the opening pressure differential of each drywell post-LOCA vacuum relief valve is $\leq$ 0.2 psid.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The four drywell post-LOCA vacuum relief subsystems use separate 10 inch lines penetrating the drywell, and each subsystem consists of a series arrangement of two check valves. During the operating cycle, each drywell post-LOCA vacuum relief valve is tested more frequently by being stroked open and closed every 31 days (i.e., SR 3.6.5.6.2). The stroke testing of these drywell post-LOCA vacuum relief valves will detect failures with valve movement. This provides assurance that the safety analysis assumptions are valid.

A review of the applicable CPS surveillance history demonstrated that drywell post-LOCA vacuum relief valves had only one previous failure of the TS function that would have been detected solely by the periodic performance of this SR. A failure associated with SR 3.6.5.6.3 was experienced with valve 1HG011A disk, which failed to fully seat on March 16, 1992. It was discovered that the limit switch adjusting screws were interfering with valve closure. No other failures were identified where mechanical interference prevented valve closure; as such, there is no evidence of repetitive or time-based failures among similar plant components.

Therefore, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.7.1 Division 1 and 2 Shutdown Service Water (SX) Subsystems and Ultimate Heat Sink (UHS)

SR 3.7.1.3 Verify each SX subsystem actuates on an actual or simulated initiation signal.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This SR verifies that the automatic isolation valves of the Division 1 and 2 SX subsystems will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This SR also verifies the automatic start capability of the SX pump in each subsystem. The SX subsystems are redundant so that no single-failure prevents accomplishing the safety function of providing the required cooling. The SX system pumps and valves are tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). This testing ensures that the major components of the systems are capable of performing their design function. Additionally, valves in the flow path are verified to be in the correct position monthly (i.e., SR 3.7.1.2). Since most of the components and associated circuits are tested on a more frequent basis, this testing would indicate any degradation to the SX System which would result in an inability to start based on a demand signal.

A review of the applicable CPS surveillance history demonstrated that the SX subsystems had only one previous failure of the TS function that would have been detected solely by the periodic performance of this SR. Shutdown Service Water pump 1SX01PA failed to start due to a bad control switch on October 16, 1996 (which was replaced). The failure of this Shutdown Service Water pump 1SX01PA control switch is an Electroswitch type 20K. One additional control switch failure was identified for all surveillances over the evaluation period. This failure involved a different switch type than the switch failure experienced with the Shutdown Service Water pump. On October 1, 2000, the remote shutdown panel Shutdown Service Water isolation valve 1SX014B control switch failed, which is a GE type CR2940 switch. Since the switch types are different and only two failures were identified in a large population of control switches over the evaluation period, these failures are not indicative of a repetitive or time-based failure problem.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.7.2 Division 3 Shutdown Service Water (SX) Subsystem

SR 3.7.2.2 Verify the Division 3 SX subsystem actuates on an actual or simulated initiation signal.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This SR verifies that the automatic isolation valves of the Division 3 SX subsystem will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This SR also verifies the automatic start capability of the Division 3 SX pump. The Division 3 SX subsystem supplies cooling to components of Division 3 only, so that no single-failure prevents accomplishing the safety function of providing the required cooling for any design basis event. The SX system pumps and valves are tested quarterly in accordance with the Inservice Testing Program (some valves may have independent relief justifying less frequent testing). This testing ensures that the major components of the systems are capable of performing their design function. Additionally, valves in the flow path are verified to be in the correct position monthly (i.e., SR 3.7.2.1). Since most of the components and associated circuits are tested on a more frequent basis, this testing would indicate any degradation to the SX System which would result in an inability to start on an initiation signal.

A review of the applicable CPS surveillance history demonstrated that the Division 3 SX subsystem had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

<u>3.7.3 Control Room Ventilation System</u>

SR 3.7.3.4 Verify each Control Room Ventilation subsystem actuates on an actual or simulated initiation signal.

SR 3.7.3.5 Verify the air inleakage rate of the negative pressure portions of the Control Room Ventilation System is $\leq$ 650 cfm.

SR 3.7.3.6 Verify each Control Room Ventilation subsystem can maintain a positive pressure of $\geq$ 1/8 inch water gauge relative to adjacent areas during the high radiation mode of operation at a flow rate of $\leq$ 3000 cfm.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. To verify the automatic operation of the Control Room Ventilation System on a high radiation signal, SR 3.7.3.4 is performed. To ensure that recirculated and outside supply air is filtered to reduce control room radiation exposure, the tests required by SR 3.7.3.5 and SR 3.7.3.6 are performed to verify the integrity of the negative pressure portions of the Control Room Ventilation System duct work and to verify acceptable control room boundary integrity, respectively. The Control Room Ventilation subsystems are redundant so that no single-failure prevents accomplishing the safety function. More frequent verification of portions of the Control Room Ventilation System function is accomplished by operating each Control Room Ventilation subsystem and heaters every 31 days (i.e., SR 3.7.3.1 and SR 3.7.3.2).

A review of the CPS surveillance history demonstrated that the Control Room Ventilation System had four previous failures of the SR 3.7.3.5 verification of inleakage that would have been detected solely by the periodic performance of these SRs. In each case, repairing excessive damper leakage resulted in satisfactory performance of the SR. These failures were:

- Division 1 subsystem on 5/16/02
- Division 1 subsystem on 10/14/00
- Division 2 subsystem on 4/23/99
- Division 2 subsystem on 3/20/95

No failures of this SR were identified during the most recent refueling outage in February 2004.

An inspection of dampers 0VC03YA and 0VC03YB is performed as part of a regularly scheduled preventive maintenance activity. This preventive maintenance activity requires inspection of blades and seals for damage, in addition to removal of dirt, dust, and debris from the damper blades and seals. The damper is cycled and proper contact of the blades and seals is verified. The frequency of this inspection is currently once every 6 years. In support of the proposed extension of the negative pressure test to 24 months, this inspection will be increased to an annual frequency. Successful completion of this preventive maintenance activity should minimize the amount of leakage observed when performing the negative duct pressure test (i.e., SR 3.7.3.5).

In the AmerGen Energy Company (AmerGen), LLC reply to NRC Generic Letter 2003-01, "Control Room Habitability," dated August 11, 2003, CPS has committed to performing additional integrated inleakage testing utilizing the American Society for Testing and Materials (ASTM) standard E741 to confirm the inleakage required by SR 3.7.3.5 in the year 2004. Further commitment was made to provide complete response to Generic Letter (GL) 2003-01 within 90 days following this testing.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, more frequent preventive maintenance, system design, and the history of system performance, the impact of this change on safety, if any, is small.

3.7.4 Control Room Air Conditioning (AC) System

SR 3.7.4.1 Verify each control room AC subsystem has the capability to remove the assumed heat load.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This SR verifies that the heat removal capability of the system is sufficient to remove the control room heat load assumed in the safety analysis. The SR consists of a combination of testing and calculation. The system is normally operating; thus, malfunctions of the cooling units can be detected by Operations personnel and corrected. The active components and power supplies of the control room AC system are designed with redundancy to ensure that a single-failure will not prevent system operability.

A review of the applicable CPS surveillance history demonstrated that the Control Room Air Conditioning System had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent observation of the system performance, system design, and the history of performance testing, the impact of this change on safety, if any, is small.

3.7.6 Main Turbine Bypass System

SR 3.7.6.2 Perform a system functional test.
SR 3.7.6.3 Verify the TURBINE BYPASS SYSTEM RESPONSE TIME is within limits.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. These tests ensure that on increasing main steam line pressure events, the main turbine bypass system will operate as designed within required response times. More frequent verification of portions of the main turbine bypass system is accomplished by SR 3.7.6.1, which requires that each main turbine bypass valve be completely cycled once every 31 days. This test demonstrates that the valves are mechanically operable and detects significant failures affecting system operation.

A review of the applicable CPS surveillance history demonstrated that the main turbine bypass system had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

3.8.1 AC Sources-Operating

SR 3.8.1.8 Verify automatic and manual transfer of unit power supply from the normal offsite circuit to the alternate offsite circuit.

SR 3.8.1.9 Verify each DG rejects a load greater than or equal to its associated single largest post accident load and following load rejection, the engine speed is maintained less than nominal plus 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is lower.

SR 3.8.1.10 Verify each DG operating at a power factor ≤ 0.9 does not trip and voltage is maintained ≤ 5000 V for DG 1A and DG 1B and ≤ 5824 V for DG 1C during and following a load rejection of a load ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C.

SR 3.8.1.11 Verify on an actual or simulated loss of offsite power signal:
- a. De-energization of emergency buses;
- b. Load shedding from emergency buses for Divisions 1 and 2; and
- c. DG auto-starts from standby condition and:
  1. energizes permanently connected loads in ≤ 12 seconds,
  2. energizes auto-connected shutdown loads,
  3. maintains steady state voltage ≥ 4084 V and ≤ 4580 V,
  4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and
  5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes.

SR 3.8.1.12 Verify on an actual or simulated Emergency Core Cooling System (ECCS) initiation signal each DG auto-starts from standby condition and:
- a. In ≤ 12 seconds after auto-start and during tests, achieves voltage ≥ 4084 V and frequency ≥ 58.8 Hz;
- b. Achieves steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz; and
- c. Operates for ≥ 5 minutes.

SR 3.8.1.13 Verify each DG's automatic trips are bypassed on an actual or simulated ECCS initiation signal except:
- a. Engine overspeed;
- b. Generator differential current; and
- c. Overcrank for DG 1A and DG 1B.

SR 3.8.1.14 Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours:
- a. For ≥ 2 hours loaded ≥ 4062 kW for DG 1A, ≥ 4069 kW for DG 1B, and ≥ 2310 kW for DG 1C; and
- b. For the remaining hours of the test loaded ≥ 3482 kW for DG 1A, ≥ 3488 kW for DG 1B, and ≥ 1980 kW for DG 1C.

SR 3.8.1.15 Verify each DG starts and achieves:
- a. In ≤ 12 seconds, voltage ≥ 4084 V and frequency ≥ 58.8 Hz; and
- b. Steady state voltage ≥ 4084 V and ≤ 4580 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.

SR 3.8.1.16 Verify each DG:
- a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;
- b. Transfers loads to offsite power source; and
- c. Returns to ready-to-load operation.

SR 3.8.1.17 Verify, with a DG operating in test mode and connected to its bus, an actual or simulated ECCS initiation signal overrides the test mode by:
- a. Returning DG to ready-to-load operation; and
- b. Automatically energizing the emergency loads from offsite power.

SR 3.8.1.18 Verify the sequence time is within ± 10% of design for each load sequence timer.

SR 3.8.1.19 Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal:
- a. De-energization of emergency buses;
- b. Load shedding from emergency buses for Divisions 1 and 2; and
- c. DG auto-starts from standby condition and:
  1. energizes permanently connected loads in ≤ 12 seconds,
  2. energizes auto-connected emergency loads,
  3. achieves steady state voltage ≥ 4084 V and ≤ 4580 V,
  4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and
  5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The CPS Class 1E AC distribution system supplies electrical power to three divisional load groups, with each division powered by an independent Class 1E 4.16 kV Engineered Safety Feature (ESF) bus. Each ESF bus has two separate and independent offsite sources of power. Each ESF bus has a dedicated onsite diesel generator (DG). The ESF systems of any two of the three divisions provide for the minimum safety functions necessary to shut down the unit and maintain it in a safe shutdown condition. This design provides substantial redundancy in AC power sources. The DGs are infrequently operated; thus, the risk of wear-related degradation is minimal. Historical testing and surveillance testing during operation prove the ability of the diesel engines to start and operate under various load conditions. Through the normal engineering design process, all load additions and deletions are tracked and any changes to loading are verified to be well within the capacity of their power sources. More frequent testing of the AC sources is also required.

* Verifying correct breaker alignment and indicated power availability for each offsite circuit every 7 days (i.e., SR 3.8.1.1);
* Verifying the DG starting and load carrying capability is demonstrated every 31 days (or 7 days, depending on failure history) (i.e., SRs 3.8.1.2 and 3.8.1.3), and ability to continuously supply makeup fuel oil is also demonstrated every 31 days (i.e., SR 3.8.1.6);
* Verifying the ability of each DG to reach rated speed and frequency within required time limits every 184 days (i.e., SR 3.8.1.7) will provide prompt identification of any substantial DG degradation or failure;

* Verifying the necessary support for DG start and operation as well as verifying the DG factors that are subject to degradation due to aging, such as fuel oil quality, (i.e., SRs 3.8.1.4, 3.8.1.5, 3.8.3.1, 3.8.3.2, 3.8.3.3, and 3.8.3.4) are required every 31 days and/or prior to addition of new fuel oil.

A review of the applicable CPS surveillance history for the AC Sources demonstrated there have been three previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs.

(a) A failure associated with SR 3.8.1.11 and SR 3.8.1.19 was experienced when the diesel generator failed to come up to required voltage on September 27, 1993. The rheostat portion of the motor driven potentiometer in the voltage regulator was replaced to correct the problem. No other voltage regulator failures were identified over the evaluation period. Therefore, there is no evidence of repetitive or time-based failures among similar plant components.

(b) A failure associated with SR 3.8.1.16 was experienced when the main feed breaker 1AP07EK would not close on October 27, 1996. A binding circuit breaker motor cut-off switch and spring charge indicator was repaired. No other failures associated with the charging motor cut-off switch or spring charge indicator were identified over the evaluation period, therefore there is no evidence of repetitive or time-based failures among similar plant components.

(c) A failure associated with SR 3.8.1.19 was experienced with the 120VAC circuit breaker for "Heated Sample Line to Panel 1PS16J" (post-accident sample system heat trace) due to failure to shunt trip as required on November 27, 1993. The circuit breaker was replaced. No other additional occurrence of a shunt trip circuit breaker failing to trip was identified over the evaluation period, therefore there is no evidence of repetitive or time-based failures among similar plant components.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, system design, and the history of system performance, the impact of this change on safety, if any, is small.

<u>3.8.4 DC Sources-Operating</u>

SR 3.8.4.2 Verify each Division 1 and 2 battery charger supplies ≥ 300 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours and each Division 3 and 4 battery charger supplies ≥ 100 amps at greater than or equal to the minimum established float voltage for ≥ 4 hours.

<u>OR</u>

Verify each battery charger can recharge the battery to the fully charged state within 12 hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.

SR 3.8.4.3 Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.

The surveillance test interval of these SRs is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period.

SR 3.8.4.1 and SR 3.8.6.1 are performed every 7 days to verify battery terminal voltage and float current, respectively. SR 3.8.6.2, SR 3.8.6.3, and SR 3.8.6.4 are performed every 31 days to verify pilot cell voltage, each cell electrolyte level, and pilot cell temperature. SR 3.8.6.5 is performed every 92 days to verify each connected cell voltage. These more frequent surveillances will provide prompt identification of any substantial degradation or failure of the battery and/or battery chargers.

A review of the applicable CPS surveillance history demonstrated that the DC electric power subsystem had no previous failures of the TS functions that would have been detected solely by the periodic performance of these SRs. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

Additionally, upon approval of this amendment request, commitments outlined in the CPS USAR related to RG 1.32, "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants," RG 1.129, "Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," and to IEEE-450, "Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," to perform the battery service test (i.e., SR 3.8.4.3) during refueling outages, or at some other outage, with intervals between tests "not to exceed 18 months," will be revised to reflect intervals between tests "not to exceed 30 months."

<u>5.5.7 Ventilation Filter Testing Program (VFTP)</u>

5.5.7 A program shall be established to implement the following required testing of Engineered Safety Feature (ESF) filter ventilation systems at the frequencies specified in Regulatory Guide 1.52, Revision 2.

While this specified frequency of testing ESF filter ventilation systems does not explicitly state "18 months," TS Section 5.5.7 requires testing frequencies in accordance with RG 1.52, "Design, Testing and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants," which does reference explicit "18 month" test intervals for various performance characteristics. With this change, these performance tests are being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. This exception to the RG 1.52 interval is explicitly addressed in the change to CPS TS 5.5.7. Furthermore, this revision to the CPS commitment to RG 1.52 will be reflected in a revision to the USAR and provided in accordance with 10CFR50.71, "Maintenance of records, making of reports," paragraph (e). Administrative Control Specification 5.5.7 is revised to state (inserted text shown <u>underlined</u>):

> 5.5.7 A program shall be established to implement the following required testing of Engineered Safety Feature (ESF) filter ventilation systems at the frequencies specified in Regulatory Guide 1.52, Revision 2<u>, except that testing specified at a frequency of 18 months is required at a frequency of 24 months</u>.

In addition to the 24-month testing, ventilation filter (HEPA and charcoal) testing will continue to be performed in accordance with the other frequencies specified in RG 1.52: (1) on initial installation and (2) following painting, fire, or chemical release in any ventilation zone communicating with the system. Additionally, RG 1.52 requires a sample of the charcoal adsorber be removed and tested after each 720 hours of system operation, and an in-place charcoal test be performed following removal of these samples if the integrity of the adsorber section was affected. This proposed amendment request will not change the commitment to perform these required tests.

A review of the applicable CPS surveillance history demonstrated that the ESF ventilation systems had five previous failures of the TS functions that would have been detected solely by the periodic performance of SRs that reference performance of the VFTP of Specification 5.5.7.

(a) Two failures associated with SR 3.7.3.3 were experienced for the 5.5.7.b inplace penetration and bypass test for the Division 2 control room recirculation filter due to an inadequately stroking damper on November 21, 2000 and on March 24, 1999. The most recent performance over the review period on May 23, 2002 was satisfactorily performed. These were the only failures in all ESF filter testing that failed as a result of inadequate damper stroking.

(b) A failure associated with SR 3.6.4.3.2 was experienced with the 5.5.7.b inplace penetration and bypass test for the Division 1 standby gas treatment filter on May 19, 1997. The addition of more charcoal resulted in satisfactory re-performance. This is the only failure of this filter, and the only occurrence where added charcoal was the corrective action.

(c) A failure associated with SR 3.7.3.3 was experienced with the 5.5.7.c laboratory testing of a charcoal sample for the Division 1 control room recirculation filter on August 10, 1994. The charcoal bed was replaced and resulted in satisfactory re-performance. There were two failures where charcoal bed replacement was the corrective action (see below for the second occurrence). Since 1994, charcoal performance trending has improved and has resulted in bed replacement prior to reaching the acceptance criterion. No failures in the 5.5.7.c laboratory testing of a charcoal sample have occurred since 1994.

(d) A failure associated with SR 3.7.3.3 was experienced with the 5.5.7.c laboratory testing of a charcoal sample for the Division 2 control room recirculation filter on August 24, 1994. The charcoal bed was replaced and resulted in satisfactory re-performance. This was the second failure where charcoal bed replacement was the corrective action. Since 1994, charcoal performance trending has improved and has resulted in bed replacement prior to reaching the acceptance criterion. No failures in the 5.5.7.c laboratory testing of a charcoal sample have occurred since 1994.

Each of these historical failures was associated with different components or the same component on different trains. There is no indication the failures reflect a repetitive failure problem. Improved performance trending minimizes the potential for time-based failure problems. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

B. Channel Calibration Changes

NRC GL 91-04 requires that licensees address instrument drift when proposing an increase in the surveillance interval for calibrating instruments that perform safety functions including providing the capability for safe shutdown. The effect of the increased calibration interval on instrument errors must be addressed because instrument errors caused by drift were considered when determining safety system setpoints and when performing safety analyses. NRC GL 91-04 identifies seven steps for the evaluation of instrumentation calibration changes. These seven steps are discussed in Attachment 1 to this submittal. In that discussion, a description of the methodology used by CPS for each step is summarized. The detailed methodology is provided in Attachment 6.

The following are the calibration-related TS SRs being proposed for revision from 18 months to 24 months, for a maximum interval of 30 months (considering the 25% grace period allowed by TS SR 3.0.2). In each instance, the instrument channel loop drift was evaluated in accordance with the methodology utilized by other Exelon sites—specifically the LaSalle County Station 24-month submittal as approved in NRC Safety Evaluation dated March 30, 2001. This previously reviewed methodology (i.e., Appendix J of NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy," Revision 3) is the basis for the CPS 24-Month Project, and is provided in Attachment 6. The methodology is also based on Electric Power Research Institute (EPRI) TR-103335, "Statistical Analysis of Instrument Calibration Data," Revision 1, dated October 1998.

The projected 30-month drift values for many of the instruments analyzed from the historical as-found/as-left evaluation shows sufficient margin between the current plant setpoint and the allowable value to compensate for the 30-month drift. For each instrument function that has a channel calibration proposed frequency change to 24 months, the associated setpoint calculation assumes (or will be revised prior to implementation to assume) a consistent or conservative drift value appropriate for a 24-month calibration interval. All revised setpoint calculations have been (or will be) completed in accordance with the guidance provided in RG 1.105, "Instrument Setpoints," as implemented by the CPS setpoint methodology, and the Instrument Society of America (ISA) Standard 67.04, 1994. These calculations determine the instrument uncertainties, setpoints, and allowable values for the affected functions. Where indicated, proposed allowable value changes have been determined to be required. The allowable values have been determined in a manner suitable to establish limits for their application. As such, the TS allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. Also, review of the applicable safety analysis concluded that the setpoints, allowable values, and projected 30-month drift confirmed the safety limits and safety analysis assumptions remain bounding. In performing the revised setpoint calculations to support any revised allowable values, the use of ISA RP67.04, Part II, "Method 3" was not utilized.

Below is a summary of the specific application of this methodology to the CPS 24-month fuel cycle extension project, as well as any required allowable value changes. Where optional methods are presented in Attachment 6, and where other alternate engineering justifications are allowed, the rationale for the selected method and alternate justification is summarized with the associated instrument calibration surveillance affected (e.g., for channel groupings having less than 30 calibrations, which is required to qualify for valid statistical evaluations).

For channel calibration requirements remaining at 18-month frequency, the applicable surveillance is administratively renumbered by adding a new 18-month surveillance requirement. This editorial presentation preference replaces the current 18-month channel calibration surveillance requirement, allowing the surveillances extended to 24 months to retain current SR numbering.

3.3.1.1 Reactor Protection System (RPS) Instrumentation

The RPS initiates a reactor scram when one or more monitored parameters exceed their specified limit, to preserve the integrity of the fuel cladding and the Reactor Coolant System (RCS), and minimize the energy that must be absorbed following a loss of coolant accident (LOCA).

SR 3.3.1.1.13 Perform CHANNEL CALIBRATION.
- Function 3, Reactor Vessel Steam Dome Pressure-High
- Function 4, Reactor Vessel Water Level-Low, Level 3
- Function 5, Reactor Vessel Water Level-High, Level 8
- Function 7, Drywell Pressure-High
- Function 8.a, Scram Discharge Volume Water Level-High, Transmitter

For these functions, no revisions to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical as-found minus as-left (AFAL) data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these Functions demonstrated that the as-found trip setpoint had only one previous failure of TS required allowable values that would have been detected solely by the periodic performance of this SR. A failure associated with Function 5 was experienced with 1B21N080D on October 27, 1992 due to as-found setting outside of the allowable value, which was corrected by recalibration of the transmitter. This calibration was included in the statistical evaluation to determine drift. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.1.1.13 Perform CHANNEL CALIBRATION.
- Function 1.a, Intermediate Range Monitors, Neutron Flux-High

No revisions to TS allowable values or safety analyses result from the required evaluations. Drift evaluations were not performed for TS Table 3.3.1.1-1 Function 1.a, Intermediate Range Monitors (IRMs), Neutron Flux-High. This is acceptable because of the design requirements for the instruments and more frequent functional testing (i.e., once per 7 days). Before the IRM detectors are used for operation, an overlap check is performed to determine if the instruments are reading and tracking with the power range (i.e., SR 3.3.1.1.7) or the source range neutron detectors (i.e., SR 3.3.1.1.6), as applicable. Furthermore, when the IRM trip is required to be operable, a channel functional test is performed on the IRM trip function every 7 days in accordance with SR 3.3.1.1.4.

A review of the applicable CPS surveillance history for the IRM channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this

SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.1.1.13 Perform CHANNEL CALIBRATION.
- Function 6, Main Steam Isolation Valve-Closure
- Function 8.b, Scram Discharge Volume Water Level-High, Float Switch
- Function 9, Turbine Stop Valve Closure

No revisions to TS allowable values or safety analyses result from the required evaluations. (The allowable value for Function 6, Main Steam Isolation Valve-Closure, is revised in the AmerGen amendment request dated November 11, 2003. The preceding statement assumes the proposed allowable values are approved.)

Drift evaluations were not performed for TS Table 3.3.1.1-1 Functions 6 (MSIV limit switches), 8.b (scram discharge volume float switches), and 9 (turbine stop valve (TSV) limit switches). The limit and float switches that perform these functions are mechanical devices that require mechanical adjustment only; drift is not applicable to these devices. The limit switches are functionally tested quarterly (i.e., SR 3.3.1.1.9) to verify operation.

A review of the applicable CPS surveillance history for these limit switch channels demonstrated that the as-found trip setpoint for these functions had only two previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. SR 3.3.1.1.13 experienced two failures associated with Function 9 (TSV closure function).

(a) On April 28, 2002, TSV #2 was found outside of the allowable value and was corrected by adjustment of the limit switch.

(b) On April 16, 1999, TSV #1 was found to have moisture intrusion in the limit switch internals caused by a suspected faulty gasket. The limit switch could not be adjusted and was replaced.

Both these failures are unique in that the surveillance test history indicates that they are not repetitive and not related to a time based failure mechanism. These were the only limit switch failures in the failure review scope for all surveillances over the evaluation period. As such, this failure is not indicative of a repetitive failure problem. (Note these failures also impact the EOC-RPT function and this discussion is repeated in discussing TS 3.3.4.1.2 below.)

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.1.1.13 Perform CHANNEL CALIBRATION.
- Function 10, Turbine Control Valve Fast Closure, Trip Oil Pressure-Low

No revisions to TS allowable values or safety analyses result from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

For Function 10, Turbine Control Valve Fast Closure, Trip Oil Pressure - Low, the evaluation of the historical performance of these pressure switches resulted in identification of two of the four switches that had excessive AFAL drift characteristics. Since the actual as-found trip point (AFT) exceeded the TS allowable value on only one occasion (i.e., for the "A" channel on March 5, 1992) there was no actual safety impact; however, it was recognized that the demonstrated drift characteristics were not reflective of adequately performing channels. Inclusion of the historical data from these devices would have resulted in excessive conservatisms between the allowable value and as-left trip setpoint, and would have resulted in the ongoing trend program identifying this excessive drift as acceptable. As such, AmerGen has replaced one of these pressure switches in the recent refueling outage, and is committing to replacing the remaining pressure switch in the Spring 2006 refueling outage. Since there were fewer than 30 calibration points for statistical evaluation of this function due to excluding calibrations from these two channels, vendor supplied data is utilized for drift to support a 30-month calibration frequency. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis. The procedural AFT (which if exceeded results in entering the occurrence into the CPS corrective action program for trending purposes) will be conservatively chosen to monitor these channels until adequate assurance that 30-month drift remains within the assumption of the analyses. The use of vendor supplied data for drift values is acceptable based on the historical AFAL data showing significant margin to the calculated margin between the allowable value and the nominal trip setpoint (NTSP). For the two channels remaining in service (that are expected to reflect the future performance of the replaced channels), the maximum historical AFAL was 37 psig (with the average AFAL of < 16 psig). This single highest AFAL was < 60% of the setpoint calculation margin between allowable value and NTSP (i.e., 65 psig). The calibration history for the two remaining channels shows that less than half of the calibrations required any adjustment, which also provided many periods greater than 30 months where drift did not result in as-found settings exceeding the TS allowable value. Furthermore, additional conservatism exists in the TS allowable value, which is 15.65 psig higher than that required by the existing setpoint calculation for margin to the analytical limit.

A review of the applicable CPS surveillance history for the remaining channels (i.e., those not identified for replacement), demonstrated that the as-found trip setpoint for these functions had only one previous failure of TS required allowable values that would have been detected solely by the periodic performance of this SR (as described above). As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, trending of future performance, and conservatism with regard to the analytical limit, the impact of this change on safety, if any, is small.

SR 3.3.1.1.16 Verify Turbine Stop Valve Closure and Turbine Control Valve Fast Closure Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.

This SR ensures that scrams initiated from the Turbine Stop Valve Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure–Low Functions will not be inadvertently bypassed when THERMAL POWER is ≥ 33.3% RTP. This involves calibration of the bypass channels.

No revisions to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations).

Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for this function demonstrated that the as-found trip setpoint had no previous failures of the TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.1.2 Source Range Monitor (SRM) Instrumentation

The SRMs provide the operator with information relative to very low neutron flux levels in the core. Specifically, the SRM indication is used by the operator to monitor the approach to criticality and to determine when criticality is achieved. During refueling, shutdown, and low power operations, the primary indication of neutron flux levels is provided by the SRMs to monitor reactivity changes during fuel or control rod movement and give the control room operator early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality.

SR 3.3.1.2.6 Perform CHANNEL CALIBRATION.

No revisions to TS allowable values or safety analyses result from the required evaluations. Drift evaluations were not performed for SRMs. This is acceptable because there are no trip setpoints or allowable values specified by the TS or credited in accident or safe shutdown analyses. There are also more frequent Channel Checks and functional testing.

Extending the SRM calibration interval from 18 months to 24 months is acceptable if calibration is sufficient to ensure neutron level is observable when the reactor is shutdown. This is verified at least every 24 hours when the reactor is shutdown (i.e., SR 3.3.1.2.4). Also, SRMs satisfy their design function (i.e., are adequately calibrated) when sufficient overlap with the IRMs is demonstrated during startup operations. IRM/SRM overlap is appropriately verified in accordance with SR 3.3.1.1.6. Additionally, SRM response to reactivity changes is distinctive and well known to plant operators and SRM response is closely monitored during these reactivity changes. Therefore, any substantial degradation of the SRMs will be evident prior to the scheduled performance of Channel Calibrations. Based on the above discussion, there will be no significant adverse impact from the surveillance test frequency increase on system reliability.

A review of the applicable CPS surveillance history for this function demonstrated that there were no previous failures of TS required channel calibration that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.2.1 Control Rod Block Instrumentation

For TS Table 3.3.2.1-1 Functions 1.a and 1.b, the calibration consists of calibrating the turbine first stage pressure enabling/bypass interlock, which enforces the Applicability for the Rod Pattern Control System. Turbine first stage turbine pressure is used to determine reactor power level, with a low power setpoint (LPSP) and a high power setpoint (HPSP) used to determine allowable control rod withdrawal distances for the rod withdrawal limiter, and a bypass/enabling setpoint for the rod pattern controller.

SR 3.3.2.1.7 Perform CHANNEL CALIBRATION.
- Function 1.a, Rod Pattern Control System, Rod withdrawal limiter
- Function 1.b, Rod Pattern Control System, Rod pattern controller

No revisions to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for this function demonstrated that the as-found trip setpoint had no previous failures of the required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.3.1 Post Accident Monitoring (PAM) Instrumentation

The primary purpose of the PAM instrumentation is to display plant variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions for which no automatic control is provided.

SR 3.3.3.1.3 Perform CHANNEL CALIBRATION.

No allowable value is applicable to these functions. A separate drift evaluation has not been performed for the PAM instruments based on the design of the PAM instruments and equipment history. The PAM function is supported by a combination of process transmitters, indicators, and recorders. These components differ from other TS instruments in that they are not associated with a function trip, but indication only to the control room operator. As such, these instruments are not expected to function with the same high degree of accuracy demanded of functions with assumed trip actuations for accident detection and mitigation. The PAM devices are expected to maintain sufficient accuracy to detect trends or the existence or non-existence of a condition. The PAM functions require at least two operable channels (except for some PCIV indications) to ensure no single failure prevents the operators from being presented with the information. The functioning status of the PAM instruments is also required more frequently by SR 3.3.3.1.1 (i.e., Channel Check every 31 days).

A review of the applicable CPS surveillance history for these functions demonstrated that there was only one previous failure of TS required channel calibration that would have been detected solely by the periodic performance of this SR. The Drywell Area Radiation

Monitor (i.e., Function 6) failed a source shot on October 28, 1996. A bad high voltage connector was discovered and replaced. The failure documented here and failure of SR 3.3.6.5.4 for the ADS/SRV function, documented in the "Non- Calibration Changes" section, involve connections. However, these failures are not related by system or surveillance requirement. Since only two connection failures were identified over the evaluation period and based on the large population of connectors, the failures are not indicative of a repetitive failure problem.

As such, the impact, if any, on PAM system availability is minimal from the proposed change to a 24-month testing frequency. Based on system design and the history of system performance, the impact of this change on safety, if any, is small.

3.3.3.2 Remote Shutdown System

The Remote Shutdown System provides the control room operator with a redundant safety-grade capability to place and maintain the plant in a safe shutdown condition from a location other than the control room.

SR 3.3.3.2.3 Perform CHANNEL CALIBRATION for each required instrumentation channel.

No allowable value is applicable to these functions. A separate drift evaluation has not been performed for the Remote Shutdown System instrument channels based on the design function and equipment history.

The Remote Shutdown System instrument channels differ from other TS instruments in that they are not associated with an automatic protective action or trip. As such, these instruments are not expected to function with the same high degree of accuracy demanded of functions with assumed trip actuations for accident detection and mitigation. The normally energized Remote Shutdown System instrument channels also require more frequent verification of the functioning status as required by SR 3.3.3.2.1 (i.e., every 31 days).

A review of the applicable CPS surveillance history demonstrated that the Remote Shutdown System had only two previous failures of the TS function that would have been detected solely by the periodic performance of this SR.

(a) A failure associated with SR 3.3.3.2.3 was experienced with the RCIC pump discharge flow controller (1C61R001) on April 16, 1999 due to the inability to calibrate the deviation meter, which was subsequently replaced.

(b) A failure associated with SR 3.3.3.2.3 was experienced with the RCIC pump discharge flow controller (1E51R600) on April 9, 1995 due to a broken zero potentiometer, which was subsequently replaced.

Flow controller failures were also reviewed for commonality. Three failures were identified for all surveillances over the entire evaluation period. In addition to these two RCIC controller failures, the Standby Gas Treatment System flow controller was replaced due to hesitation during calibration, discussed in the "Non-Calibration Changes" section above. None of these failures shares a common failure mode. Since only three failures with no common failure mode were identified over the evaluation period, these failures are not indicative of a repetitive or time-based failure problem.

As such, the impact, if any, on Remote Shutdown System availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.4.1 End of Cycle Recirculation Pump Trip (EOC-RPT) Instrumentation

The EOC-RPT instrumentation initiates a recirculation pump trip to reduce the peak reactor pressure and power resulting from turbine trip (TSV closure) or generator load rejection (TCV fast closure) transients to provide additional margin to core thermal minimum critical power ratio (MCPR) Safety Limits.

SR 3.3.4.1.2 Perform CHANNEL CALIBRATION.
- Function a, TSV Closure

No revisions to TS allowable values or safety analyses result from the required evaluations. Drift evaluations were not performed for the TSV limit switches. The limit switches that perform these functions are mechanical devices that require mechanical adjustment only; drift is not applicable to these devices. The limit switches are functionally tested quarterly (i.e., SR 3.3.4.1.1) to verify operation.

A review of the applicable CPS surveillance history for these limit switch channels demonstrated that the as-found trip setpoint for these functions had only two previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR.

(a) A failure associated with SR 3.3.4.1.2 was experienced with TSV #2 on April 28, 2002 due to limit switch as-found setting outside of the allowable value, which was corrected by adjustment of the limit switch.

(b) A failure associated with SR 3.3.4.1.2 was experienced with TSV #1 on April 16, 1999 due to moisture intrusion in the limit switch internals caused by a suspected faulty gasket. The limit switch would not adjust and was replaced.

Both these failures are unique in that the surveillance test history indicates that they are not repetitive and not related to a time based failure mechanism. These were the only limit switch failures in the failure review scope for all surveillances over the evaluation period. As such, these failures are not indicative of a repetitive failure problem. (Note these failures also impact the RPS function and are discussed above for TS 3.3.1.1.)

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.4.1.2 Perform CHANNEL CALIBRATION.
- Function b, TCV Fast Closure, Trip Oil Pressure-Low

No revisions to TS allowable values or safety analyses result from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

For Function b, TCV Fast Closure, Trip Oil Pressure - Low, the evaluation of the historical performance of these pressure switches resulted in identification of two of the four switches that had excessive AFAL drift characteristics. Since the actual as-found trip point exceeded the TS allowable value on only one occasion (i.e., for the "A" channel on March 5, 1992) there was no actual safety impact; however, it was recognized that the demonstrated drift characteristics were not reflective of adequately performing channels. Inclusion of the historical data from these devices would have resulted in excessive conservatisms between the allowable value and as-left trip setpoint, and would have resulted in the ongoing trend program identifying this excessive drift as acceptable. As such, AmerGen has replaced one of these pressure switches in the recent refueling outage, and is committing to replacing the remaining pressure switch in the Spring 2006 refueling outage. Since there were fewer than 30 calibration points for statistical evaluation of this function due to excluding calibrations from these two channels, vendor supplied data is utilized for drift to support a 30-month calibration frequency. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis. The procedural AFT (which if exceeded results in entering the occurrence into the CPS corrective action program for trending purposes) will be conservatively chosen to monitor these channels until adequate assurance that 30-month drift remains within the assumption of the analyses. The use of vendor supplied data for drift values is acceptable based on the historical AFAL data showing significant margin to the calculated margin between the allowable value and the NTSP. For the two channels remaining in service (that are expected to reflect the future performance of the replaced channels), the maximum historical AFAL was 37 psig (with the average AFAL of < 16 psig). This single highest AFAL was < 60% of the setpoint calculation margin between allowable value and NTSP (i.e., 65 psig). The calibration history for the two remaining channels shows that less than half of the calibrations required any adjustment, which also provided many periods greater than 30 months where drift did not result in as-found settings exceeding the TS allowable value. Furthermore, additional conservatism exists in the TS allowable value, which is 15.65 psig higher than that required by the existing setpoint calculation for margin to the analytical limit.

A review of the applicable CPS surveillance history for the remaining channels (i.e., those not identified for replacement), demonstrated that the as-found trip setpoint for these functions had only one previous failure of TS required allowable values that would have been detected solely by the periodic performance of this SR (as described above). As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, trending of future performance, and conservatism with regard to the analytical limit, the impact of this change on safety, if any, is small.

SR 3.3.4.1.4 Verify TSV Closure and TCV Fast Closure, Trip Oil Pressure-Low Functions are not bypassed when THERMAL POWER is ≥ 33.3% RTP.

No revisions to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

This SR ensures that an EOC-RPT initiated from the Turbine Stop Valve Closure and Turbine Control Valve Fast Closure, Trip Oil Pressure–Low functions will not be inadvertently bypassed when THERMAL POWER is ≥ 33.3% RTP. This involves calibration of the bypass channels.

A review of the applicable CPS surveillance history for this function demonstrated that the as-found trip setpoint had no previous failures of the TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.4.2 Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) Instrumentation

The ATWS-RPT System initiates a recirculation pump trip, adding negative reactivity, following events in which a scram does not (but should) occur, to lessen the effects of an ATWS event. Tripping the recirculation pumps adds negative reactivity from the increase in steam voiding in the core area as core flow decreases. When Reactor Vessel Water Level-Low Low, Level 2 or Reactor Steam Dome Pressure-High setpoint is reached, the recirculation pump motor breakers trip.

SR 3.3.4.2.4 Perform CHANNEL CALIBRATION.
- Function a, Reactor Vessel Water Level–Low Low, Level 2
- Function b, Reactor Steam Dome Pressure-High

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). (The allowable value for Function b, Reactor Steam Dome Pressure-High, is revised in the AmerGen amendment request dated November 11, 2003. The preceding statement assumes the proposed allowable values are approved.) Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these functions demonstrated that the as-found trip setpoint had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation

The purpose of the ECCS instrumentation is to initiate appropriate responses from the systems to ensure that fuel is adequately cooled in the event of a design basis accident or transient.

SR 3.3.5.1.4 Perform CHANNEL CALIBRATION.
- Function 1.b, 2.b, 3.b, 4.b, 5.b, Drywell Pressure-High
- Function 1.c, 2.c, LPCI Pump A and B Start-Time Delay Logic Card
- Function 1.d, 2.d, Reactor Vessel Pressure-Low (Injection Permissive)
- Function 1.e, 1.f, 2.e, LPCS Pump & LPCI Pump A, B, & C Discharge Flow-Low (Bypass)
- Function 3.d, RCIC Storage Tank Level-Low
- Function 3.e, Suppression Pool Water Level-High
- Function 3.f, HPCS Pump Discharge Pressure-High (Bypass)
- Function 4.c, 5.c, ADS Initiation Timer
- Function 4.d, 5.d, Reactor Vessel Water Level–Low, Level 3 (Confirmatory)
- Function 4.e, 4.f, 5.e, LPCS Pump & LPCI Pump A, B, & C Discharge Pressure-High
- Function 4.g, 5.f, ADS Drywell Pressure Bypass Timer

No revisions to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). (The allowable value for Functions 1.d, 2.d, Reactor Vessel Pressure-Low (Injection Permissive), Function 3.d, RCIC Storage Tank Level-Low, Function 3.e, Suppression Pool Water Level-High, and Function 4.e, 4.f, 5.e, LPCS Pump & LPCI Pump A, B, & C Discharge Pressure-High are revised in the AmerGen amendment request dated November 11, 2003. The preceding statement assumes the proposed allowable values are approved.) Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for all these functions had only two previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR.

(a) A failure associated with Function 1.d was experienced with 1B21N078A on July 25, 1990 due to as-found setting outside of the allowable value, which was corrected by recalibration of the transmitter. This calibration was included in the statistical evaluation to determine drift.

(b) A failure associated with Function 3.d was experienced with 1E22N054G on December 31, 2001 due to as-found setting outside of the allowable value, which was corrected by recalibration of the transmitter. This calibration was included in the statistical evaluation to determine drift.

Both failures are unique in that the surveillance test history indicates that they are not repetitive and not related to a time based failure mechanism. As such, these failures are not indicative of a repetitive failure problem and do not invalidate the conclusion that only on rare occasions do as-found values exceed acceptable limits. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

<u>SR 3.3.5.1.4</u> Perform CHANNEL CALIBRATION.
- Function 3.g, HPCS System Flow Rate-Low (Bypass)

For this function, no revision to TS allowable values or safety analyses results from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

TS Table 3.3.5.1-1, Function 3.g, HPCS System Flow Rate-Low (Bypass), is associated with the minimum flow valve, which is provided to protect the HPCS pump from overheating when the pump is operating and the associated injection valve is not fully open. This function consists of one channel. As such, there were fewer than 30 calibration points over the entire CPS operating history for statistical evaluation of this channel. Vendor supplied data is utilized for drift to support a 30-month calibration frequency. Furthermore, the ongoing drift trend program will monitor this channel for operation within the assumptions of the setpoint analysis. The use of vendor supplied data for drift values is acceptable based on the historical AFAL data showing significant calculated margin between the allowable value and the NTSP. For the seven most recent (i.e., through the Spring 2002 refueling outage) calibration data sets evaluated, only the last performance required an adjustment to the transmitter (as-found trip remained within the allowed AFT).

A review of the applicable CPS surveillance history for this channel demonstrated that the as-found trip setpoint for this function had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

<u>SR 3.3.5.1.6</u> Perform CHANNEL CALIBRATION.
- Function 1.a, 2.a, 4.a, 5.a, Reactor Vessel Water Level–Low Low Low, Level 1
- Function 3.a, Reactor Vessel Water Level–Low Low, Level 2
- Function 3.c, Reactor Vessel Water Level–High, Level 8

For TS Table 3.3.5.1-1 functions listed above, the SR frequency remains at 18 months. Since the current 18 month channel calibration (i.e., SR 3.3.5.1.4) is revised to 24 months for application to other functions, a new SR 3.3.5.1.6 is included for the 18 month calibration. The above listed functions are not proposed to have the calibration interval extended at this time. Calibration of these functions is performed online and will not be impacted by the proposed change to a 24 month fuel cycle. Therefore, for these TS Table 3.3.5.1-1 functions the proposed change replaces SR 3.3.5.1.4 with SR 3.3.5.1.6. This is an administrative change only.

3.3.5.2 Reactor Core Isolation Cooling (RCIC) System Instrumentation

The purpose of the RCIC System instrumentation is to initiate actions to ensure adequate core cooling when the reactor vessel is isolated from its primary heat sink (the main condenser) and normal coolant makeup flow from the Reactor Feedwater System is unavailable, such that initiation of the low pressure ECCS pumps does not occur.

SR 3.3.5.2.4 Perform CHANNEL CALIBRATION.
- Function 2, Reactor Vessel Water Level–High, Level 8
- Function 3, RCIC Storage Tank Level-Low
- Function 4, Suppression Pool Water level-High

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). (The allowable values for Functions 3 and 4 are revised in the AmerGen amendment request dated November 11, 2003. The preceding statement assumes the proposed allowable values are approved.) Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for all these functions had only one previous failure of a TS required allowable value that would have been detected solely by the periodic performance of this SR. A failure associated with Function 4 was experienced with 1E51N036E on October 8, 1998 due to as-found setting outside of the allowable value, which was corrected by recalibration of the transmitter. This calibration was included in the statistical evaluation to determine drift.

This failure is unique in that the surveillance test history indicates that it is not repetitive and not related to a time based failure mechanism. As such, this failure is not indicative of a repetitive failure problem and does not invalidate the conclusion that only on rare occasions do as-found values exceed acceptable limits. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.5.2.6 Perform CHANNEL CALIBRATION.
- Function 1, Reactor Vessel Water Level–Low Low, Level 2

For TS Table 3.3.5.2-1, Function 1, the SR frequency remains at 18 months. Since the current 18 month channel calibration (i.e., SR 3.3.5.2.4) is revised to 24 months for application to other functions, a new SR 3.3.5.2.6 is included for the 18 month calibration. The above listed function is not proposed to have the calibration interval extended at this time. Calibration of this function is performed online and will not be impacted by the proposed change to a 24-month fuel cycle. Therefore, TS Table 3.3.5.2-1 for this function is revised to replace SR 3.3.5.2.4 with SR 3.3.5.2.6. This is an administrative change only.

3.3.6.1 Primary Containment and Drywell Isolation Instrumentation

The primary containment and drywell isolation instrumentation automatically initiates closure of appropriate primary containment isolation valves (PCIVs) and drywell isolation valves.

SR 3.3.6.1.5 Perform CHANNEL CALIBRATION.
- Function 1.c, Main Steam Line Flow-High
- Function 1.d, Condenser Vacuum-Low
- Function 1.e, Main Steam Tunnel Temperature-High
- Function 1.f, Main Steam Line Turbine Building Temperature-High
- Function 2.b, 2.d, 2.f, 3.j, 5.f, Drywell Pressure-High
- Function 2.k, Containment Pressure-High
- Function 3.a, Auxiliary Building RCIC Steam Line Flow-High
- Function 3.b, RCIC Steam Line Flow-High, Time Delay
- Function 3.c, RCIC Steam Supply Line Pressure-Low
- Function 3.d, RCIC Turbine Exhaust Diaphragm Pressure-High
- Function 3.e, RCIC Equipment Room Ambient Temperature-High
- Function 3.f, Main Steam Line Tunnel Ambient Temperature-High
- Function 3.i, Drywell RCIC Steam Line Flow-High
- Function 4.c, RWCU Heat Exchanger Equipment Room Temperature-High
- Function 4.d, RWCU Pump Rooms Temperature-High
- Function 4.e, Main Steam Line Tunnel Ambient Temperature-High
- Function 5.a, RHR Heat Exchanger Ambient Temperature-High
- Function 5.b, 5.c, Reactor Vessel Water Level - Low, Level 3

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.1.5 Perform CHANNEL CALIBRATION.
- Function 2.g, Containment Building Fuel Transfer Pool Ventilation Plenum Radiation-High
- Function 2.h, Containment Building Exhaust Radiation-High
- Function 2.i, Containment Building Continuous Containment Purge (CCP) Exhaust Radiation-High

For this function, no revision to TS allowable values or safety analyses results from the required evaluations. Drift evaluations were not performed for radiation monitors. The above radiation detectors are calibrated using a calibrated source as an input signal to the detector. The source check is performed by exposing the sensor-converter to a known source in a constant geometry. Source checks of radiation monitors are subject to far more uncertainties than electronic calibration checks because of source decay, positioning of the sources, signal strength, and the sensor response curves of that particular monitoring system. Because of the uncertainties associated with the calibration methods for these devices, any AFAL evaluation would provide no true indication of the instrument performance over time.

Extending the surveillance test interval for calibration of these functions is acceptable because the functions are verified to be operating properly by the performance of more frequent Channel Checks (i.e., SR 3.3.6.1.1 every 12 hours) and Channel Functional Tests (i.e., SR 3.3.6.1.2 every 92 days). Additionally, each of the above functions is provided with four channels, which ensures that no single instrument failure can preclude the isolation function. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on system design and the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.1.5 Perform CHANNEL CALIBRATION.
- Function 3.g, Main Steam Line Tunnel Temperature Timer

No revisions to safety analyses result from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

For Function 3.g (i.e., timer associated with RCIC isolation on Main Steam Line Tunnel Temperature), only two channels are provided, and based on the manufacturer and model, these channels remained a unique drift group (i.e., Group 31; refer to Attachment 7). As such, for the entire history of CPS, there were fewer than 30 calibrations to perform valid statistical evaluations of drift, and therefore, vendor supplied data is utilized for drift to support a 30-month calibration frequency. The ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis. Historical performance shows that 1986 was the last time a calibration adjustment was required on either of these two channels (except for 2 replaced timers; one in 1994 and one in 1999), indicating performance that has not experienced significant or time-dependent drift. Informal statistical analysis was performed on the limited calibration data with results showing 0 second bias and 49 second loop drift (2-sigma) (which also includes instrument and calibration accuracies). The existing calculation provides > 68 seconds for drift and loop accuracies between the allowable value and the trip setpoint. As such, sufficient margin currently exists and future performance of these instruments is expected to remain bounded by currently assumed drift.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for the function had no previous failures of the TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.1.5 Perform CHANNEL CALIBRATION.
- Function 1.b, Main Steam Line Pressure-Low
- Function 5.e, Reactor Vessel Pressure-High

For each of these functions, revisions to calculations have resulted in proposing the following TS allowable value changes. The new allowable values have been calculated in accordance with the guidance provided in RG 1.105, as implemented by the CPS setpoint methodology, and the ISA 67.04. These calculations determine the instrument uncertainties, setpoints, and allowable values for the affected functions. As such, the revised allowable value ensures that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. No revision to safety analyses results from the required evaluations since no change to the analytical limit is made. In performing the revised setpoint calculations to support the revised allowable values, the use of ISA RP67.04, Part II, "Method 3" was not utilized.

For Function 1.b, Main Steam Line Pressure-Low, statistical drift analyses have been incorporated into a revision to the applicable setpoint calculation. In conjunction with re-performing this calculation, the methods used were also revised. Note that for Function 1.b, the allowable value was revised in the AmerGen amendment request dated November 11, 2003. The revised calculation that supports the requested change herein was performed utilizing ISA RP67.04, Part II, "Method 1," for additional conservatism. This results in an additional 1 psig more conservative allowable value (≥ 841 psig proposed herein versus ≥ 840 psig proposed in the November 11, 2003 submittal). This revised allowable value continues to adequately protect the analytical limit of 825 psig, which remains unchanged (i.e., no safety analysis revisions are required). Furthermore, sufficient margin remains between the current plant NTSP (remains unchanged) and the more conservative allowable value to support a 24-month calibration interval (with 25% margin, i.e., 30-month interval) based on the statistical drift analysis. Since the current NTSP has been determined to be appropriate, adequate administrative controls are being implemented to assure safe plant operation until approval of the revised allowable value.

For Function 5.e, Reactor Vessel Pressure-High (residual heat removal shutdown cooling (RHR-SDC) isolation), statistical drift analyses have been incorporated into a revision to the applicable setpoint calculation. The revised calculation that supports the requested change herein was performed utilizing ISA RP67.04, Part II, "Method 1." In evaluating the potential impacts of these changes to the setpoint calculation, it was desired to retain the NTSP to maintain current operating margin. As such, both the analytical limit and allowable value are increased. The revised safety analysis for the increased analytical limit continues to support the basis provided in CPS TS Amendment No. 104 (which had previously lowered the analytical limit and allowable value to ensure isolation valve closure under the worst-case differential pressure in the event of a line break downstream of the isolation valves). The revised calculation results in a 10 psig increase in the analytical limit (≤ 128 psig proposed herein versus ≤ 118 psig approved in Amendment 104), and an additional 3 psig increase in the allowable value (≤ 113 psig proposed herein versus ≤ 110 psig approved in Amendment 104).

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of the TS required allowable value, including no instances where the as-found setting would have resulted in exceeding the proposed allowable value, that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.1.8 Perform CHANNEL CALIBRATION.
- Function 1.a, 2.j, 5.d, Reactor Vessel Water Level–Low Low Low, Level 1
- Function 2.a, 2.e, 3.h, 4.f, Reactor Vessel Water Level–Low Low, Level 2
- Function 4.a, Reactor Water Cleanup (RWCU) System Differential Flow-High

For TS Table 3.3.6.1-1 functions listed above, the SR frequency remains at 18 months. Since the current 18-month channel calibration (i.e., SR 3.3.6.1.5) is revised to 24 months for application to other functions, a new SR 3.3.6.1.8 is included for the 18-month calibration. The above listed functions are not proposed to have the calibration interval extended at this time. Calibration of these functions is performed online and will not be impacted by the proposed change to a 24-month fuel cycle. Therefore, these TS Table 3.3.6.1-1 functions are revised to replace SR 3.3.6.1.5 with SR 3.3.6.1.8. This is an administrative change only.

3.3.6.2 Secondary Containment Isolation Instrumentation

The secondary containment isolation instrumentation automatically initiates closure of appropriate secondary containment isolation dampers (SCIDs) and starts the Standby Gas Treatment (SGT) System.

SR 3.3.6.2.4 Perform CHANNEL CALIBRATION.
- Function 2, Drywell Pressure-High

For this function, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.2.4 Perform CHANNEL CALIBRATION.
- Function 3, Containment Building Fuel Transfer Pool Ventilation Plenum Exhaust Radiation-High
- Function 4, Containment Building Exhaust Radiation-High
- Function 5, Containment Building Continuous Containment Purge (CCP) Exhaust Radiation-High
- Function 6, Fuel Building Exhaust Radiation-High

For these functions, no revision to TS allowable values or safety analyses result from the required evaluations. Drift evaluations were not performed for radiation monitors. The above radiation detectors are calibrated using a calibrated source as an input signal to the detector. The source check is performed by exposing the sensor-converter to a known source in a constant geometry. Source checks of radiation monitors are subject to far more uncertainties than electronic calibration checks because of source decay, positioning of the sources, signal strength, and the sensor response curves of that particular monitoring system. Because of the uncertainties associated with the calibration methods for these devices, any AFAL evaluation would provide no true indication of the overall instrument performance over time.

Extending the surveillance test interval for calibration of these functions is acceptable because the functions are verified to be operating properly by the performance of more frequent Channel Checks (i.e., SR 3.3.6.2.1 every 12 hours) and Channel Functional Tests (i.e., SR 3.3.6.2.2 every 92 days). Additionally, each of the above functions is provided with four channels, which ensures that no single instrument failure can preclude the isolation function. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on system design and the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.2.6 Perform CHANNEL CALIBRATION.
- Function 1, Reactor Vessel Water Level-Low Low, Level 2

For TS Table 3.3.6.2-1 Function 1, Reactor Vessel Water Level-Low Low, Level 2, the SR frequency remains at 18 months. Since the current 18 month channel calibration (i.e., SR 3.3.6.2.4) is revised to 24 months for application to other functions, a new SR 3.3.6.2.6 is included for the 18 month calibration. Function 1 is not proposed to have the calibration interval extended at this time. Calibration of this function is performed online and will not be impacted by the proposed change to a 24 month fuel cycle. Therefore, TS Table 3.3.6.2-1, Function 1, is revised to replace SR 3.3.6.2.4 with SR 3.3.6.2.6. This is an administrative change only.

3.3.6.3 Residual Heat Removal (RHR) Containment Spray System Instrumentation

The RHR Containment Spray System is an operating mode of the RHR System that is initiated to condense steam in the containment atmosphere. This ensures that containment pressure is maintained within its limits following a loss of coolant accident (LOCA). The RHR Containment Spray System can be initiated either automatically or manually.

SR 3.3.6.3.4 Perform CHANNEL CALIBRATION.
- Function 1, Drywell Pressure-High
- Function 2, Containment Pressure-High
- Function 5, Timer, System B Only

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for all these functions had only one previous failure of a TS required allowable value that would have been detected solely by the periodic performance of this SR. A failure associated with Function 2 was experienced with 1E12N062A on July 6, 2000 due to as-found setting outside of the allowable value, which was corrected by recalibration of the transmitter. This calibration was included in the statistical evaluation to determine drift.

This failure is unique in that the surveillance test history indicates that it is not repetitive and not related to a time based failure mechanism. As such, this failure is not indicative of a repetitive failure problem and does not invalidate the conclusion that only on rare occasions do as-found values exceed acceptable limits. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.3.4 Perform CHANNEL CALIBRATION.
- Function 4, Timers, System A and System B

For TS Table 3.3.6.1-1 Function 4, Timers, System A and System B, an administrative change to the allowable value is proposed. The allowable value for this function is based on the system design specification. When the allowable value was incorporated into the TS, the limits were converted from seconds to minutes. This conversion resulted in a rounding error. As a result, an administrative change for the allowable value associated with this function is proposed. The proposed change will ensure that the TS allowable value is consistent with the design basis for this function. The revised allowable value ensures that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. No revision to safety analyses results from the proposed change since no change to the analytical limit is made. This is an administrative change only.

SR 3.3.6.3.6 Perform CHANNEL CALIBRATION.
- Function 3, Reactor Vessel Water Level–Low Low Low, Level 1

For TS Table 3.3.6.3-1 Function 3, Reactor Vessel Water Level-Low Low Low, Level 1, the SR frequency remains at 18 months. Since the current 18 month channel calibration SR 3.3.6.3.4 is revised to 24 months for application to other functions, a new SR 3.3.6.3.6 is included for the 18 month calibration. Function 3 is not proposed to have the calibration interval extended at this time. Calibration of this function is performed online and will not be impacted by the proposed change to a 24 month fuel cycle. Therefore, TS Table 3.3.6.3-1, Function 3, is revised to replace SR 3.3.6.3.4 with SR 3.3.6.3.6. This is an administrative change only.

3.3.6.4 Suppression Pool Makeup (SPMU) System Instrumentation

The SPMU System is automatically initiated to provide water from the upper containment pool to the suppression pool, by gravity flow, after a loss of coolant accident (LOCA) to ensure that primary containment temperature and pressure design limits are met.

SR 3.3.6.4.6 Perform CHANNEL CALIBRATION.
- Function 1, Drywell Pressure-High
- Function 3, Suppression Pool Water Level-Low Low

For this function, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.6.4.8 Perform CHANNEL CALIBRATION.
- Function 2, Reactor Vessel Water Level–Low Low Low, Level 1

For TS Table 3.3.6.4-1 Function 2, Reactor Vessel Water Level-Low Low Low, Level 1, the SR frequency remains at 18 months. Since the current 18 month channel calibration (i.e., SR 3.3.6.4.6) is revised to 24 months for application to other functions, a new SR 3.3.6.4.8 is included for the 18 month calibration. Function 2 is not proposed to have the calibration interval extended at this time. Calibration of this function is performed online and will not be impacted by the proposed change to a 24 month fuel cycle. Therefore, TS Table 3.3.6.4-1, Function 2, is revised to replace SR 3.3.6.4.6 with SR 3.3.6.4.8. This is an administrative change only.

3.3.6.5 Relief and Low-Low Set (LLS) Instrumentation

The safety/relief valves (S/RVs) prevent overpressurization of the nuclear steam system. Instrumentation is provided to support two modes (in addition to the automatic depressurization system (ADS) mode of operation for selected valves) of S/RV operation—the relief function (all valves) and the LLS function (selected valves).

SR 3.3.6.5.3 Perform CHANNEL CALIBRATION.

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). (The allowable value for the Relief Function and the LLS Function are revised in the AmerGen amendment request dated November 11, 2003. The preceding statement assumes the proposed allowable values are approved.) Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.3.7.1 Control Room Ventilation System Instrumentation

The instrumentation and controls for the Control Room Ventilation (CRV) System automatically initiate action to route makeup air to the main control room (MCR) through emergency filter units to minimize the consequences of radioactive material in the control room environment.

SR 3.3.7.1.3 Perform CHANNEL CALIBRATION.
- Function 1, Control Room Air Intake Radiation Monitors

For this function, no revision to TS allowable values or safety analyses result from the required evaluations. Drift evaluations were not performed for radiation monitors. These radiation detectors (2 per intake) are calibrated using a calibrated source as an input signal to the detector. The source check is performed by exposing the sensor-converter to a known source in a constant geometry. Source checks of radiation monitors are subject to far more uncertainties than electronic calibration checks because of source decay, positioning of the sources, signal strength, and the sensor response curves of that particular monitoring system. Because of the uncertainties associated with the calibration methods for these devices, any AFAL evaluation would provide no true indication of the instrument performance over time.

Extending the surveillance test interval for calibration of these functions is acceptable because the functions are verified to be operating properly by the performance of more frequent Channel Checks (i.e., SR 3.3.7.1.1 every 12 hours) and Channel Functional Tests (i.e., SR 3.3.7.1.2 every 92 days). Additionally, the function is provided with four channels, which ensures that no single instrument failure can preclude CRV System high radiation mode initiation. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on system design and the history of system performance, the impact of this change on safety, if any, is small.

3.3.8.1 Loss of Power (LOP) Instrumentation

Successful operation of the required safety functions of the Emergency Core Cooling Systems (ECCS) is dependent upon the availability of adequate power sources for energizing the various components such as pump motors, motor operated valves, and the associated control components. The LOP instrumentation monitors the 4.16 kV emergency buses. Offsite power is the preferred source of power for the 4.16 kV emergency buses. If the monitors determine that insufficient power is available, the buses are disconnected from the offsite power sources and connected to the onsite diesel generator (DG) power sources.

SR 3.3.8.1.3 Perform CHANNEL CALIBRATION.
- Function 1.a, Division 1 and 2 Loss of Voltage
- Function 2.a, Division 3 Loss of Voltage

For these functions, no revision to TS allowable values or safety analyses result from the GL 91-04 evaluations (e.g., statistical evaluation of historical drift factored into setpoint calculations). Any necessary revisions to setpoint calculations and calibration procedures to incorporate results of the statistical analysis of the historical AFAL data will be completed prior to implementation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had only one previous failure of TS required allowable values that would have been detected solely by the periodic performance of this SR. A failure associated with Function 2.a was experienced with NGV relay 27S2 on October 14, 1993 due to as found drop-out setting (i.e., 66.6 volts) below the allowable value (i.e., 67 volts), which was corrected by recalibration of the relays. This calibration data was included in the statistical evaluation to determine drift. This failure is not repetitive and not related to a time based failure mechanism. As such, the failure is not indicative of a repetitive failure problem and does not invalidate the conclusion that only on rare occasions do as-found values exceed acceptable limits.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

<u>SR 3.3.8.1.3</u> Perform CHANNEL CALIBRATION.
- Function 1.d, Division 1 and 2 Degraded Voltage Drop-out (lower allowable value)
- Function 1.e, Division 1 and 2 Degraded Voltage - Time Delay
- Function 2.b, Division 3 Loss of Voltage - Time Delay
- Function 2.d, Division 3 Degraded Voltage Drop-out (lower allowable value)

For these functions, no revision to TS allowable values or safety analyses result from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

The above TS Table 3.3.8.1-1 functions are associated with insufficient historical data (fewer than 30 calibration points) to perform valid statistical evaluations of drift. For the Division 1, 2, and 3 Degraded Voltage Drop-out channels (i.e., Functions 1.d and 2.d) design modifications in 1997 resulted in excluding earlier data for analysis. For the Division 1 and 2 degraded voltage time delays (i.e., Function 1.e) and Division 3 loss of voltage time delay (i.e., Function 2.b), there is only one time delay channel associated with each division. Also note that the time delay relays for degraded voltage and for loss of voltage are of different manufacturer (refer to Attachment 7), and are not able to be combined for analysis purposes. Similarly, Division 3 degraded voltage (i.e., Function 2.d) having only two channels, also did not provide sufficient valid calibration points for statistical analysis.

As such, vendor supplied data is utilized for drift to support a 30-month calibration frequency. The ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

For <u>Functions 1.d and 2.d</u>, Division 1, 2, and 3 Degraded Voltage Drop-out (lower allowable value), the dropout allowable value lower limit ensures adequate voltage to operate plant equipment under all loading conditions. After recovery from the voltage transient created by the block start of motors at the start of a LOCA, the specified degraded voltage drop-out allowable value lower limit provides significant margin to the voltage required to power running loads needed to mitigate a LOCA.

This value was selected based on other licensing basis events discussed in USAR Section 8.3.1.1.2.

The actual NTSP applied in the calibration procedure (i.e., 4078 V) provides 27 V margin to the TS lower allowable value of 4051 V. Recent performance history (i.e., since this allowable value was revised in CPS Amendment 122, on March 26, 1999) demonstrates the maximum AFAL to have been less than 6 V with the average AFAL less than 3 V (at the 4160-basis). This shows significant margin to the TS allowable value to support 30 month calibration interval.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

For Function 1.e, Division 1 and 2 Degraded Voltage - Time Delay, the allowable value is long enough to provide time for the offsite power supply to recover to normal voltages during short transients (such as motor starts), but short enough to ensure that sufficient power is available to prevent damage to the required equipment.

The historical AFAL results were analyzed statistically, although not utilized in the final setpoint calculation due to insufficient data. Using 15 data points to arrive at a 30-month drift term, which imposed a significant statistical multiplier (i.e., K-factor) of 3.507 (increasing the confidence to 2-sigma of the measured standard deviation of 0.178 seconds), the calculated drift term was -0.667 seconds to +0.733 seconds. This overly conservative evaluation yielded a result relatively close to the 30-month drift term used in the calculation (i.e., 0.6 seconds), which is based on vendor information. Actual historical data demonstrated an average absolute AFAL of less than 0.18 seconds and a maximum of 0.509 seconds. As such, the 1.0 second margin provided between the current plant NTSP, which remains unchanged, and the current allowable value is sufficient to support a 24-month calibration interval with 25% margin (i.e., 30-month interval) based on the revised setpoint calculation and historical margins.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for the function had no previous failures of the TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

For Function 2.b, Division 3 Loss of Voltage - Time Delay, the allowable values are long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment.

Vendor supplied data is utilized for drift to support a 30-month calibration frequency (i.e. 0.095 seconds). Only one prior calibration interval produced an AFAL (i.e., 0.110 seconds) that exceeded the calculation assumed drift (i.e., 0.095 seconds); however, this maximum of 0.110 seconds was associated with an interval of 1198 days between calibrations. Sufficient margin (i.e., 0.5 seconds) is provided between the current plant NTSP, which remains unchanged at 2.5 seconds, and the current allowable value to support a 24-month calibration interval with 25% margin (i.e., 30-month interval) based on the revised setpoint calculation and historical performance.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for the function had no previous failures of the TS required allowable value that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

<u>SR 3.3.8.1.3</u> Perform CHANNEL CALIBRATION.
- Function 1.b, Division 1 and 2 Loss of Voltage - Time Delay
- Function 1.c, Division 1 and 2 Degraded Voltage Reset
- Function 2.c, Division 3 Degraded Voltage Reset
- Function 2.e, Division 3 Degraded Voltage - Time Delay

For each of these functions (based either on statistical evaluation of historical drift or vendor data as described below), revisions to calculations have resulted in proposing TS allowable value changes. The new allowable values have been calculated in accordance with the guidance provided in RG 1.105, as implemented by the CPS setpoint methodology, and the ISA Standard 67.04. These calculations determine the instrument uncertainties, setpoints, and allowable values for the affected functions. As such, the revised allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function. No revision to safety analyses results (i.e., no change to the analytical limit is made) from the required evaluations. In performing the revised setpoint calculations to support the revised allowable values, the use of ISA RP67.04, Part II, "Method 3" was not utilized.

For <u>Function 1.b</u>, Division 1 and 2 Loss of Voltage - Time Delay, the revised setpoint calculation incorporates the results of the statistical analysis of the historical AFAL data. The allowable values are evaluated to be long enough to provide time for the offsite power supply to recover to normal voltages, but short enough to ensure that power is available to the required equipment. Each of these relays is an inverse time delay relay, i.e., the time delay is shorter the lower the detected bus voltage. On a complete loss of bus voltage (i.e., the basis for this trip), the time delay will be less than 3.0 seconds, while an approximate 10-second delay would be typical for sustained voltages nearer the lower Loss of Voltage allowable value. Sustained degraded voltage protection is provided by the Degraded Voltage functions of TS Table 3.3.8.1-1, which trip at higher voltages and a nominal time delay of 15 seconds. Therefore, the TS allowable value for Loss of Voltage is revised from ≤ 10 seconds to ≤ 5.0 seconds, which is based on using a 0-volt basis for measuring the time delay. This provides a more appropriate TS allowable value for the function and is consistent with the actual testing of the time response of the relay. The calibration procedures performed at CPS test at 0 V and 44 V, and apply procedurally controlled conservative acceptance criteria that are more restrictive than the stated TS allowable value of 10 seconds.

Sufficient margin remains between the current plant NTSP, which remains unchanged, and the more conservative allowable value to support a 24-month calibration interval with 25% margin (i.e., 30-month interval) based on statistical analysis of the historical AFAL data. Pending approval of the revised allowable value, the procedural acceptance criterion is being administratively controlled to the more restrictive allowable value to assure safe plant operation.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for this function had no previous failures, even of the new proposed allowable value of ≤ 5.0 seconds, that would have been detected solely by the periodic performance of this SR.

As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

For Function 1.c and 2.c, Division 1, 2 and 3 Degraded Voltage Reset, insufficient historical data (i.e., fewer than 30 calibration points) were available to perform valid statistical evaluations of drift. For the Division 1, 2, and 3 Degraded Voltage channels associated with Functions 1.c and 2.c, design modifications in 1997 exclude the use of earlier data for analysis. As such, there are insufficient calibration performances to result in 30 valid calibration points for statistical analysis. Therefore, vendor supplied data is utilized for drift to support a 30-month calibration frequency. The ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

The degraded voltage protection function utilizes two undervoltage relays per bus; one sensing voltage across the A-B phase and the other across the B-C phase. In the determination of the degraded voltage relay setpoints, the calculation considered the degraded voltage logic applicable to reset of the relay and dropout of the relay. For the relay dropout function, the logic is two-out-of-two (i.e., both relays must sense a degraded voltage condition before a signal is sent to the timer to begin the degraded voltage time delay sequence). For the relay reset function, the logic is one-out-of-two (i.e., if either of the two relays that have previously tripped subsequently reset, the signal to the degraded voltage timer will be interrupted and the timer will reset). The one-out-of-two reset logic is a direct result of the two-out-of-two dropout logic. The setpoint calculation took the combined uncertainties (e.g., temperature, drift, calibration, etc.) associated with a single degraded voltage relay reset setpoint and calculated the degree to which those uncertainties would be reduced when two of the relays were combined in the one-out-of-two reset logic. The basis behind this approach is that it is unlikely that the uncertainties which would cause the reset point of the relay to move in the nonconservative direction would be identical for both relays since the uncertainties are random. Therefore, there is some likelihood that the setpoint of one of the two relays will be less marginal than that calculated for the single relay, and that relay will reset first to reset the timer as the voltage recovers in the upward direction. The NRC has previously reviewed and approved this approach for establishing 95% confidence level for this reset function as documented in Safety Evaluations for CPS Amendment 110, dated December 4, 1996, and Amendment 122, dated March 26, 1999. In revising the setpoint calculation, the methodology that determines the allowable value and setpoint tolerances has been enhanced from the previous revision of the calculation, but this enhancement continues to maintain a 95% confidence that the allowable value protects the analytical limit.

The setpoints are based on supporting the required voltage response range of these relays, including accounting for the potential transformer (PT) ratio correction factor and circuit voltage drop of the individual PT circuit that senses the 4kV voltage. An individual 120 V-basis setpoint is being developed for each relay to account for the differences in ratio correction factor based on the individual PT burden, such that the 4160 V-basis measurement and response is the same for both phases on all three buses.

The USAR Section 8.3.1.1.2 describes the second level undervoltage (i.e., degraded voltage) relay including the device function and operation. The USAR states:

> *"From the equipment critical voltage analysis, it was determined that a minimum of 4084 Vac at the 4160-V buses will prevent the voltage at the equipment terminals of the above items from falling below their minimum acceptable voltage levels for equipment protection, starting and continued operation. Degraded voltage for motor operated valves has been properly considered in evaluating motor operated valve capability under NRC Generic Letter 89-10. Based on setpoint calculations, a relay pickup setting was selected that allows sufficient margin between the minimum expected offsite voltage and the minimum required voltage at the 4160-V buses in conjunction with SVC operation."*

The value presently determining margin to the minimum expected offsite voltage pickup setpoint is defined as 4118V, and is used as the upper reset analytical limit in the revised setpoint calculations. The allowable value upper limit is provided for avoidance of shifting to the onsite source when the offsite source is acceptable. The basis for the reset allowable value lower limit is the minimum voltage required to support the LOCA loads. The TS allowable value is proposed to be revised from ≥ 4090 V and ≤ 4111 V, to ≥ 4102.2 V and ≤ 4109.3 V. The procedural acceptance criterion is being administratively controlled to the more restrictive allowable value to assure safe plant operation pending approval of this amendment request. The revised calculation also resulted in the NTSP (as reflected at the 4160 V bus) being raised to 4107 V, which provides 2.3 V and 4.8 V margins to the proposed upper and lower allowable values, respectively. No revision to safety analyses results (i.e., no change to the analytical limit is required) from the required evaluations.

These settings are being adjusted based on revising the setpoint calculation to incorporate the change in method and determination of tolerance values, along with a revised PT circuit ratio correction factor. Each PT circuit feeding its respective relay has been calculated with resultant determination of individual ratio correction factors and individual setpoint (at the 120 V basis) for each relay phase of each bus. Additionally, to maintain the calculated tolerances for the relay loop, the temperature of the relay and the calibration devices has been defined in the calculations and has been applied to the procedures for calibration of the relays.

Recent performance history (i.e., since these allowable values were revised in CPS Amendment 122, dated March 26, 1999) was reviewed against these revised allowable values accounting for the revised PT ratio correction factor and circuit voltage drop of the individual PT circuit. This evaluation demonstrates that on only one occasion in 18 calibrations (3 divisional busses, 2 relays each bus, and 3 calibrations each) would the as-found relay setting have exceeded the new allowable value(s) for channel operability. The one occurrence would have been during a calibration performed in October 2000 for the degraded voltage 4160 V bus 1A1 reset being about 1 V below the new allowable value of 4102.2 V. During one other calibration reviewed (April 2002), one channel associated with 4160 V bus 1B1 would have been beyond the new upper allowable value; however, since the remaining bus 1B1 channel was projected to have been within the allowable value, the degraded voltage reset function would have remained operable. Extrapolating the apparent drift between these 18-month calibrations to account for 30-month calibrations did not introduce any additional as-found failures to meet the allowable value. As such the proposed allowable values are expected to provide adequate margin to account for any increased loop drift for the extended period. The ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

As such, sufficient margin remains between the revised plant NTSP and the more conservative allowable values to support a 24-month calibration interval with 25% margin (i.e., 30-month interval) based on utilizing vendor supplied data for drift. Based on the history of system performance, the impact of this change on safety, if any, is small.

For Function 2.e, Division 3 Degraded Voltage - Time Delay, insufficient historical data (i.e., fewer than 30 calibration points) were available to perform valid statistical evaluations of drift. There is only one time delay channel associated with this division. Also note that the time delay relays for degraded voltage and for loss of voltage are supplied by different manufacturers (refer to Attachment 7), and are not able to be combined for analysis purposes. As such, CPS has not had a sufficient number of calibrations to result in 30 valid calibration points for statistical analysis for this function. Therefore, vendor supplied data is utilized for drift to support a 30-month calibration frequency. The ongoing drift trend program will monitor this channel for operation within the assumptions of the setpoint analysis.

For the purposes of extension to a 24-month cycle, a more rigorous setpoint calculation was completed and as a result the allowable value is revised from ≥ 14 seconds and ≤ 16 seconds to ≥ 13.2 seconds and ≤ 16.8 seconds. The more conservative allowable values remain in place pending approval of this amendment request. The current NTSP of 15 seconds remains unchanged.

There is no defined lower analytical limit for degraded voltage time delay, however, the design basis limit has normally been taken as 13 seconds since this is the time at which the voltage recovery analysis is documented in the CPS AC load flow calculation. The recorded analysis results show that the 4 kV bus voltages for Division 1, 2, and 3 have recovered above the reset point in less than 10 seconds and all large (i.e., 4 kV) motors have transitioned from starting to running. The original selection of a 15 second time delay setpoint for the degraded voltage relays referenced an assumption that all large motors would have started in less than 10 seconds. Since that time, motor start times have been confirmed as stated in CPS USAR Section 8.3.1.1.2. This completion of large motor starting represents the point at which bus voltage recovery occurs. Accordingly, there is additional margin beyond that represented by the present assumed lower limit of 13 seconds for either the present allowable value of 14 seconds (for Division 1 or 2) or the new allowable value of 13.2 seconds (for Division 3).

There is no defined upper analytical limit for the degraded voltage time delay. The original degraded voltage time delay setting of 5 minutes was questioned by the NRC (CPS USAR Q&R 040.135) due to the absence of an analysis that would demonstrate no damage would occur to the connected equipment from operation at degraded voltage levels for the time delay interval. The standard specification for procurement of motors at CPS (Clinton form 1800-Y) required that continuous duty motors would be capable of operation at reduced voltage (i.e., 75% of nameplate) for up to 1 minute at infrequent intervals without being damaged. Accordingly, 1 minute could be used as an upper limit based on preventing damage to connected equipment. Another value considered for an upper limit is the time at which the diesel generators are ready to load during the design basis accident operational sequence. This is 23 seconds in accordance with the SAFER/GESTR analysis as indicated in CPS USAR Table 6.3-1. This time can be an overly conservative value for the degraded voltage scenario since the design basis accident assumes a loss of offsite power. With a degraded voltage condition instead, the non-safety balance of plant equipment would remain available during the diesel start (from the LOCA signal) and continue to provide water to the vessel. Either value, 60 or 23 seconds, represents significant additional margin beyond either the present allowable value of 16 seconds (for Division 1 or 2) or the new allowable value of 16.8 seconds (for Division 3).

A review of the applicable CPS surveillance history for this channel demonstrated only one previous failure of the TS required allowable value that would have been detected solely by the periodic performance of this SR. A failure associated with Function 2.e was experienced on July 9, 1998 due to the as-found setting (i.e., 13.9843 seconds) being less than the allowable value (i.e., 14 seconds), which was corrected by recalibration of the relay. This failure is unique in that the surveillance test history indicates that it is not repetitive and not related to a time based failure mechanism. In fact, 10 out of 15 performances dating back to 1986 did not require a relay adjustment. As such, this failure is not indicative of a repetitive failure problem and does not invalidate the conclusion that only on rare occasions do as-found values exceed acceptable limits.

Furthermore, the AFAL (i.e., 1.08 seconds) for the single calibration as-found failure was the greatest value in the applicable CPS calibration history. The average absolute AFAL change between 18-month calibrations was less than 0.35 seconds. Even extrapolating this worst-case value to account for 30 month calibration intervals, the resultant AFAL would be expected to provide significant margin between the new allowable value and the NTSP.

As such, sufficient margin remains between the revised plant NTSP and the more conservative allowable values to support a 24-month calibration interval with 25% margin (i.e., 30-month interval) based on utilizing vendor supplied data for drift. Based on the history of system performance, the impact of this change on safety, if any, is small.

SR 3.3.8.1.3 Perform CHANNEL CALIBRATION.
- Function 1.d, Division 1 and 2 Degraded Voltage Drop-out (upper allowable value)
- Function 2.d, Division 3 Degraded Voltage Drop-out (upper allowable value)

Coincident with the preparation of a more rigorous setpoint calculation to support the extension to a 24-month cycle, the upper allowable value for Division 1, 2, and 3 degraded voltage drop-out is being eliminated.

In the degraded voltage relay setpoint calculation, the reset setpoint for the relay was evaluated against both the minimum and maximum reset voltage limits while the drop-out setpoint was only evaluated against a minimum drop-out voltage limit. The reset limits consisted of a) a lower limit at the minimum value for which the capability to start all motors had been analyzed, and b) an upper limit at the recovery voltage that can be attained after motor starting under the worst case grid conditions. The drop-out limit consisted of a lower limit at the minimum value for which the capability to operate all running loads had been analyzed, with no motor starting. There was no upper limit on the drop-out value since there was no analysis performed to establish such a value. This methodology was reviewed and found to be acceptable by the NRC in the safety evaluations documenting approval of CPS license amendment 110, dated December 4, 1996 and license amendment 122, dated March 26, 1999.

Despite the absence of an upper analytical limit for the dropout relay, the previous revisions of the calculation assigned an upper allowable value for the drop-out setpoint. It designated this value by determining the voltage difference between the drop-out setpoint and the lower allowable value and then adding that difference to the drop-out setpoint. As such, this upper allowable value had no analytical basis.

In the last setpoint calculation, new setpoints and allowable values were established based on a new methodology to support a 24-month cycle (i.e., 30-month calibration interval with 25% margin). Since there was no basis for an upper allowable value for the drop-out setpoint, none was derived. The removal of this value is acceptable not only because there is no analytical basis for a drop-out setpoint upper allowable value, but also because the drop-out/reset tolerance for the relays will be set so that the relays will drop-out at approximately 99.3% of their reset value. Since the reset value has both an upper and lower allowable value, any upward movement of the drop-out setpoint is limited by the allowable value of the reset point.

The lower allowable value for the drop-out setpoint is still required due to the presence of the lower analytical limit.

3.3.8.2 Reactor Protection System (RPS) Electric Power Monitoring

The RPS Electric Power Monitoring System is provided to isolate the RPS bus from the normal uninterruptible power supply (UPS) or alternate power supply in the event of overvoltage, undervoltage, or underfrequency. This system protects the loads connected to the RPS bus against unacceptable voltage and frequency conditions.

SR 3.3.8.2.2 Perform CHANNEL CALIBRATION.
- Function a, Overvoltage
- Function b, Undervoltage
- Function c, Underfrequency and Underfrequency Time Delay

For these functions, no revision to TS allowable values or safety analyses result from the required evaluations. Any necessary revisions to setpoint calculations and calibration procedures will be completed prior to implementation.

A modification in March 1999 replaced the RPS Electric Power Monitoring System with a new design, which resulted in excluding the use of earlier data for analysis. As such, there are insufficient calibration performances to result in 30 valid calibration points for statistical analysis for these functions. The CPS setpoint methodology standard assumption for electronic component drift (i.e., 0.5% of span) is used in justifying a 30-month calibration frequency. Furthermore, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis. The use of this assumed drift value is acceptable based on the recent calibration performances since the modification. Due to the limited experience since 1999, calibration data was collected up through the most recent performance in February 2004. For both Division 1 and Division 2 inverter, including all four functions, no calibration adjustment has been required since March 1999. This reflects approximately 60 months for each inverter where drift has not resulted in exceeding the TS allowable value or the more conservative procedural as-left tolerance. This performance history provides adequate assurance that the assumed drift supporting the calculated allowable value and NTSP will support the conclusion that the impact of this change on safety, if any, is small.

A review of the applicable CPS surveillance history for these channels demonstrated that the as-found trip setpoint for these functions had no previous failures of TS required allowable values that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the history of system performance, the impact of this change on safety, if any, is small.

3.4.7 RCS Leakage Detection Instrumentation

Leakage detection systems for the RCS are provided to alert the operators when leakage rates above normal background levels are detected and to supply quantitative measurement of rates.

SR 3.4.7.3 Perform CHANNEL CALIBRATION of required leakage detection instrumentation.

For this function, no revision to TS allowable values or safety analyses results from the required evaluations. Drift evaluations were not performed for these instruments.

No allowable value is applicable to these functions. The leakage detection instrumentation differs from other TS instruments in that they are not associated with a function trip, but indication only to the control room operator. As such, these instruments are not expected to function with the same high degree of accuracy demanded of functions with assumed trip actuations for accident detection and mitigation. The leakage detection instrumentation devices are expected to maintain sufficient accuracy to detect trends or the existence or non-existence of an excessive leakage condition.

The surveillance test interval of this SR is being increased from once every 18 months to once every 24 months, for a maximum interval of 30 months including the 25% grace period. The drywell floor drain sump flow monitoring system is required to quantify the unidentified leakage from the RCS. This monitoring system consists of either the sump level rate of change or the sump pump discharge flow monitoring portion of the system. The other monitoring systems provide qualitative indication to the operators so closer examination of other detection systems will be made to determine the extent of any corrective action that may be required. More frequent verification of the instrument functions are accomplished by SR 3.4.7.1 (Channel Check of the required drywell atmospheric monitoring system) once every 12 hours and SR 3.4.7.2 (Channel Functional Tests of the required leakage detection instrumentation) once every 31 days.

A review of the applicable CPS surveillance history demonstrated that the RCS Leakage Detection System had no previous failures of the TS function that would have been detected solely by the periodic performance of this SR. As such, the impact, if any, on system availability is minimal from the proposed change to a 24-month testing frequency. Based on the redundancy of detection methods, other more frequent testing of the system, and the history of system performance, the impact of this change on safety, if any, is small.

NES-EIC-20.04, Appendix J, Revision 3

“Guideline for the Analysis and Use of As-Found / As-Left Data”

APPENDIX J

GUIDELINE FOR THE ANALYSIS AND USE OF AS-FOUND/AS-LEFT DATA

1.0 INTRODUCTION

The analysis of the data from calibration of installed instrumentation can provide the station with several pieces of information that will allow for better prediction of instrument behavior and will provide more "accurate" data for computation of loop uncertainties.

This attachment defines a process that will be used at ComEd to ensure consistency and compliance with regulatory position GL-91-04. This process will specifies certain requirements, but does not provide a step-by-step methodology. Each site should develop specific methodologies, utilizing these guidelines to support their specific needs.

There are several approaches to the analysis of data and it's subsequent use. ComEd has adopted a general methodology similar to that presented in EPRI TR-103335, *Guidelines for Instrument Calibration Extension/Reduction Programs, Revision 1.* Refer to this document for a complete understanding of the guidelines developed in this Appendix.

This Appendix is divided into the following sections:

2.1 DATA COLLECTION AND POOLING
2.2 INITIAL ANALYSIS PROCESS
2.3 OUTLIER AND POOLING VERIFICATION REQUIREMENTS
2.4 NORMALITY
2.5 TIME DEPENDENCE
2.6 RESULTS
2.7 USING RESULTS
2.8 CONTINUING EVALUATION

Each of these sections contains a general discussion of the expected actions that will conform to TR-103335 and the guidelines to be followed for analysis at ComEd sites.

2.0 ANALYSIS METHODOLOGY

2.1 DATA COLLECTION AND POOLING

2.1.1 To evaluate the performance of an instrument or group of instruments the data that is collected should consist of a sufficient number of independent samples to allow for statistical analysis of the data that could indicate drift changes. The sample should also represent a good distribution of the instruments used. In most cases, this will be the whole population. For instruments that are used extensively in the plant, a sample can be used. When collecting data, the application of each instrument must be identified to avoid application specific errors that will cause pooling of data to be an incorrect decision. Because the evaluation includes the important element of time dependency determination, the data collected should have data from different calibration intervals. The evaluation must include all of the times that the instrument has been calibrated, or checked for accuracy (i.e. surveillance testing without adjustment).

2.1.2 Selection of the Instruments to be Evaluated (Pooled) for a Given Drift Study

2.1.2.1. All instruments evaluated shall be from the same manufacturer and shall perform in an identical manner for the critical parameters that are to be analyzed. Determining which instruments meet this criterion is eschewed by the fact that many manufacturers' have different model numbers based on mounting, enclosure, etc. The differences typically have no effect on the method that the instrument uses to monitor the parameter of concern. In addition, the range of the instrument may vary without having any significant change in the measurement method. If multiple model numbers are used, the evaluations must include a discussion of the reason why the instruments are assumed identical, specifically in the critical areas of concern.

2.1.2.2. ComEd has specified that the minimum targeted number of valid data points that are required to make a drift study statistically significant shall be 30 data points. The sample value of 30 is generally accepted as a minimum valid sample size. An analysis using less than this number can be performed if justification is provided in the study results. To allow for the potential of an outlier, this number should be > 30 data points. If there are more than approximately 150 data points, there is no significant improvement in the statistical rigor of the analysis.

2.1.2.3. In order to obtain the necessary number of data points required to ensure that there is variance in the calibration interval for the make/model of concern, the calibration data from multiple instruments will be needed. The following criteria for the selection of which instruments and calibration data points shall be used:

a. All instruments that are directly associated with RPS/ESF/ECCS automatic trips and actuations shall include at least one channel's instruments.

b. To ensure that there is a historical perspective to the data evaluated, at least four calibration intervals of data shall be collected. The four intervals provide for historical data while ensuring that the more recent calibration data is used to detect current problems. If the instrument has not been installed for that period, then the available data will be used. There may be some problems in the evaluation of the instrument over a given calibration interval.

c. If more than 150 data points can be developed for a given analysis, then a sample of instruments can be used instead of the whole population. The selection of which instruments to include will be done on a random basis, provided Section 2.1.2.3.a requirements are maintained. The method of selection will be prepared and included in the calculation.

2.1.3 Data Collection is the transfer of data from the calibration records to the final analysis tool. This very sensitive process will require independent verification and validation of data transferred.

2.1.3.1 A search of all preventive and corrective maintenance records shall be conducted on each instrument selected for inclusion in the study. This search shall identify every calibration and every corrective maintenance activity for the period of concern for the study. The search should go back at least four calibration intervals (i.e. at least five sets of calibration data). If there are less than eight instruments included in the study then additional historical data will need to be collected to achieve the minimum number of data points specified by Section 2.1.2.2.

The data collected should ensure that the results are not from overlapping calibration intervals.

2.1.3.2 The data from the calibrations will be entered into a spreadsheet or data base program using a format similar to Figure J1. For instruments that have multiple calibration points (transmitters, function generators, etc.) each calibration point will be entered in the spreadsheet using the percent of span as the column title. If there are discrepancies in the exact percent of span then calibration points that are within 5% of each other can be used together (e.g. 0% FS, 1% FS and 5% FS can be considered the same calibration point).

For switches, relays or other equipment where there is a single point that is calibrated the data can be entered in percent of instrument span or in process units.

Due to the diversity of software that can be used to compute this spreadsheet statistics, there may be some variation in format. The specific project or calculation shall identify the software used and justify that the data entry is in agreement with the intent of Section 4.0 of TR-103335.

Initial Data Analysis									
Date Mo.	Yr.	Data Status	Interval Months	Tag Number	Calibration Data (mA) 0%	25%	50%	75%	100%
5	93	As-Found	12	LT-459	4.00	8.00	11.94	15.96	20.01
		As-Left		LT-459	4.00	8.00	11.94	15.96	20.01
5	92	As-Found	14	LT-459	4.20	8.04	12.05	16.05	20.04
		As-Left		LT-459	4.00	8.00	11.98	15.98	20.00
3	91	As-Found	11	LT-459	4.09	8.04	12.02	16.05	20.04
		As-Left		LT-459	4.09	8.04	12.02	16.05	20.04
4	90	As-Found	10	LT-459	4.06	7.92	11.95	15.98	19.95
		As-Left		LT-459	4.06	7.92	11.95	15.98	19.95
6	89	As-Found	13	LT-459	4.00	8.00	12.02	16.07	20.02
		As-Left		LT-459	4.00	8.00	12.02	16.07	20.02
5	88	As-Found	12	LT-459	4.24	8.20	12.16	16.12	20.15
		As-Left		LT-459	4.00	7.97	11.98	15.98	20.00
5	87	As-Found		LT-459	NEW	NEW	NEW	NEW	NEW
		As-Left		LT-459	4.02	7.99	11.99	16.07	20.01

Figure J1, Example Spreadsheet Data Entry

The following information is particularly valuable for the analysis:

- The date of calibration is documented. The time interval since the previous calibration is calculated in months in the *Interval* column. Depending on the data, the time interval might be calculated in days, weeks, or months.

- The as-found and as-left data are entered into the spreadsheet exactly as recorded on the instrument data sheet. The values are in milliamperes (in this case) corresponding to a range of 0% to 100% of calibrated span.

- Note that all calibration data points have been recorded. In general, it is preferable to consider and evaluate all available data. By this approach, a better understanding of instrument drift can be obtained.

  For calibrations that check calibration points during ascending and descending calibration, the ascending and descending point will be kept separately for the initial evaluation.

2.1.3.3 All Data transfer will require 100% independent verification.

2.1.3.4. Due to legibility problems, even if it is obvious that the data recorded in original records is incorrect, verbatim transcription of the data is required. If the information cannot be determined from the original record (due to legibility problems) then the data point will be left blank. Record of this omission shall be included in the analysis.

2.1.3.5 In addition to the calibration point as-found and as-left values, the calibrated span of the instrument, date of the calibration and any significant calibration anomalies are to be recorded in the spreadsheet.

2.2 INITIAL ANALYSIS PROCESS

2.2.1 From the original data, certain manipulations may be required to get the data in a form that can be evaluated across various instruments.

2.2.1.1 If the instrument loop is not a linear loop and the data has not been converted, then the raw calibration data should be converted to Linear Equivalent Full Scale (LEFS) to ensure that drift information is not masked.

2.2.1.2 If the instrument has a known span, the data should be normally converted into percent of calibrated span by dividing the raw data by the span.

If the instrument does not have a known span, the data should be left in process units or converted to percent of the setpoint.

2.2.1.3 For each calibration interval where there is an as-left value from the older calibration and an as-found value from the younger calibration, a raw drift value should be determined by subtracting the as-left value from the as-found value. The calibration interval, in days, should also be determined.

2.2.2 Once the data is in the correct format, the number of data points, the average and the sample standard deviation should be determined for each column, (reference Section 4.0 of TR-103335).

Due to the diversity of software that can be used to compute this spreadsheet statistics, there may be some variation in format. The specific project or calculation should identify the software used and justify that the data entry is in agreement with this Standard.

2.3. OUTLIER AND POOLING VERIFICATION REQUIREMENTS

2.3.1 After the initial computation of the average and the sample standard deviation, identification of any potential outliers and the cause of these outliers will provide important information as to the behavior of the data that was evaluated.

2.3.1.1 Using a T-Test, A statistical check of the raw data against the average and the sample standard deviation shall be conducted.

Outlier Detection by the Critical values for T-Test

ASTM Standard E 178-80 provides several methods for determining the presence of outliers. The recommended method for detection of an outlier is by the T-Test. This test compares an individual measurement to the sample statistics and calculates a parameter, T, known as the extreme studentized deviate as follows:

$$T = \frac{|x_i - \bar{x}|}{s}$$

Where,

T - Calculated value of extreme studentized deviate that is compared to the critical value of T for the sample size

$\bar{x}$ - Sample mean

x_i - Individual data point

s - Sample standard deviation

If the calculated value of T exceeds the critical value for the sample size and desired significance level, then the evaluated data point is identified as an outlier. The critical values of T for the upper 1%, 2.5%, and 5% levels are shown in Table J1.

Outlier Analysis			
Sample Size	Upper 5 % Significance Level	Upper 2.5% Significance Level	Upper 1% Significant Level
10	2.18	2.29	2.41
20	2.56	2.71	2.88
30	2.75	2.91	3.10
40	2.87	3.04	3.24
50	2.96	3.13	3.34
75	3.10	3.28	3.50
100	3.21	3.38	3.60
125	3.28	3.46	3.68
~150	3.33	3.51	3.73

Table J1, Critical Values for T

Note that the critical value of T increases as the sample size increases. The significance of this is that as the sample size grows, it is more likely that the sample is truly representative of the population. In this case, it is less likely that an extreme observation is truly an outlier. Thus, the T-Test makes it progressively more difficult to identify a point as an outlier as the sample size grows larger. This intuitively makes sense. As the sample size approaches infinity, there should be no outliers since all the data truly is a part of the total population. For this reason, it is relatively easy to identify a larger than average data point as an outlier if the sample size is small; however, it is (and should be) harder to call a given data point an outlier if the sample size is large.

Table J1 provides outlier criteria up to a sample of 150 data points. Beyond this size, it should be even more difficult to declare an observation as an outlier. For greater than 150 data points, an outlier factor of 4 (or 4 standard deviations) is recommended in order to assure that outliers are not easily rejected from the sample.

The T-Test inherently assumes that the data is normally distributed. The significance levels in Table J1 represent the probability that a data point will be chance exceed the stated critical value. Referring to Table J1 for a sample size of 40, we would expect to have a calculated value of T greater than 2.87 about 5% of the time and a calculated value of T greater than 3.24 about 1% of the time. For safety-related calculations, testing outliers at the 2.5% significance level is required. Refer to ASTM Standard E 178-80 for further information regarding the interpretation of the T-Test.

Example, Instrument Draft Sample

Consider the 20 instrument drift data points shown in Table J2. The data appears to be within a ±2.5% range with the exception of a single large data point, 5.20%. Would the T-Test identify this point as an outlier?

Instrument Drift Sample Data	
0.47%	5.20%
-0.27%	0.21%
0.03%	-0.12%
-0.28%	0.42%
0.60%	0.69%
-0.30%	-0.78%
-0.82%	0.30%
-0.28%	-0.08%
0.27%	0.03%
0.00%	-0.45%

Table J2, Instrument Draft Sample Data

The T-Test method requires the calculation of the sample mean and standard deviation before the calculated value of T can be obtained. For the above data, the sample mean and standard deviation are:

Sample mean: 0.23%
Sample Standard deviation: 1.24%

Now, evaluate the 5.20% data point to determine if it might be an outlier. The calculation of T is as follows:

$$T = \frac{|5.20 - 0.23|}{1.24} = 4.01$$

As shown, the calculated value of T is 4.01. Compare this result to the critical values of T for this sample size is 2.56 at the 5% significant level and 2.88 at the 1% significant level (see Table J1). In either case, the calculated value of T exceeds the critical value of T and the 5.20% data point is identified as an outlier.

If the 5.205 data point is rejected from the sample, the sample statistics would be recomputed for the 19 remaining data points with the following results:

Sample mean: -0.03%
Sample standard deviation: 0.42%

Notice that the single outlying observation was the only reason for an apparent bias of 0.23%. The standard deviation was reduced by approximately 65% (from 1.24% to 0.42%) by elimination of this single extreme value.

2.3.1.2 For any raw drift value that exceeds the critical T-Test, an evaluation shall be performed to determine if the data point should be excluded from the final data set. In no case can more than 5% of the original data be removed. Removal of outliers from the data set should be minimized as the process is to predict actual instrument performance. Since the data is all that we have to depict that performance, whether we like it or not, we need to accept the data unless underlying information can be inferred. The outlier process can not be repeated after an outlier or outliers have been removed within the constraints of this section.

2.3.1.3 Identification of a potential outlier in Section 2.3.1.2 does not mean that the value will be automatically excluded. Examples of when outliers should be removed include:

a. Review of the calibration indicates that a data entry error was likely. This will normally be seen as a random value that is significantly outside the rest of the data with no explanation. This type of outlier is a rare event and should not be done routinely.

b. Review of the data indicates that a bad calibration was performed. This will normally be seen by multiple outliers from the same calibration and a reverse drift of similar magnitude in the next calibration. In these cases, both sets of raw data should be removed.

2.3.1.4 The pattern of outliers should also be evaluated to determine if there is a bad instrument or application that is contaminating the data set.

It is permissible for this evaluation to rerun the T-Test with a smaller critical T value to force outliers. If this is done, these outliers should not be removed from the final data set.

This process will provide a number of data points that were at the extremes of the data set. If these extremes were primarily in one instruments' data or in one application area then additional evaluations need to be performed to determine if this data can be used with the rest of the data.

2.3.1.5 Bad instruments or bad applications will be detectable from the outliers that are identified. The best indication will be that the outliers will be bunched in the instrument or instruments used for a specific application. Other potential causes that could be identified by this process are:

a. Variations in range or span
b. Variations in age of calibration or equipment.

2.3.1.6 If the result of the outlier analysis indicates the potential for an application, range, age, etc. type of problem, then an analysis of the selection at that particular instrument should be conducted. Inclusion of data from any instrument can be checked by comparing this mean and variance of the instrument data to the mean and variance to the remainder of the data as explained in TR-103335 Section B.9.

2.4 NORMALITY

2.4.1 For this analysis, the assumption of normality is an integral assumption. To ensure that the data is a normal distribution or that a normal distribution is a conservative assumption, a test for normality of the data will be performed for all as-found/as-left data analysis after any outliers have been removed.

2.4.2 There are several tests for the normality of a data set. (See Appendix C of TR-103335). ComEd requires at least one of the following numerical approaches be conducted before the qualitative evaluations are performed.

- Chi-Squared, χ^2, Goodness of Fit Test. This well known test is stated as a method for assessing normality in ISA-RP67.04, Recommended Practice, *Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation.*
- WTest. This test is recommended by ANSI N15.15-1974, *Assessment of the Assumption of Normality (Employing Individual Observed Values),* for sample sizes less than 50.
- D-Prime Test. This test is recommended by ANSI N15.15-1974, *Assessment of the Assumption of Normality (Employing Individual Observed Values),* for moderate to large sample sizes.

2.4.3 If normality cannot be determined from a standard test then the data should be evaluated to determine if the assumption of normality is a conservative assumption. This can be done by one of the following techniques:

- Probability Plots. Probability plots (See Figure J2) provide a graphical presentation of the data that can reveal possible reasons for why the data is or is not normal. Use of a probability plot and qualitative evaluation demonstrates how close the tails of the curve approach a diagonal.

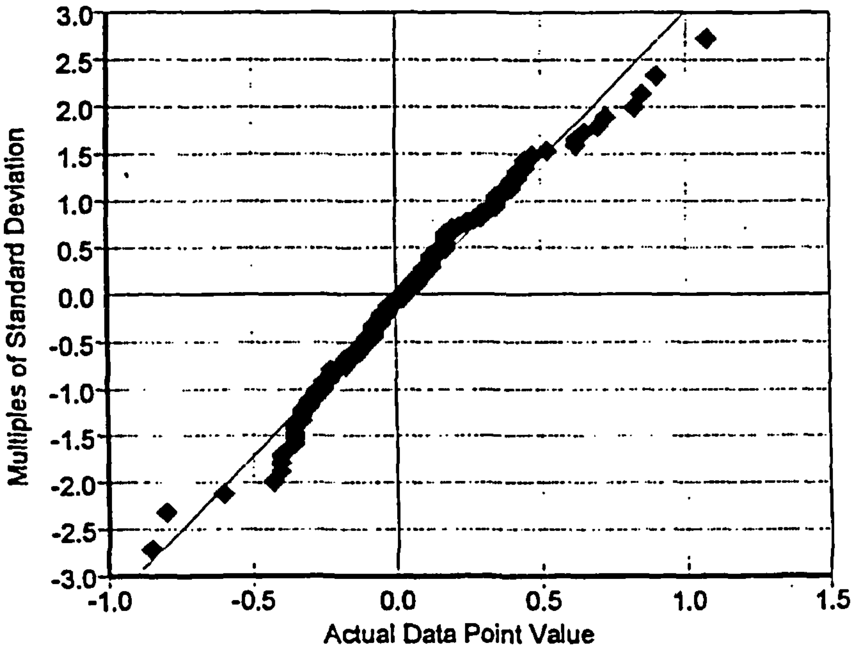

Figure J2, Typical Probability Plot for Approximately Normally Distributed Data

- Coverage Analysis. A coverage analysis (See figure J3) is used for cases in which the data fails a test for normality, but the assumption of normality can still be a conservative representation of the data.

This is performed by a visual evaluation of a histogram of the data with a normal curve for the data overlaid. In most cases instrument data will tend to have a high kurtosis (center peaked data). Since the area of concern for uncertainty analysis is in the tails of the normal curve beyond at least two standard deviations, a high kurtosis will not invalidate the conservative assumption of normality if there are not multiple data points outside the two standard deviation points.

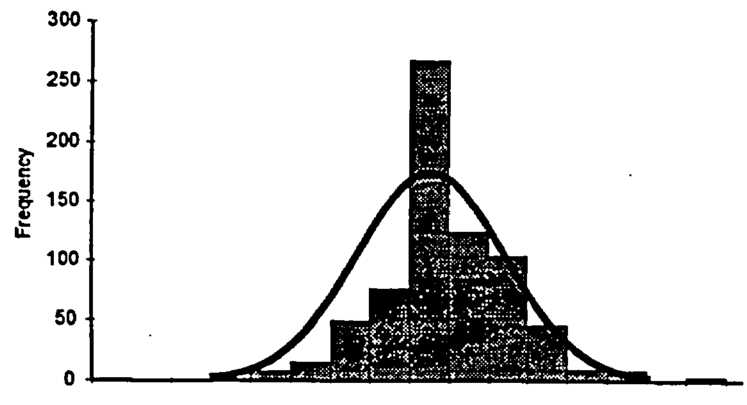

Figure J3, Coverage Analysis Histogram

2.4.4 If normality or a bounding condition of normality cannot be assumed for the data set, then depending on the distribution:

a. A distribution free tolerance value must be determined.
b. The size of the standard deviation will be expanded to bound the distribution.

As this is a seldom used case, this will not be discussed in this Standard. Refer to standard statistics texts for binomial and distribution free statistical method.

To determine the amount of increase needed from the tabular 95/95 value for the histogram evaluation, use the count in each bar of the histogram and ensure that greater than 95% of the data is captured. Increase the standard deviation as necessary to capture at least 95% of the data.

2.5 TIME DEPENDENCE

2.5.1 The way the resultant drift value from this as-found/as-left analysis is used is very sensitive to the determination of the time dependency.

This is particularly important for the extension of operating cycles via the NRC Generic Letter 91-04. This drift analysis requires that some decision be made on how the drift at thirty months can be determined from data that is taken over an eighteen month period.

2.5.2 The basic and most conservative assumption that drift is linear time dependant will be used for the initial evaluation of the computed drift. However, during the development of the EPRI TR-103335, significant data was collected that indicates that drift does not follow a linear time dependent pattern and challenges this basic assumption.

To determine the existence or lack of time dependency requires evaluation of the mean of the data over the calibration interval and the variation in uncertainty over the calibration interval. The evaluation of the mean of the data over the calibration interval will identify any bias component of the instrument drift that is time dependent. The evaluation of the variation in the data over the calibration interval will identify any change in the random component of drift that is time dependent.

The following methodology is to be used to determine time dependence. Evaluation of the drift mean and its changes over time will use any combination of the following tools.

a. Qualitative methods, which will include visual evaluation of the data on scatter plots, regression predication plots and bin mean plots.

b. Quantitative methods, which will include regression of the significant data and the regression of the means of the bins (if there is sufficient data).

Evaluation of drift variability and its changes over time will use any combination of the following tools:

a. Qualitative methods, which will include visual evaluation of the data on scatter plots, regression predication plots and bin standard deviation plots.

b. Quantitative methods, which will include regression of the Absolute Value of the significant data and the regression of the standard deviation of the bins (if there is sufficient data).

2.5.2.1 First, the data will be evaluated to determine if any of the data will generate significant leverage during regression. To do this the data collected shall be placed in interval bins. The interval bins that will normally be used are:

a. 0 to 45 days (covers most weekly and monthly calibrations)
b. 46 to 135 days (covers most quarterly calibrations)
c. 136 to 225 days (covers most semi-annual calibrations)
d. 226 to 445 days (covers most annual calibrations)
e. 446 to 650 days (covers most old refuel cycle calibrations)
f. 651 to 800 days (covers most extended refuel cycle calibrations)
g. 801 to 999 days
h. > 1000 days

2.5.2.2 For each internal bin, the average ($\bar{x}$), sample standard deviation (σ) and data count (η) shall be computed. In addition, the average calibration interval of the data points in each bin will be computed.

2.5.2.3 To determine the existence of time dependency, ideally the data needs to be "equally" distributed across the multiple bins. However, equal distribution in all bins would not normally occur. The minimum expected distribution that would allow this evaluation is:

a. A bin will be considered in the final analysis if it holds more than five data points and more than ten percent of the total data count. The minimum number of data points in a bin was selected to ensure that one calibration at a point would not adversely affect evaluation of a significant amount of data at other intervals. The choice of five data points is engineering judgement and may be changed for a specific case with appropriate documentation in the specific calculation.

b. For those bins that are to be considered the difference between bins will be less than twenty percent of the total data count. If there is a bin with significant data that does not meet this requirement, the evaluation should be done and the bin included if it can be shown to be from the same data set (a pooling test).

c. At least two bins including the bin with the most data must be left for evaluation to occur.

The following example demonstrates the process described above.

Example, Time Dependence Evaluation

For a given make and model of transmitter there were twelve EPNs that were looked at with historical calibrations for five calibration periods. Including corrective actions there were a total of 66 data points. The distribution of the data by bins was:

Bin	Data Count	% of Total Count
0 to 45 days	7	11
46 to 135 days	4	6
136 to 225 days	29	44
226 to 445 days	6	9
446 to 650 days	18	27
651 to 800 days	2	3

The 46 to 135 day and 46 to 135 day bins are thrown out due to less than five data points and the 226 to 445 day bin is thrown out do to having less than ten percent of the data. Of the remaining three bins the 446 to 650 day bin is within twenty percent of the other two bins so there will be three bins used for evaluation.

With a slight variation in the data:

Bin	Data Count	% of Total Count
0 to 45 days	7	11
46 to 135 days	4	6
136 to 225 days	29	44
226 to 445 days	3	5
446 to 650 days	21	32
651 to 800 days	2	3

Now the 0 to 45 day bin is greater than twenty percent from the next bin and thus only the 136 to 225 day and 446 to 650 day bins can be used for analysis.

With another slight variation:

Bin	Data Count	% of Total Count
0 to 45 days	7	11
46 to 135 days	3	5
136 to 225 days	33	50
226 to 445 days	6	9
446 to 650 days	15	23
651 to 800 days	2	3

The majority of the data is in the 136 to 225 day bin and that bin is greater than twenty percent from the next most populous bin. In this case the normal analysis cannot be used. Engineering evaluation of the other bins with greater than ten percent of the data should be done to determine if they can be grouped with the data from the large bin. This could be done by the pooling techniques listed above

2.5.2.4 Once the bins have been selected, data from selected bins and all bins between them will be entered into a regression analysis program.

The initial regression is for the data that populates all of the significant bins and the data that is between them. By eliminating the data that is in low populated bins and at the extremes of the calibration interval, leverage is minimized. This regression is to determine if the mean of the data changes over calibration interval.

A regression analysis will be performed using calibration interval as the independent variable and drift as the dependant variable. Output of the regression analysis shall be in a standard ANOVA table similar to that shown in Table J3.

DEP VAR: DOT2 N: 31 MULTIPLE R: 0.178 SQUARED MULTIPLE R: 0.032						
ADJUSTED SQUARED MULTIPLE R: .000 STANDARD ERROR OF ESTIMATE: 1.304						
VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	T	P (2 TAIL)
CONSTANT	0.848	0.740	0.000		1.146	0.266
PERIOD	-0.001	0.002	-0.178	1.000	-0.787	0.441
ANALYSIS OF VARIANCE						
SOURCE	SUM-OF-SQUARES	DF	MEAN-SQUARE	F-RATIO	P	
REGRESSION	1.054	1	1.054	0.620	0.441	
RESIDUAL	32.319	29	1.701			

Table J3, Sample ANOVA Table

If the value for R^2 is greater than 0.3, then the bias component of the drift should be considered to be linearly time dependent over the range of the calibration intervals included in the analysis. The constant and slope of the drift line will be used for bias values in uncertainty analysis for this instrument make and model. The appropriate tolerance interval for the 95/95 case should also be determined for this regression. [Note: This case will only occur rarely]

If the value of R^2 is less than 0.3 but greater than 0.1 then there still can be a time dependency. To continue the evaluation use terms from the ANOVA table generated by the regression program (partial printout below) or an equivalent ANOVA table.

Example, ANOVA Table Evaluation for Time Dependency

ANOVA				
	df	*SS*	*MS*	*F*
Regression	001	0.606767762	0.6067678	2.7507691
Residual	119	26.24915424	0.2205811	
Total	120	26.855922		
	Coefficients	Standard Error	*t Stat*	*P – value*
Intercept	0.1594012	0.087925043	1.812913	0.0723646
X Variable 1	-0.0003408	0.000205483	-1.6586443	0.0998413

Table J4, Time Dependence Evaluation ANOVA Table

From this table, the following values will give an indication of the potential for linear time dependency:

1. X Variable 1 *P-value,* if less than 0.05, would indicate a time dependency

2. ANOVA table F value, if it is greater than the F-table value for a 0.25% probability, the number of data points for the regression, and two degrees of freedom for the numerator, would indicate a time dependency.

2.5.2.5 After the initial regression test the same regression test is applied to the absolute value of the same data. This test detects the increasing variability with calibration interval but will not provide a correct mean. The same decision criteria as the first regression apply but the variable that is being evaluated is the random component of the drift. The slope of the regression will represent the variation in the standard deviation as calibration interval increases if a time dependency is determined. This variation will NOT provide a numerical value for the increase, but will indicate the trend.

2.5.2.6 If neither of the regression tests show an R^2 value greater than 0.3, then a review of the mean and standard deviation data for each bin of significance and an evaluation of qualitative plots will assist the engineer in determining time dependence.

2.5.2.7 If the R-Square value is less than 0.1, then the bias component of the drift should be considered to be time independent over the range of the calibration intervals included in the analysis. For those cases with no apparent time dependency, one additional check should be performed to identify any potential problems resulting from increasing uncertainty.

The evaluation of the mean and standard deviation of each bin of significance will provide visual trending of the mean and standard deviation with calibration interval.

For each bin that was evaluated, plot the mean and sample standard deviation against the average calibration interval for that bin. These plots will provide visual indication of the stability of the mean and sample standard deviation for the data available. Indications of increased magnitude of the mean and/or the standard deviation with increasing or decreasing calibration interval can be qualitatively assessed.

A linear extrapolation of the expected increase in sample standard deviation and mean to the next bin outside the analyzed interval can be determined through the regression of the plotted values for the mean and standard deviation. This will provide a value for the mean and sample standard deviation, in Units/Day, for projection into the next bin.

If there are more than three bins with significant data then a regression of the mean and standard deviation values that were plotted can be used for evaluation of the linear fit of the data.

2.5.2.8 Determination of time dependency will be in two parts. One for the bias section and one for the random section of the drift term. These decisions will be based on the following decision process:

a. Bias Component

If the bias is showing a time dependency it will be deviating from its calibration as-left value of near zero drift as the calibration interval is increased. This deviation will be repeatable in only one direction (positive or negative).

1) If the regression of the data has an R-Square value greater than 0.3 then it is assumed that the data is time dependent.

2) If the R-Square is less than 0.3 but greater than 0.1 then the X Variable 1 *P-value* and the F-Value tests should be completed. If either test indicates that the regression is significant then assume time dependency unless there is a reason to disregard the tests.

One result that would be a reason for disregarding the regression test is that the result could not represent the real instrument behavior. This has shown up in several cases where the regression line has a large intercept value and then trends toward or crosses the zero drift term. This implies that the maximum drift will occur at time zero which is not the expectation of the instrument calibration process.

3) If the R-Square value is less than 0.1 then there is an expectation that the bias is time independent. This will be checked against the qualitative visual information to make a final determination.

Review:

The scatter plot of all data – Include linear approximation line

The plot of the data that was regressed – Include linear approximation line

The plot of the means of each significant bin – Include linear approximation line

If the review of these plots indicates a clear trend toward an increasing value in the magnitude of the mean versus calibration interval, then engineering judgement should be used to conservatively treat the mean as a linearly time dependent bias.

4) The value of the bias will be either the linear extrapolated value of the time dependent regression for a time dependent bias component or the mean of the final data set for a time independent bias component.

5) If the value of bias is determined to be less than 0.1% FS, it will be considered negligible whether it is time independent or time dependent (computed to the maximum surveillance interval).

b. Random Component

The variation of the data about the mean is normally the larger uncertainty in drift evaluations and this value is the random component of drift. If the magnitude of this variation is a function of calibration interval then this variation can be said to be time dependent.

1) If the regression of the Absolute Value of the data has an R-Square value greater than 0.3 then it is assumed that the data is time dependent.

2) If the R-Square is less than 0.3 but greater than 0.1 then the X Variable 1 *P-value* and the F-Value tests should be completed. If either test indicates that the regression is significant then assume time dependency unless there is a reason to disregard the tests.

3) If the R-Square value is less than 0.1 then there is an expectation that the random uncertainty is time independent. This will be checked against the qualitative visual information to make a final determination.

Review:

The scatter plot of all data – Include linear approximation line

The plot of the Absolute Value of the data that was regressed – Include linear approximation line

The plot of the standard deviation of each significant bin – Include linear approximation line

If the review of these plots indicates a clear trend toward a linear variation in the standard deviation with calibration interval, then engineering judgement should be used to assume time dependency for the random component of the uncertainty.

4) The value of the random component of the drift will be either:

The linear extrapolated value of the standard deviation of the bins plot for a time dependent random uncertainty

or

The standard deviation of the data for a time independent random component

The interval for which this is valid is only the interval of the bins that were analyzed.

2.5.3 If two or more bins were not identified for analysis then the value of drift from this evaluation must determined from the data from the most populated bin. For this case the process utilized is:

2.5.3.1 Compute the mean and sample standard deviation for the most populated bin. In addition, compute the average calibration interval for the data in that bin.

2.5.3.2 The bias and random components of the drift are then determined by:

a. The bias component will be then mean of the data in the single bin. This bias will be considered time independent unless a qualitative evaluation of the data would visually indicate that it is time dependent.

Extrapolation of the bias value from this bin to other bins will be by assuming it is a constant value throughout the range of concern for a time independent bias.

b. The random component will be the 95/95 tolerance value of the data. This will be assumed to be time independent.

Extrapolation to the bin either side of the single bin will require the use of the 99/95 tolerance value for additional conservatism. For extrapolation to larger calibration interval the random value will be expanded using the A2 Equation method of Appendix A Section 3.1.

2.6 RESULTS

2.6.1 The results of these as-found/as-left analyses determine a value of derived drift for the instrument make/model This value will require the following minimum elements:

2.6.1.1 Bias – Will normally be either the mean of the final data set for time independent drift or the intercept (constant) and slope for linear time dependent drift. For time dependent drift, this cannot be from the regression of the absolute value data set but from the final data set. A mean that is less than 0.1% FS will be assumed to be zero. This is a standard value. Bias below this value has no significant effect on the loop uncertainty.

2.6.1.2 Time Dependent Drift Value – For drift that was classified as time dependent, the slope of the regression curve (Units/Day) is the dependent drift value. If this number was determined from the absolute value regression, it still should be specified.

2.6.1.3 Tolerance Value – This value will come from the regression study for time dependent drift. For time independent drift, it will be the sample standard deviation times a multiplier based on the sample size. The selection of the multiplier will be based on the required expectations. Some specific requirements are:

99/95 – For cases where only one bin has sufficient data for analysis use this tolerance if the intent is to still assume time independent drift.

95/95 – For RPS and ECCS automatic actuations. If any instruments of the make/model are used for this then the result must be this confidence and tolerance interval.

95/75 – For other safety related instrumentation. If no instruments of this make/model are used for automatic actuations but they are used in safety related indication and alarm circuits then the tolerance value can be reduced to 75%.

75/75 – If the make/model is only used for non-safety related activities.

2.6.1.4 Valid Interval – The bounds of the calibration interval that were included in the analysis. For the above example, the first case would be 0 to 650 days and the second case would be 136 to 650 days. As extrapolation of statistical evaluations are not normally done this provides the data over the range where it should be valid. Some evaluation of the data within the bounding bins may be necessary to ensure that all of the data is not bunched at one interval. If there is bunching of data, the valid interval should be adjusted to account for this effect.

2.6.1.5 Extrapolation Margin – If the data from the analysis is to be extrapolated to either of the adjacent bins from the Valid Interval, then an additional margin will be added to the results of the evaluation.

2.6.2 The analysis should clearly indicate the make/model that it was performed for, and any functions excluded.

2.7 USING THE RESULTS

2.7.1 The data reduction has generated a "drift" value, but that number includes several uncertainties in addition to the classical drift. If the determined drift value is used in uncertainty calculations, the following uncertainties can normally be eliminated. To replace these values state that they are included in the calculated drift value and set their individual values to zero.

2.7.1.1 Reference Accuracy – The reference accuracy of the instrument is included in the calibration data and can be removed from the uncertainty calculation.

2.7.1.2 M&TE – As long as the calibration process uses the same, or more accurate, test equipment then this uncertainty is included in the calibration data and can be removed from the uncertainty calculation.

2.7.1.3 Drift – The true drift is included in the determined drift and is included in the calibration data and can be removed from the uncertainty calculation.

2.7.1.4 Normal Environmental Effects – For the instruments that are included in the calibration, the effects of variations in radiation, humidity, temperature, vibration, etc. experienced **during the calibration** are included in the calibration data and can be removed from the uncertainty calculation. These terms cannot be removed from the uncertainty calculations if these components see different conditions or magnitudes of the parameter, such as vibration or temperature, while operating then during calibration.

2.7.1.5 Power Supply Effects – If the instruments are attached to the same power supply during calibration that is used during operation, then the affects are included in the calibration data and can be removed from the uncertainty calculation.

2.7.1.6 Setting Tolerance – If the setting tolerance is such that it is less than the determined drift then this tolerance will show up in that determined drift and can be removed from the uncertainty calculation.

If the ST is much larger than the determined drift it will not normally be used in the calibration process and will not be seen in the determined drift. In this case the ST can be combined with the determined drift using SRSS.

2.7.2 For cases were there are time dependent drifts, the time frame used for determining the drift should be the normal surveillance interval plus twenty-five percent.

Time dependent drift that is random is assumed to be normally distributed and can be combined using the Square Root Sum of the Squares method for intervals beyond the given interval for the drift as explained in Appendix A and C to this procedure.

2.7.3 Time independent drift can be assumed constant over the Valid Interval. It can also be assumed constant over the interval in the next bin if the Extrapolation Margin is applied.

2.8 CONTINUING EVALUATION

2.8.1 To maintain these evaluations current and to detect increasing drift, the process stipulated in CC-AA-520 "Instrument Performance Trending" shall be followed.

ATTACHMENT 7
Applicable Instrumentation

Drift Group	Technical Specification	Manufacturer / Model No.	
14	SR 3.3.1.1.13, Fn 3	Rosemount	1154GP9 1153GB9
15	SR 3.3.1.1.13, Fn 4	Rosemount	1153DB4
15	SR 3.3.1.1.13, Fn 5	Rosemount	1153DB4
13	SR 3.3.1.1.13, Fn 7	Rosemount	1153AB5
16	SR 3.3.1.1.13, Fn 8.a	Gould	PD3218
17	SR 3.3.1.1.13, Fn 10	Barksdale	TC9622-3
20	SR 3.3.1.1.16, Fn 9	Rosemount	1152GP9
20	SR 3.3.1.1.16, Fn 10	Rosemount	1152GP9
40	SR 3.3.2.1.7, Fn 1.a	Rosemount Rosemount	1153GB8 1152GP8
40	SR 3.3.2.1.7, Fn 1.b	Rosemount Rosemount	1153GB8 1152GP8
17	SR 3.3.4.1.2.b	Barksdale	TC9622-3
20	SR 3.3.4.1.4	Rosemount	1152GP9
24A	SR 3.3.4.2.4.a	Rosemount	1153DB5
39A	SR 3.3.4.2.4.b	Rosemount	1153GB9
13	SR 3.3.5.1.4, Fn 1.b	Rosemount	1153AB5
12	SR 3.3.5.1.4, Fn 1.c	GE	147D8584G001
14 40	SR 3.3.5.1.4, Fn 1.d	Rosemount Rosemount	1154GP9 1154GP8
38	SR 3.3.5.1.4, Fn 1.e	Rosemount	1153DB3
38	SR 3.3.5.1.4, Fn 1.f	Rosemount	1153DB3
13	SR 3.3.5.1.4, Fn 2.b	Rosemount	1153AB5
12	SR 3.3.5.1.4, Fn 2.c	GE	147D8584G001

ATTACHMENT 7
Applicable Instrumentation

Drift Group	Technical Specification	Manufacturer / Model No.	
14 40	SR 3.3.5.1.4, Fn 2.d	Rosemount Rosemount	1154GP9 1154GP8
38	SR 3.3.5.1.4, Fn 2.e	Rosemount	1153DB3
13	SR 3.3.5.1.4, Fn 3.b	Rosemount	1153AB5
35	SR 3.3.5.1.4, Fn 3.d	Rosemount	1153DB3
16	SR 3.3.5.1.4, Fn 3.e	Gould	PD3218
23	SR 3.3.5.1.4, Fn 3.f	Rosemount	1153GB9
36	SR 3.3.5.1.4, Fn 3.g	Rosemount	1153DB4
13	SR 3.3.5.1.4, Fn 4.b	Rosemount	1153AB5
12	SR 3.3.5.1.4, Fn 4.c	GE	147D8584G001
15	SR 3.3.5.1.4, Fn 4.d	Rosemount	1153DB4
30	SR 3.3.5.1.4, Fn 4.e	Rosemount	1153GB7
30	SR 3.3.5.1.4, Fn 4.f	Rosemount	1153GB7
12	SR 3.3.5.1.4, Fn 4.g	GE	147D8584G001
13	SR 3.3.5.1.4, Fn 5.b	Rosemount	1153AB5
12	SR 3.3.5.1.4, Fn 5.c	GE	147D8584G001
15	SR 3.3.5.1.4, Fn 5.d	Rosemount	1153DB4
30	SR 3.3.5.1.4, Fn 5.e	Rosemount	1153GB7
12	SR 3.3.5.1.4, Fn 5.f	GE	147D8584G001
15	SR 3.3.5.2.4, Fn 2	Rosemount	1153DB4
35	SR 3.3.5.2.4, Fn 3	Rosemount	1153DB3
16	SR 3.3.5.2.4, Fn 4	Gould	PD3218
23	SR 3.3.6.1.5, Fn 1.b	Rosemount	1153GB9 1152GP9
21	SR 3.3.6.1.5, Fn 1.c	Rosemount	1153DB7

ATTACHMENT 7
Applicable Instrumentation

Drift Group	Technical Specification	Manufacturer / Model No.	
22	SR 3.3.6.1.5, Fn 1.d	Rosemount	1152AP5
27	SR 3.3.6.1.5, Fn 1.e	Riley-Beaird GE	86PEGF-EG 164C5687P005
32	SR 3.3.6.1.5, Fn 1.f	Riley-Beaird	86-PEEF-E
13	SR 3.3.6.1.5, Fn 2.b	Rosemount	1153AB5
13	SR 3.3.6.1.5, Fn 2.d	Rosemount	1153AB5
13	SR3.3.6.1.5, Fn 2.f	Rosemount	1153AB5
33	SR 3.3.6.1.5, Fn 2.k	Rosemount Love Controls	1153DB4 48-8115-8174
26	SR 3.3.6.1.5, Fn 3.a	Rosemount	1153DB5 1152DP5
12	SR 3.3.6.1.5, Fn 3.b	GE	147D8584G001
30	SR 3.3.6.1.5, Fn 3.c	Rosemount	1153GB7
25	SR 3.3.6.1.5, Fn 3.d	Rosemount	1153GB6
27	SR 3.3.6.1.5, Fn 3.e	Riley-Beaird	86PEGF-EG
27	SR 3.3.6.1.5, Fn 3.f	Riley-Beaird	86PEGF-EG
31	SR 3.3.6.1.5, Fn 3.g	Eagle Signal	HP55A6
26	SR 3.3.6.1.5, Fn 3.i	Rosemount	1153DB5
13	SR 3.3.6.1.5, Fn 3.j	Rosemount	1153AB5
27	SR 3.3.6.1.5, Fn 4.c	Riley-Beaird	86PEGF-EG
27	SR 3.3.6.1.5, Fn 4.d	Riley-Beaird	86PEGF-EG
27	SR 3.3.6.1.5, Fn 4.e	Riley-Beaird	86PEGF-EG
27	SR 3.3.6.1.5, Fn 5.a	Riley-Beaird	86PEGF-EG
15	SR 3.3.6.1.5, Fn 5.b	Rosemount	1153DB4
15	SR 3.3.6.1.5, Fn 5.c	Rosemount	1153DB4

ATTACHMENT 7
Applicable Instrumentation

Drift Group	Technical Specification	Manufacturer / Model No.	
14	SR 3.3.6.1.5, Fn 5.e	Rosemount	1154GP9 1153GB9
13	SR 3.3.6.1.5, Fn 5.f	Rosemount	1153AB5
13	SR 3.3.6.2.4, Fn 2	Rosemount	1153AB5
13	SR 3.3.6.3.4, Fn 1	Rosemount	1153AB5
41	SR 3.3.6.3.4, Fn 2	Rosemount	1153AB5
12	SR 3.3.6.3.4, Fn 4	GE	147D8584G001
12	SR 3.3.6.3.4, Fn 5	GE	147D8584G001
13	SR 3.3.6.4.6, Fn 1	Rosemount	1153AB5
42	SR 3.3.6.4.6, Fn 3	Rosemount	1153DB4
39	SR 3.3.6.5.3.a	Rosemount	1153GB9
39	SR 3.3.6.5.3.b	Rosemount	1153GB9
7	SR 3.3.8.1.3, Fn 1.a	Westinghouse	CV-2
8	SR 3.3.8.1.3, Fn 1.b	Westinghouse	CV-2
5	SR 3.3.8.1.3, Fn 1.c	ABB	27N
5	SR 3.3.8.1.3, Fn 1.d	ABB	27N
6	SR 3.3.8.1.3, Fn 1.e	Westinghouse	1520F55A08
10	SR 3.3.8.1.3, Fn 2.a	GE	12NGV13B21A
11	SR 3.3.8.1.3, Fn 2.b	GE	12SAM11B22A
5	SR 3.3.8.1.3, Fn 2.c	ABB	27N
5	SR 3.3.8.1.3, Fn 2.d	ABB	27N
9	SR 3.3.8.1.3, Fn 2.e	Agastat	ETR14D3DC2004002
1	SR 3.3.8.2.2.a	Elgar	UPS-103-1-189
2	SR 3.3.8.2.2.b	Elgar	UPS-103-1-189

ATTACHMENT 7
Applicable Instrumentation

Drift Group	Technical Specification	Manufacturer / Model No.	
3	SR 3.3.8.2.2.c	Elgar	UPS-103-1-189
4	SR 3.3.8.2.2.c (T.D.)	Elgar	UPS-103-1-189

CPS Evaluation of the NRC Status Report on the Staff Review of EPRI Technical Report 103335, "Guidelines for Instrument Calibration Extension/Reduction Programs"

The following are excerpts or paraphrases from the NRC Status Report dated December 1, 1997, on the Staff review of EPRI Technical Report (TR)-103335, "Guidelines for Instrument Calibration Extension /Reduction Programs." These excerpts are followed by the CPS position regarding utilization of EPRI TR-103335.

Item 4.1, Section 1, "Introduction," Second Paragraph

> "The staff has issued guidance on the second objective (evaluating extended surveillance intervals in support of longer fuel cycles) only for 18-month to 24-month refueling cycle extensions (GL 91-04). Significant unresolved issues remain concerning the applicability of 18 month (or less) historical calibration data to extended intervals longer than 24 months (maximum 30 months), and instrument failure modes or conditions that may be present in instruments that are unattended for periods longer than 24 months."

EVALUATION

Extensions for longer than 24 months were not requested for any instrument calibrations.

Item 4.2, Section 2, "Principles of Calibration Data Analysis," First Paragraph

> "This section describes the general relation between the as-found and as-left calibration values and instrument drift. The term 'time dependent drift' is used. This should be clarified to mean time dependence of drift uncertainty, or in other words, time dependence of the standard deviation of drift of a sample or a population of instruments."

EVALUATION

Both EPRI TR-103335, Revision 0 and Revision 1 failed to adequately determine if there existed a relationship between the magnitude of drift and the time interval between the calibration process. The drift analysis performed by CPS looked at the time to magnitude relationship using several different statistical and non-statistical methods. First, data was grouped for the same or similar manufacturer, model number, and application combinations. After the standard deviation and other simple statistics were calculated, the data was evaluated for the time to magnitude relationship. Two separate regression type analyses were performed; the first, a simple regression calculation based on the scatter of the raw "drift" values and the absolute value "drift" regression. Second, a regression of the calculated standard deviation and mean for the different calibration frequencies was performed if sufficient samples were available. Additionally, if these analyses did not contain sufficient samples for the regression of standard deviations, then different analyses may have been used or the samples may have conservatively been assumed to have a time dependent relationship and the drift value extrapolated based on a time dependent relationship.

Item 4.2, Section 2, "Principles of Calibration Data Analysis," Second Paragraph

> "Drift is defined as as-found - as-left. As mentioned in the TR, this quantity unavoidably contains uncertainty contributions from sources other than drift. These uncertainties account for variability in calibration equipment and personnel, instrument accuracy, and environmental effects. It may be difficult to separate these influences from drift uncertainty

> when attempting to estimate drift uncertainty, but this is not sufficient reason to group these allowances with a drift allowance. Their purpose is to provide sufficient margin to account for differences between the instrument calibration environment and its operating environment see Section 4.7 of this report for a discussion of combining other uncertainties into a 'drift' term."

EVALUATION

The drift determined by analysis was compared to the equivalent set of variables in the setpoint calculation. The variables for the comparison were all associated with the calibration process (measurement and test equipment error, setting tolerance error, reference accuracy, and drift). The errors associated with the environment were not considered in the comparison although some portion of environmental error would be expected to contribute to the differences between calibrations.

Item 4.2, Section 2, "Principles of Calibration Data Analysis," Third Paragraph

> "The guidance of Section 2 is acceptable provided that time dependency of drift for a sample or population is understood to be time dependency of the uncertainty statistic describing the sample or population; e.g., the standard deviation of drift. A combination of other uncertainties with drift uncertainty may obscure any existing time dependency of drift uncertainty, and should not be done before time-dependency analysis is done."

EVALUATION

Time dependency evaluations were performed on the basic as-found/as-left data. Obviously other error contributors are contained in this data and it is impossible to separate the contribution from drift from the contribution due to Measurement and Test Equipment, Setting Tolerance, Reference Accuracy or other errors associated with the calibration process. Using the raw values appears to give the most reliable interpretation of the time dependency for the calibration process, which is the true value of interest. No other uncertainties are combined with the basic as-found/as-left data for time dependency determination.

Item 4.3, Section 3, "Calibration Data Collection," Second Paragraph

> "When grouping instruments, as well as manufacturer make and model, care should be taken to group only instruments that experience similar environments and process effects. Also, changes in manufacturing method, sensor element design, or the quality assurance program under which the instrument was manufactured should be considered as reasons for separating instruments into different groups. Instrument groups may be divided into subgroups on the basis of instrument age, for the purpose of investigating whether instrument age is a factor in drift uncertainty."

EVALUATION

Instruments were originally grouped based on manufacturer make, model number, and specific range of setpoint or operation. The groups were then evaluated, and combined based on the CPS methodology outlined in Attachment 6.

Item 4.3, Section 3, "Calibration Data Collection," Second Paragraph (continued)

"Instrument groups should also be evaluated for historical instrument anomalies or failure modes that may not be evident in a simple compilation of calibration data. This evaluation should confirm that almost all instruments in a group performed reliably and almost all required only calibration attendance."

EVALUATION

A separate surveillance test failure evaluation was performed for surveillance test performances. This evaluation identified calibration-related and non-calibration-related failures for single instruments, and groups of instruments supporting a specific function. After all relevant device and multiple device failures were identified, a cross-check of failures across manufacturer make and model number was also performed to determine if common mode failures could present a problem for the cycle extension. This evaluation confirmed that almost all instruments in a group (associated with extended Technical Specification line items) performed reliably and most failures were detected by more frequent testing.

Item 4.3, Section 3, "Calibration Data Collection," Third Paragraph

"Instruments within a group should be investigated for factors that may cause correlation between calibrations. Common factors may cause data to be correlated, including common calibration equipment, same personnel performing calibrations, and calibrations occurring in the same conditions. The group, not individual instruments within the group, should be tested for trends."

EVALUATION

Instruments were only investigated for correlation factors where multiple instruments appeared to have been driven out of tolerance by a single factor. Correlation may exist between the specific type of test equipment and the personnel performing calibrations. This correlation would only affect the measurement if it caused the instrument performance to be outside expected boundaries, e.g., where additional errors should be considered in the setpoint analysis or where it showed a defined bias. Because Measurement and Test Equipment (M&TE) is calibrated more frequently than most process components being monitored, the effect of test equipment between calibrations is considered to be negligible and random. The setting tolerance, readability, and other factors which are more personnel based, would only affect the performance if there was a predisposition to leave or read settings in a particular direction (e.g., always in the more conservative direction). Plant training and evaluation programs are designed to eliminate this type of predisposition. Therefore, the correlation between M&TE and instrument performance, or between personnel and instrument performance, has not been evaluated. Observed as-found values outside the allowable tolerance were evaluated to determine if a common cause existed as part of the data entry evaluation.

Item 4.3, Section 3, "Calibration Data Collection," Fourth Paragraph

"TR-103335, Section 3.3, advises that older data may be excluded from analysis. It should be emphasized that when selecting data for drift uncertainty time dependency analysis, it is unacceptable to exclude data simply because it is old data. When selecting data for drift uncertainty time dependency analysis, the objective should be to include data for time spans at least as long as the proposed extended calibration interval, and preferably several times as long, including calibration intervals as long as the proposed interval. For limited extensions (e.g., a GL 91-04 extension), acceptable ways to obtain this longer interval data include obtaining data from other nuclear-plants or from other industries for identical or close-to-identical instruments, or combining intervals between which the instrument was not reset or adjusted. If data from other sources is used, the source should be analyzed for similarity to the target plant in procedures, process, environment, methodology, test equipment, maintenance schedules and personnel training. An appropriate conclusion of the data collection process may be that there is insufficient data of appropriate time span for a sufficient number of instruments to support statistical analysis of drift uncertainty time dependency."

EVALUATION

Data was selected at least five operating cycles prior to and including the Spring 2002 refueling outage, when available. Five cycles of data may not have been available due to replacement of instruments, changes in calibration methods, or missing records. This data allowed for the evaluation of data with various different calibration spans over several calibration intervals to provide representative information for each type of instrument. Data from outside the CPS data set was not used to provide longer interval data due to differences in calibration methodology. In most cases, the time dependency determination was based on calibrations performed at or near 18 months and data obtained at shorter intervals. There did not appear to be any time based factors that would be present from 18 to 24 months that would not have been present between 18-month and more frequent intervals. In some cases, multiple intervals were evaluated (where the instrument was not reset) to simulate a longer calibration interval. When intervals were combined, the sample set size was reduced to account for the combination of data points into longer calibration intervals. In some cases, it was determined that there was insufficient data to support statistical analysis of drift time dependency. For these cases, CPS setpoint methodology assumptions for drift were utilized to provide setpoint calculations applicable for 30-month calibration intervals. Additionally, the ongoing drift trend program will monitor these channels for operation within the assumptions of the setpoint analysis.

Item 4.3, Section 3, "Calibration Data Collection," Fifth Paragraph

"TR-103335, Section 3.3 provides guidance on the amount of data to collect. As a general rule, it is unacceptable to reject applicable data, because biases in the data selection process may introduce biases in the calculated statistics. There are only two acceptable reasons for reducing the amount of data selected: enormity, and statistical dependence. When the number of data points is so enormous that the data acquisition task would be prohibitively expensive, a randomized selection process, not dependent upon engineering judgment, should be used. This selection process should have three steps. In the first step, all data is screened for applicability, meaning that all data for the chosen instrument grouping is selected, regardless of the age of the data. In the second step, a proportion of the applicable data is chosen by automated random selection, ensuring that the data records for single instruments are complete, and enough individual instruments are included to constitute a statistically diverse sample. In the third step, the first two steps are documented. Data points should be combined when there is indication that they are statistically dependent on each other, although alternate approaches may be acceptable. See Section 4.5, below, on 'combined point' data selection and Section 4.4.1 on 0%, 25%, 50%, 75%, and 100% calibration span points."

EVALUATION

A time interval of 5 cycles was selected as representative based on the CPS operating history. All data points during this period were selected and no sampling techniques were used. In some cases, due to either upgrade of equipment, revision of calibration methods, extended plant shutdowns, or other plant changes, 5 cycles of applicable data was not available. In these cases, the analysis was performed using the available data set.

Item 4.4, Section 4, "Analysis of Calibration Data"

Sub-Item, 4.4.1, Sections 4.3 and 4.4, "Data Setup and Spreadsheet Statistics," First Paragraph

> "The use of spreadsheets, databases, or other commercial software is acceptable for data analysis provided that the software, and the operating system used on the analysis computer, is under effective configuration control. Care should be exercised in the use of Windows or similar operating systems because of the dependence on shared libraries. Installation of other application software on the analysis machine can overwrite shared libraries with older versions or versions that are inconsistent with the software being used for analysis."

EVALUATION

The project used Microsoft Excel spread sheets to perform the statistical analysis. Since it was desired to maintain consistency between the Exelon Stations in their approach and methods used in performing these Drift Analyses, CPS utilized the same basic Instrumentation Drift Analysis Spreadsheet that was developed and used for the LaSalle County Station Instrument Drift Analyses. This spreadsheet had been validated during its prior use. Prior to its implementation at CPS, the Exelon Instrument Drift Analysis Spreadsheet was reviewed to verify the function of the spreadsheet. No problems were identified.

Item 4.4, Section 4, "Analysis of Calibration Data"

Sub-Item, 4.4.1, Sections 4.3 and 4.4, "Data Setup and Spreadsheet Statistics," Second Paragraph

> "Using either engineering units or per-unit (percent of span) quantities is acceptable. The simple statistic calculations (mean, sample standard deviation, sample size) are acceptable. Data should be examined for correlation or dependence to eliminate over-optimistic tolerance interval estimates. For example, if the standard deviation of drift can be fitted with a regression line through the 0%, 25%, 50%, 75%, and 100% calibration span points, there is reason to believe that drift uncertainty is correlated over the five (or nine, if the data includes a repeatability sweep) calibration data points. An example is shown in TR-103335, Figure 5.4, and a related discussion is given in TR-103335 Section 5.1.3. Confidence/tolerance estimates are based on (a) an assumption of normality (b) the number of points in the data set, and (c) the standard deviation of the sample. Increasing the number of points (utilizing each calibration span point) when data is statistically dependent decreases the tolerance factor k which may falsely enhance the confidence in the predicted tolerance interval. To retain the information, but achieve a reasonable point count for confidence/tolerance estimates, the statistically dependent data points should be combined into a composite data point. This retains the information but cuts the point count. For drift uncertainty estimates with data similar to that in the TR example, an acceptable method requires that the number of independent data points should be one-

fifth (or one ninth) of the total number of data points in the example, and a combined data point for each set of five span points should be selected that is representative of instrument performance at or near the span point most important to the purpose of the analysis (i.e., trip or normal operation point)."

EVALUATION

The analysis for CPS used either engineering units or percent of calibrated span as appropriate to the calibration process. As an example, for switches that do not have a realistic span value, the engineering units were used in the analyses; for analog devices, normally percent of span is used. The multiplier was determined based on the number of actual calibrations associated with the worst case calibration point selected. Selection of the actual number of calibrations is equivalent to the determination of independent points (e.g., one fifth or one ninth of the total data point count). Selection of the worst case point (in Group 38 the second worse point) is also more conservative than the development of a combined data point.

<u>Item 4.4, Section 4, "Analysis of Calibration Data"</u>

Sub-Item 4.4.2, Section 4.5, "Outlier Analysis"

"Rejection of outliers is acceptable only if a specific, direct reason can be documented for each outlier rejected. For example, a documented tester failure would be cause for rejecting a calibration point taken with the tester when it had failed. It is not acceptable to reject outliers on the basis of statistical tests alone. Multiple passes of outlier statistical criterion are not acceptable. An outlier test should only be used to direct attention to data points, which are then investigated for cause. Five acceptable reasons for outlier rejection, provided that they can be demonstrated, are given in the TR: data transcription errors, calibration errors, calibration equipment errors, failed instruments, and design deficiencies. Scaling or setpoint changes that are not annotated in the data record indicate unreliable data, and detection of unreliable data is not cause for outlier rejection, but may be cause for rejection of the entire data set and the filing of a licensee event report. The usual engineering technique of annotating the raw data record with the reason for rejecting it, but not obliterating the value, should be followed. The rejection of outliers typically has cosmetic effects; if sufficient data exists, it makes the results look slightly better; if insufficient data exists, it may mask a real trend. Consequently, rejection of outliers should be done with extreme caution and should be viewed with considerable suspicion by a reviewer."

EVALUATION

Analysis of data was based on categorization into one of the following:

1) Data Transcription Errors. The review identified typographical data entry error. The data point was adjusted to correct the error.

2) Technician Data Entry Error. The review identified an obvious transposition error by the technician entering data. The data point was eliminated based on the data entry error.

3) Equipment Replacement. The review identified that a new instrument was installed. The data point "As-found" data was zeroed because this data would not be reflective of drift. Any repetitive instrument failures would be identified in the Surveillance Test History Review.

4) Chronic Equipment Failure. The review of the data indicated repetitive bad data points for a single instrument with excessive changes in the input/output relationship, while all other instruments in the same application did not exhibit the same characteristics. The data of this instrument was eliminated based on a unique instrument problem, in conjunction with appropriate corrective action (e.g., replacement of the instrument). Any repetitive instrument failures would be identified in the Surveillance Test History review. The CPS trending program will identify such future conditions and require appropriate cause evaluation and replacement.

5) Scaling or Setpoint Changes. Changes in instrument scaling or setpoints can appear in the data set as a larger-than-actual drift point unless the change is detected during the data entry process. These changes were only eliminated where insufficient as-found or as-left data was available (e.g., the as-found test was performed using the new scale or setpoint). Where there was not clear annotation of the change, the data was maintained in the data set.

6) Measuring and Test Equipment (M&TE) Out of Calibration. The review indicated that the instrument was calibrated with out of calibration M&TE. The data point was eliminated based on the fact that the recorded change could not be correlated to the performance of the instrument.

7) Poor Calibration Techniques. The review identified that poor calibration techniques were used. The data point was eliminated based on the fact that the recorded change could not be correlated to the performance of the instrument.

All eliminated or adjusted data points were individually evaluated to meet these categories. The seven criteria are consistent with the five reasons defined in EPRI TR-103335 and in the NRC Status Report. The additional two criteria for scaling or setpoint change and chronic failure are included to prevent past poor practices from generating excessively large acceptance criteria for the future. The allowed tolerance for as-found in the CPS trending program is based on the calculated drift value. Where a large drift value ensures that the drift used to calibrate the setpoint adequately envelops all performance conditions, the large drift value used to generate as-found acceptance criteria actually makes it more difficult to predict when an instrument is failing. The data is only eliminated after the careful identification of bad practices (e.g., leaving marginally-performing instruments in the plant or changing the setpoint without first taking as found data).

<u>Item 4.4, Section 4, "Analysis of Calibration Data"</u>

Sub-Item 4.4.3, Section 4.6, "Verifying the Assumption of Normality"

> "The methods described are acceptable in that they are used to demonstrate that calibration data or results are calculated as if the calibration data were a sample of a normally distributed random variable. For example, a tolerance interval which states that there is a 95% probability that 95% of a sample drawn from a population will fall within tolerance bounds is based on an assumption of normality, or that the population distribution is a normal distribution. Because the unwarranted removal of outliers can have a significant effect on the normality test, removal of significant numbers of, or sometimes any (in small populations), outliers may invalidate this test."

EVALUATION

While the methodology outlined in Attachment 6 allows up to 5% of the population to be removed by the Critical-T test as outliers, CPS has limited outlier removal to no more than one (1) within the data set being evaluated. Data that is eliminated based on one of the above seven exclusion criteria before statistical analysis is not counted against this percentage or as a part of the initial data set. Many groups did not contain any outliers, and when Critical-T tests produced more than one outlier in a data set, only the single worst outlier was removed.

Item 4.4, Section 4, "Analysis of Calibration Data"

Sub-Item 4.4.4, Section 4.7, "Time-Dependent Drift Considerations," First through Ninth Paragraphs

> "This section of the TR discusses a number of methods for detecting a time dependency in drift data, and one method of evaluating drift uncertainty time dependency. None of the methods uses a formal statistical model for instrument drift uncertainty, and all but one of them focus on drift rather than drift uncertainty. [...] Two conclusions are inescapable: regression analysis cannot distinguish drift uncertainty time dependency, and the slope and intercept of regression lines may be artifacts of sample size, rather than being statistically significant. Using the results of a regression analysis to rule out time dependency of drift uncertainty is circular reasoning: i.e., regression analysis eliminates time dependency of uncertainty; no time dependency is found; therefore, there is no time dependency."

EVALUATION

Several different methods of evaluation for time dependency of the data were used for the analysis. One method was to evaluate the standard deviations at different calibration Intervals. This analysis technique is the recommended method of determining time-dependent tendencies in a given sample pool. The test consists simply of segregating the drift data into different groups (bins) corresponding to different ranges of calibration or surveillance intervals, and comparing the standard deviations for the data in the various groups. The purpose of this type of calculation is to determine if the standard deviation tends to become larger as the time between calibration increases. Simple regression lines and regression of the absolute value of drift were generated and reviewed. Where drift was determined to be time independent, however, increases in confidence interval and other methods were used to ensure a conservative 30 month drift term.

Item 4.4, Section 4, "Analysis of Calibration Data"

Sub-Item 4.4.4, Section 4.7, "Time-Dependent Drift Considerations," Thirteenth and Fourteenth Paragraphs

> "A model can be used either to bound or project future values for the quantity in question (drift uncertainty) for extended intervals. An acceptable method would use standard statistical methods to show that a hypothesis (that the instruments under study have drift uncertainties bounded by the drift uncertainty predicted by a chosen model) is true with high probability. Ideally, the method should use data that include instruments that were unreset for at least as long as the intended extended interval, or similar data from other sources for instruments of like construction and environmental usage. The use of data of appropriate time span is preferable; however, if this data is unavailable, model projection

may be used provided the total projected interval is no greater than 30 months and the use of the model is justified. A follow-up program of drift monitoring should confirm that model projections of uncertainty bounded the actual estimated uncertainty. If it is necessary to use generic instrument data or constructed intervals, the chosen data should be grouped with similar grouping criteria as are applied to instruments of the plant in question, and Student's "t" test should be used to verify that the generic or constructed data mean appears to come from the same population. The "F" test should be used on the estimate of sample variance. For a target surveillance interval constructed of shorter intervals where instrument reset did not occur, the longer intervals are statistically dependent upon the shorter intervals; hence, either the constructed longer-interval data or the shorter-interval data should be used, but not both. In a constructed interval, drift = as-left$_{(0)}$ - as found$_{(LAST)}$; the intermediate values are not used.

When using samples acquired from generic instrument drift analyses or constructed intervals, the variances are not simply summed, but are combined weighted by the degrees of freedom in each sample."

EVALUATION

When constructed intervals were developed from shorter intervals, they were from occasions where the instrument was not reset. Only the overall AFAL was not used in the data set. ISA 67.04 recognizes two models for the extrapolation of drift — the linear method and the use of square-root-sum-of-the-squares (SRSS), which recognizes the random nature of drift, and extrapolates the magnitude accordingly. Through binning analysis and regression analysis, the drift bias and random terms were evaluated separately for each group of instruments. If the drift bias was determined to be time dependent, the value was linearly extrapolated to 30 months using the regression prediction line from the data within the valid time bins. If the bias was determined to be time independent, the bias term was established as the mean of the final data set.

If the random portion of the drift was determined to be time dependent, the standard deviation was from the standard deviation averages from the binning analysis. The standard deviation is then multiplied by the 95/95 confidence factor (based on sample size) and normality adjustment factor. This result was then conservatively linearly extrapolated to the 30-month period to obtain the value of the random portion of the drift.

If the random portion of drift was found to be time independent, additional confidence was added (99/95 factor) to be able to use the value in the next time bin. If additional extrapolation was necessary, additional conservatism was added through means of an SRSS extrapolation to expand the drift value to 30 months.

<u>Item 4.4, Section 4, "Analysis of Calibration Data"</u>

Sub-Item 4.4.5, Section 4.8, "Shelf Life of Analysis Results"

"The TR gives guidance on how long analysis results remain valid. The guidance given is acceptable with the addition that once adequate analysis and documentation is presented and the calibration interval extended, a strong feedback loop must be put into place to ensure drift, tolerance and operability of affected components are not negatively impacted. An analysis should be re-performed if its predictions turn out to exceed predetermined limits set during the calibration interval extension study. A goal during the re-performance should be to discover why the analysis results were incorrect. The establishment of a review and monitoring program, as indicated in GL 91-04, Enclosure 2, Item 7 is crucial to determining that the assumptions made during the calibration interval extension study were true. The methodology for obtaining reasonable and timely feedback must be documented."

EVALUATION

As discussed in Attachment 1, the plant is committed to establish a trending program to provide feedback on the acceptability of the drift error extension. As-found and as-left calibration data will be recorded for each 24 month calibration activity. This will identify occurrences of instruments found outside of their allowable value and instruments whose performance is not as assumed in the drift or setpoint analysis. When as-found conditions are outside the allowable value, an evaluation will be performed in accordance with the CPS corrective action program to determine if the assumptions made to extend the calibration frequency are still valid and to evaluate the effect on plant safety.

In addition, the trending program will address calibration as-found data found to be outside of the "as-found tolerance" (AFT). This AFT is based on the expected 30-month drift for the instruments. The trending program will require that any time a calibration as-found value is found outside the AFT, the occurrence will be entered into the CPS corrective action program and the instrument performance evaluated to assure that it is still enveloped by the assumptions in the drift or setpoint analysis. This will allow the trending program to evaluate AFAL values to verify that the performance of the instruments is within expected boundaries and that adverse trends are detected and evaluated. This evaluation will be conducted for three (3) 24-month calibration intervals to ensure the assumptions in the setpoint calculations continue to be valid. If this evaluation indicates that instrument performance is not consistent with assumptions, corrective actions will be taken in accordance with CPS corrective action program requirements.

Item 4.5, Section 5, "Alternative Methods of Data Collection and Analysis"

"Section 5 discusses two alternatives to as-found/as-left (AFAL) analysis, combining the 0%, 25%, 50%, 75% and 100% span calibration points, and the EPRI Instrument Calibration Reduction Program (ICRP).

Two alternatives to AFAL are mentioned: as-found/setpoint (AFSP) analysis, and worst-case as-found/as-left (WCAFAL). Both AFSP and WCAFAL are more conservative than the AFAL method because they produce higher estimates of drift. Therefore, they are acceptable alternatives to AFAL drift estimation.

The combined-point method is acceptable, and in some cases preferable, if the combined value of interest is taken at the point important to the purpose of the analysis. That is, if the instrument being evaluated is used to control the plant in an operating range, the instrument should be evaluated near its operating point. If the instrument being evaluated is employed to trip the reactor, the instrument should be evaluated near the trip point. The combined-point method should be used if the statistic of interest shows a correlation between calibration span points, thus inflating the apparent number of data points and causing an overstatement of confidence in the results. The method by which the points are combined (e.g., nearest point, interpolation, averaging) should be justified and documented."

EVALUATION

The worst case as-found/as-left method and combined point method were not utilized. The AFSP analysis was applied to instrumentation that was not calibrated over a span range (e.g., area temperature monitors do not have 5-point calibrations). Additionally, an AFSP analysis was performed for other special-case loops (e.g., Drift Group 39A; refer to Attachment 7). For these special case functions, the typical CPS calibration method of performing AFAL calibrations of the entire loop involved an end-device readout unit whose accuracy was not conducive to establishing drift parameters on the transmitter or trip loop. In these cases, loop AFAL data was taken solely at the trip point of the end device, which involved highly accurate M&TE readings and excluded the less accurate end-device readout.

Item 4.6, Section 6, "Guidelines for Calibration and Surveillance Interval Extension Programs"

> This section presents an example analysis in support of extending the surveillance interval of reactor trip bistables from monthly to quarterly.

EVALUATION

The CPS submittal used the same methodology for the extension of bistables as used for transmitters, switches, and time delay relays. In addition, CPS did not propose extending any surveillances from monthly to quarterly.

Item 4.7, Section 7, "Application to Instrument Setpoint Programs"

> "Section 7 is a short tutorial on combining uncertainties in instrument setpoint calculations. Figure 7-1 of this section is inconsistent with ANSI/ISA S67.04, Part I, 1994, Figure 1. Rack uncertainty is not combined with sensor uncertainty in the computation of the allowable value in the standard. The purpose of the allowable value is to set a limit beyond which there is reasonable probability that the assumptions used in the setpoint calculation were in error. For channel functional tests, these assumptions normally do not include an allowance for sensor uncertainty (quarterly interval, sensor normally excluded). If a few instruments exceed the allowable value, this is probably due to instrument malfunction. If it happens frequently, the assumptions in the setpoint analysis may be wrong. Since the terminology used in Figure 7-1 is inconsistent with ISA S67.04-1994, Part I, Figure 1, the following correspondences are suggested: the 'Nominal Trip Setpoint' is the ANSI/ISA trip setpoint; ANSI/ISA value 'A' is the difference between TR 'Analytical Limit' and 'Nominal Trip Setpoint'; 'Sensor Uncertainty' is generally not included in the 'Allowable Value Uncertainty' and would require justification, the difference between 'Allowable Value' and 'Nominal Trip Setpoint' is ANSI/ISA value 'B'; the 'Leave-As-Is-Zone' is equivalent to the ANSI/ISA value 'E'; and the difference between 'System Shutdown' and 'Nominal Trip Setpoint' is the ANSI/ISA value 'D'. Equation 7-5 (page 7-7 of the TR) combines a number of uncertainties into a drift term, D. If this is done, the reasons and the method of combination should be justified and documented. The justification should include an analysis of the differences between operational and calibration environments, including accident environments in which the instrument is expected to perform."

EVALUATION

Plant setpoints and allowable values are calculated in accordance with the guidance provided in Regulatory Guide 1.105, "Instrument Setpoints," as implemented by the CPS setpoint methodology, and the Instrument Society of America (ISA) 67.04, 1994. These calculations determine the instrument uncertainties, setpoints, and allowable values for the affected functions. The allowable values have been determined in a manner suitable to establish limits for their application. As such, the allowable values ensure that sufficient margins are maintained in the applicable safety analyses to confirm the affected instruments are capable of performing their intended design function.

Item 4.8, Section 8, "Guidelines for Fuel Cycle Extensions"

> "The TR repeats the provisions of Enclosure 2, GL 91-04, and provides direct guidance, by reference to preceding sections of the TR, on some of them."

EVALUATION

A specific discussion of CPS compliance to NRC Generic Letter 91-04 is provided in the other sections of this submittal.