

# Exelon®

Nuclear

Clinton Power Station  
8401 Power Road  
Clinton, IL 61727-9351

U-603908  
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U. S. Nuclear Regulatory Commission  
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Clinton Power Station, Unit 1  
Facility Operating License  
NRC Docket No. 50-461

Subject: Transmittal of Revision 12 to the Clinton Power Station  
Technical Specification Bases

In accordance with Clinton Power Station (CPS) Technical Specification 5.5.11, "Technical Specification (TS) Bases Control Program," Exelon Generation Company (EGC), LLC is transmitting the revised pages constituting Revision 12 to the CPS TS Bases. The changes associated with this revision were processed in accordance with CPS TS 5.5.11. Compliance with CPS TS 5.5.11 requires updates to the TS Bases to be submitted to the NRC at a frequency consistent with 10CFR50.71, "Maintenance of records, making of reports," paragraph (e).

There are no regulatory commitments in this letter.

Should you have any questions concerning this information, please contact Mr. Jim Peterson at (217) 937-2810.

Respectfully;



Daniel J. Kemper  
Regulatory Assurance Manager  
Clinton Power Station

JLP/blf

Attachment – Revision 12 to the CPS Technical Specification Bases

cc: Regional Administrator – NRC Region III  
NRC Senior Resident Inspector – Clinton Power Station  
Illinois Emergency Management Agency – Division of Nuclear Safety

A001  
NRR

**Attachment  
U-603908  
Clinton Power Station, Unit 1  
Revision 12 to the CPS Technical Specification Bases**

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.1.1.6 and SR 3.3.1.1.7 (continued)

block. Overlap between SRMs and IRMs similarly exists when, prior to withdrawing the SRMs from the fully inserted position, IRMs are above the downscale value of 5 and increasing as neutron flux increases, prior to the SRMs indication reaching their upscale limit.

As noted, SR 3.3.1.1.7 is only required to be met during entry into MODE 2 from MODE 1. That is, after the overlap requirement has been met and indication has transitioned to the IRMs, maintaining overlap is not required (APRMs may be reading downscale once in MODE 2).

If overlap for a group of channels is not demonstrated (e.g., IRM/APRM overlap), the reason for the failure of the Surveillance should be determined and the appropriate channel(s) declared inoperable. Only those appropriate channel(s) that are required in the current MODE or condition should be declared inoperable.

A Frequency of 7 days is reasonable based on engineering judgment and the reliability of the IRMs and APRMs.

SR 3.3.1.1.8

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The 2000 MWD/T Frequency is based on operating experience with LPRM sensitivity changes and the NRC Safety Evaluation documenting approval of License Amendment 181 (Reference 14).

SR 3.3.1.1.9 and SR 3.3.1.1.12

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the entire channel will perform the intended function. 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 92 day Frequency of SR 3.3.1.1.9 is based on the reliability analysis of Reference 9.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.1.1.9 and SR 3.3.1.1.12 (continued)

The 24 month Frequency for the Reactor Mode Switch - Shutdown Position function 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.

The 24-month Frequency for the Scram Discharge Volume float switch channel functional test is based on a plant-specific risk analysis documented in Reference 13. This analysis demonstrated that a surveillance test interval of 24 months resulted in a very small increase in core damage frequency and large early release frequency. In addition, this frequency supports optimizing radiological exposures as low as reasonably achievable.

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.

The SR 3.3.1.1.13 calibration for selected Functions is modified by a Note as identified in Table 3.3.1.1-1. This Note, which applies only to those Functions identified in Table 3.3.1.1-1, is divided into three parts. Part 1 of the Note requires evaluation of instrument performance for the condition where the as-found setting for these instrument channels is outside its As-Found Tolerance (AFT) but conservative with respect to the Allowable Value.

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.1.1.11 and SR 3.3.1.1.13 (continued)

Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on-shift operations personnel during the approval of the surveillance data. Subsequent to returning the instrument to service, the deviation is entered into the Corrective Action Program. In accordance with procedures, entry into the Corrective Action Program will require review and documentation of the condition for operability by on-shift operations personnel. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends. If the as-found channel setpoint is not conservative with respect to the Allowable Value, the channel shall be declared inoperable. Part 2 of the Note requires that the instrument channel setpoint shall be reset to within the ALT of the Actual Trip Setpoint (ATSP). The ATSP is equivalent to or more conservative than the Nominal Trip Setpoint (NTSP). The NTSP is the limiting value of the sensed process variable at which a trip may be set in accordance with the methodology documented in the ORM. Therefore, the NTSP is equivalent to the Limiting Safety System Setting (LSSS) required by 10 CFR 50.36, "Technical specifications." The Actual Trip Setpoint is also calculated in accordance with the plant-specific setpoint methodology as documented in the CPS ORM and may include additional margin. The ATSP will ensure that sufficient margin to the safety and/or analytical limit is maintained. If the as-left instrument channel setpoint cannot be returned to within the ALT of the Actual Trip Setpoint, then the channel shall be declared inoperable. Part 3 of the Note indicates that the Nominal Trip Setpoint and the methodology used to determine the Nominal Trip Setpoint, the As-Found Tolerance and the As-Left Tolerance bands are specified in the ORM.

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 2000 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.

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BASES

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REFERENCES

1. USAR, Section 7.2.
  2. USAR, Section 5.2.2.
  3. USAR, Section 6.3.3.
  4. USAR, Chapter 15.
  5. USAR, Section 15.4.1.2.
  6. NEDO-23842, "Continuous Control Rod Withdrawal in the Startup Range," April 18, 1978.
  7. USAR, Section 15.4.9.
  8. Letter, P. Check (NRC) to G. Lainas (NRC), "BWR Scram Discharge System Safety Evaluation," December 1, 1980, as attached to NRC Generic Letter dated December 9, 1980.
  9. NEDO-30851-P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.
  10. NEDO-32291-A, "System Analyses for Elimination of Selected Response Time Testing Requirements," January 1994.
  11. Calculation IP-0-0002.
  12. Calculation IP-0-0024.
  13. Risk Management Document No. 1073, "Scram Discharge Volume Level Instrument Surveillance Interval Extension Risk Assessment," dated November 17, 2006.
  14. Letter from U. S. NRC to C. Pardee (AmerGen Energy Company, LLC), "Clinton Power Station (CPS), Unit No. 1 - Issuance of Amendment Re: License Amendment Request to Increase the Interval Between Local Power Range Monitor Calibrations from 1000 Megawatt-Days/Ton (MWD/T) to 2000 MWD/T as Required in CPS Technical Specification Surveillance Requirement 3.3.1.1.8 and 3.3.1.3.2 (TAC No. MD3795)," dated September 12, 2008.
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BASES

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SURVEILLANCE  
REQUIREMENTS  
(continued)

For the following OPRM instrumentation Surveillances, both OPRM modules are tested, although only one is required to satisfy the Surveillance Requirement.

SR 3.3.1.3.1

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. A Frequency of 184 days provides an acceptable level of system average unavailability over the Frequency interval and is based on the reliability of the channel (Reference 7).

SR 3.3.1.3.2

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The 2000 MWD/T Frequency is based on operating experience with LPRM sensitivity changes and the NRC Safety Evaluation documenting approval of License Amendment 181 (Reference 12).

SR 3.3.1.3.3

The CHANNEL CALIBRATION is a complete check of the instrument loop. 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. Calibration of the channel provides a check of the internal reference voltage and the internal processor clock frequency. It also compares the desired trip setpoint with those in the processor memory. Since the OPRM is a digital system, the internal reference voltage and processor clock frequency are, in turn, used to automatically calibrate the internal analog to digital converters. The nominal setpoints for the period based detection algorithm are specified in the Core Operating Limits Report (COLR). As noted, 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 2000 MWD/T LPRM calibration against the TIPs (SR 3.3.1.1.8). SR 3.3.1.1.8 thus also ensures the operability of the OPRM instrumentation.

The nominal setpoints for the OPRM trip function for the period based detection algorithm (PBDA) are specified in the COLR. The PBDA trip setpoints are the number of confirmation counts required to permit a trip signal and the peak to average amplitude required to generate a trip signal.

The Frequency of 24 months is based upon the assumption of the magnitude of equipment drift provided by the equipment supplier (Reference 7).

(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.3.1.3.6 (continued)

virtually ensure an instantaneous response time. RPS RESPONSE TIME tests are conducted on an 24 month STAGGERED TEST BASIS. This Frequency is consistent with the refueling cycle and is based upon operating experience, which shows that random failures of instrumentation components causing serious time degradation, but not channel failure, are infrequent.

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BASES (continued)

REFERENCES

1. NEDO-31960, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology," June 1991.
2. NEDO-31960, "BWR Owners' Group Long-Term Stability Solutions Licensing Methodology," Supplement 1, March 1992.
3. NRC Letter, A. Thadani to L. A. England, "Acceptance for Referencing of Topical Reports NEDO-31960, Supplement 1, 'BWR Owners' Group Long-Term Stability Solutions Licensing Methodology'," July 12, 1994.
4. Generic Letter 94-02, "Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal-Hydraulic Instabilities in Boiling Water Reactors," July 11, 1994.
5. BWROG Letter BWROG-94079, "Guidelines for Stability Interim Corrective Action," June 6, 1994.
6. NEDO-32465-A, "BWR Owners' Group Reactor Stability Detect and Suppress Solution Licensing Basis Methodology and reload Application," August 1996.
7. CENPD-400-P, Rev. 01, "Generic Topical Report for the ABB Option III Oscillation Power Range Monitor (OPRM)," May 1995.
8. NRC Letter, B. Boger to R. Pinelli, "Acceptance of Licensing Topical Report CENPD-400-P, 'Generic Topical Report for the ABB Option III Oscillation Power Range Monitor (OPRM)'," August 16, 1995.
9. NEDO-30851-P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," March 1988.
10. NEDC-32989P, "Safety Analysis Report for Clinton Power Station Extended Power Uprate," dated June 2001.
11. Letter from K. P. Donovan (BWR Owners' Group) to U. S. NRC, "Guidelines for Stability Option III 'Enabled Region'," dated September 17, 1996.
12. Letter from U. S. NRC to C. Pardee (AmerGen Energy Company, LLC), "Clinton Power Station (CPS), Unit No. 1 - Issuance of Amendment Re: License Amendment Request to Increase the Interval Between Local Power Range Monitor Calibrations from 1000 Megawatt-Days/Ton (MWD/T) to 2000 MWD/T as Required in CPS Technical Specification Surveillance Requirement 3.3.1.1.8 and 3.3.1.3.2 (TAC No. MD3795)," dated September 12, 2008.

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### B 3.3 INSTRUMENTATION

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

##### BASES

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##### BACKGROUND

The EOC-RPT instrumentation initiates a recirculation pump trip (RPT) to reduce the peak reactor pressure and power resulting from turbine trip or generator load rejection transients to provide additional margin to core thermal MCFR Safety Limits (SLs).

The need for the additional negative reactivity in excess of that normally inserted on a scram reflects end of cycle reactivity considerations. Flux shapes at the end of cycle are such that the control rods may not be able to ensure that thermal limits are maintained by inserting sufficient negative reactivity during the first few feet of rod travel upon a scram caused by Turbine Control Valve (TCV) Fast Closure, Trip Oil Pressure-Low, or Turbine Stop Valve (TSV) Closure. The physical phenomenon involved is that the void reactivity feedback due to a pressurization transient can add positive reactivity at a faster rate than the control rods can add negative reactivity.

The EOC-RPT instrumentation as described in Reference 1 is comprised of sensors that detect initiation of closure of the TSVs, or fast closure of the TCVs, combined with logic circuits, load drivers, and fast acting circuit breakers that interrupt the fast speed power supply to each of the recirculation pump motors. The channels consist of pressure switches and limit switches. When the setpoint is exceeded, the switch closes which then inputs a signal to the EOC-RPT trip logic. Actuation of the EOC-RPT system causes each division of the RPS to energize a trip coil in its associated RPT breaker. When the EOC-RPT breakers trip open, the recirculation pumps coast to stop.

The EOC-RPT system is a two-out-of-four logic for each Function; thus, either two TSV Closure or two TCV Fast Closure, Trip Oil Pressure-Low signals are required to actuate tripping both recirculation pumps from fast speed operation. There are two EOC-RPT breakers in series per recirculation pump. A trip in Division 1 (or 4) will cause a trip of the 'A' recirculation pump. A trip in Division 2 (or 3) will cause a trip of the 'B' recirculation pump. Both EOC-RPT breakers for each recirculation pump trip upon actuation of the EOC-RPT system. Placing an EOC-RPT bypass switch in "bypass" will allow the EOC-RPT trip capability to be maintained, however, an additional single failure cannot be accommodated (refer to Required Action B.1 Bases).

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BASES

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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 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 48 months. The acceptance criterion for the RPT breaker mechanical timing check shall be  $\leq 41$  milliseconds (for trip coil TC2).

EOC-RPT SYSTEM RESPONSE TIME tests are conducted on an 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 24 months on an alternating basis such that both Functions are tested every 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.

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## B 3.7 PLANT SYSTEMS

## B 3.7.3 Control Room Ventilation System

## BASES

## BACKGROUND

The Control Room Ventilation System provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals or smoke.

The safety related function of the Control Room Ventilation System used to control radiation exposure consists of two independent and redundant high efficiency air filtration subsystems for treatment of recirculated air or outside supply air and a CRE boundary that limits the inleakage of unfiltered air. Each subsystem contains a makeup air filter and a recirculation adsorber, a fan, and the associated ductwork, dampers, doors, barriers, and instrumentation. The makeup filter consists of a demister, an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, and a second HEPA filter. The recirculation adsorber consists of a prefilter and an activated charcoal adsorber section. Demisters remove water droplets from the airstream. Prefilters and HEPA filters remove particulate matter that may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay. For filter train test performed in accordance with ASME/ANSI N510-1980 flow rates are measured with respect to design flow. For the Control Room Ventilation System, the design flows are in scfm.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, and may encompass other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The CRE is protected for normal operation, natural events, and accident conditions. The CRE is the combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage assumed in the licensing basis analysis of Design basis accident (DBA) consequences to the CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program

In addition to the safety related standby emergency filtration function, parts of the Control Room Ventilation System are operated to maintain the

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BASES

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BACKGROUND  
(continued)

CRE environment during normal operation. Upon receipt of the initiation signal(s) (indicative of conditions that could result in radiation exposure to CRE occupants), the Control Room Ventilation System automatically switches to the high radiation mode of operation to minimize infiltration of contaminated air into the CRE (outside makeup air is routed through the makeup air filters, the recirculation adsorber is placed in service, and the locker room exhaust is isolated).

The Control Room Ventilation System is designed to maintain a habitable environment in the CRE for a 30 day continuous occupancy after a DBA, without exceeding 5 rem total effective dose equivalent (TEDE). Control Room Ventilation System operation in maintaining the CRE habitability is discussed in the USAR, Sections 6.5.1 and 9.4.1 (Refs. 1 and 2, respectively).

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APPLICABLE  
SAFETY ANALYSES

The ability of the Control Room Ventilation System to maintain the habitability of the CRE is an explicit assumption for the safety analyses presented in the USAR, Chapters 6 and 15 (Refs. 3 and 4, respectively). The high radiation mode of the Control Room Ventilation System is assumed to operate following a DBA. The radiological doses to CRE occupants as a result of the various DBAs are summarized in Reference 4. No single active or passive failure will cause the loss of outside or recirculated air from the CRE.

The Control Room Ventilation System provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref 5). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 6).

The Control Room Ventilation System satisfies Criterion 3 of the NRC Policy Statement.

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BASES (continued)

LCO

Two redundant subsystems of the Control Room Ventilation System are required to be OPERABLE to ensure that at least one is available, if a single active failure disables the other subsystem. Total Control Room Ventilation System failure, such as from a loss of both ventilation subsystems or from an inoperable CRE boundary, could result in exceeding a dose of 5 rem TEDE to the CRE boundary occupants in the event of a DBA.

Each Control Room Ventilation subsystem is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A subsystem is considered OPERABLE when its associated:

- a. Fan is OPERABLE;
- b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions; and
- c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

In order for the Control Room Ventilation subsystems to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequences analysis for DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the CRE boundary to be opened intermittently under administrative controls. This Note only applies to openings in the CRE boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls should be proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

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BASES (continued)

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APPLICABILITY

In MODES 1, 2, and 3, the Control Room Ventilation System must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA, since the DBA could lead to a fission product release.

In MODES 4 and 5, the probability and consequences of a DBA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the Control Room Ventilation System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

- a. During operations with a potential for draining the reactor vessel (OPDRVs);
- b. During CORE ALTERATIONS; and
- c. During movement of irradiated fuel assemblies in the primary or secondary containment.

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ACTIONS

A.1

With one Control Room Ventilation subsystem inoperable for reasons other than an inoperable CRE boundary, the inoperable Control Room Ventilation subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE Control Room Ventilation subsystem is adequate to perform the CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE subsystem could result in loss of Control Room Ventilation System function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

B.1, B.2, and B3

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE), or inadequate protection of CRE occupants from hazardous chemicals and smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating

(continued)

BASES

ACTIONS

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

actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e, actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a DBA during this time period, and the use of mitigating actions. The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability the CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

C.1 and C.2

In MODE 1, 2, or 3, if the inoperable Control Room Ventilation subsystem or CRE boundary cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

BASES

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ACTIONS  
(continued)

D.1, D.2.1, D.2.2, and D.2.3

The Required Actions of Condition D are modified by a Note indicating that LCO 3.0.3 does not apply. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of irradiated fuel assemblies in the primary or secondary containment, during CORE ALTERATIONS, or during OPDRVs, if the inoperable Control Room Ventilation subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE Control Room Ventilation subsystem may be placed in the high radiation mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require the Control Room Ventilation subsystem to be in the high radiation mode of operation. This places the unit in a condition that minimizes the accident risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies 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.

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BASES

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ACTIONS  
(continued)

E.1

If both Control Room Ventilation subsystems are inoperable in MODE 1, 2, or 3 for reasons other than an inoperable CRE boundary (i.e., Condition B), the Control Room Ventilation System may not be capable of performing the intended function and the unit is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

F.1, F.2, and F.3

During movement of irradiated fuel assemblies in the primary or secondary containment, during CORE ALTERATIONS, or during OPDRVs, with two Control Room Ventilation subsystems inoperable or with one or more Control Room Ventilation subsystems inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require treatment of the control room air. This places the unit in a condition that minimizes the accident risk.

If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies 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. 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.

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SURVEILLANCE  
REQUIREMENTS

SR 3.7.3.1 and SR 3.7.3.2

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing each subsystem once every month provides an adequate check on this system. Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. The Makeup Filter System must be operated from the main control room for  $\geq 10$  continuous hours with the heaters energized. The Recirculation Filter System (without heaters) need only be operated for  $\geq 15$  minutes to demonstrate the function of the system. Furthermore, the 31 day Frequency is based on the known reliability of the equipment and the two subsystem redundancy available.

(continued)

BASES

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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. 7, 8).

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 in accordance with Regulatory Guide 1.52 (ref. 9). The Frequencies for performing the Control Room Ventilation System filter tests are also in accordance with Regulatory Guide 1.52 (Ref.9). Specific test frequencies and additional information are discussed in detail in the VFTP.

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, which is based on the refueling cycle. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

(continued)

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BASES

SURVEILLANCE  
REQUIREMENTS  
(continued)

SR 3.7.3.5

This SR verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room envelope Habitability Program.

The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the CRE occupants are protected from hazardous chemicals and smoke. This SR verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed flow rate, Condition B must be entered. Required Action B.3 allows time to restore the CRE boundary to OPERABLE status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, (Ref. 10) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 11). These compensatory measures may also be used as mitigating actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 12). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the CRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the CRE boundary has been restored to OPERABLE status.

(continued)

BASES (continued)

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REFERENCES

1. USAR, Section 6.5.1.
  2. USAR, Section 9.4.1.
  3. USAR, Chapter 6.
  4. USAR, Chapter 15.
  5. USAR, Section 6.4.
  6. USAR, Section 9.5.
  7. Calculation IP-O-0096.
  8. Calculation IP-O-0097.
  9. Regulatory Guide 1.52, Revision 2, March 1978.
  10. Regulatory Guide 1.196.
  11. NEI 99-03, "Control Room Habitability Assessment," June 2001.
  12. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 10, 2004, "NEI Draft White Paper, Use of Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability." (ADAMS Accession No. ML040300694).
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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.3 (continued)

Fuel oil degradation during long term storage shows up as an increase in particulate, mostly due to oxidation. The presence of particulate does not mean that the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment, which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM D6217-98(Ref. 6). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

The Frequency of this Surveillance takes into consideration fuel oil degradation trends indicating that particulate concentration is unlikely to change between Frequency intervals.

With regard to fuel oil property 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 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design provides for multiple start attempts without recharging when pressurized above the low pressure alarm setpoint. The pressure specified in this SR reflects a value at which multiple starts can be accomplished, but is not so high as to result in failing the limit due to normal cycling of the recharge compressor.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

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(continued)

BASES

SURVEILLANCE  
REQUIREMENTS

SR 3.8.3.4 (continued)

With regard to air start 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. 10).

SR 3.8.3.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the storage tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, contaminated fuel oil, and from breakdown of the fuel oil by bacteria.

Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent a failure of this SR provided that accumulated water is removed during performance of the Surveillance.

REFERENCES

1. USAR, Section 9.5.4.
2. Regulatory Guide 1.137.
3. ANSI N195, Appendix B, 1976.
4. USAR, Chapter 6.
5. USAR, Chapter 15.
6. ASTM Standards: D4057-95; D1298-99; D975-06b; D4176-93; D6217-98.
7. Deleted.
8. Calculation IP-0-0120.
9. Calculation IP-0-0121.
10. Calculation IP-0-0122.
11. Calculation IP-C-0111.

BASES

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APPLICABILITY      Inverter requirements for MODES 4 and 5 are covered in the  
(continued)      Bases for LCO 3.8.8, "Inverters—Shutdown."

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ACTIONS            With a required inverter inoperable, its associated  
uninterruptible AC bus is inoperable if not energized.  
LCO 3.8.9 addresses this action; however, pursuant to  
LCO 3.0.6, these actions would not be entered even if the  
uninterruptible AC bus were de-energized. Therefore, the  
ACTIONS are modified by a Note stating that ACTIONS for  
LCO 3.8.9 must be entered immediately. This ensures the  
uninterruptible bus is re-energized within 8 hours.

A.1

Required Action A.1 allows 7 days to restore an inoperable inverter and return it to service. The 7 day limit is a risk-informed Completion Time based on a plant-specific risk analysis performed to establish this Completion Time for the Division 1 and 2 inverters. This risk has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems that such a shutdown might entail. When the uninterruptible AC bus is powered from its constant voltage source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the uninterruptible AC buses is the preferred source for powering instrumentation trip setpoint devices.

An inverter may be removed from service to perform planned preventive maintenance so long as the inverter is restored to operable status within 24 hours (this is an administrative limit). The intent of the 7 day limit is to restore an inoperable inverter following an inverter failure (i.e., to support online corrective maintenance).

With a required inverter inoperable, the following compensatory actions will be taken:

1. Entry into Required Action A.1 will not be planned concurrent with Emergency Diesel Generator (EDG) maintenance on the associated train.
2. Entry into Required Action A.1 will not be planned concurrent with planned maintenance on another RPS or ECCS/RCIC actuation logic channel that could result in that channel being in a tripped condition.

These actions are taken because it is recognized that with an inverter inoperable and the instrument bus being powered by the regulating transformer, instrument power for that train is dependent on power from the associated EDG following a loss of offsite power event.

(continued)

BASES

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ACTIONS

A.1 (continued)

When the Division 1 NSPS inverter is unavailable, the following compensatory actions will be taken.

1. Entry into the extended inverter CT will not be planned concurrent with shutdown service water maintenance.
2. Entry into the extended inverter CT will not be planned concurrent with Division 3 (HPCS) maintenance including the Division 3 battery or charger.
3. Entry into the extended inverter CT will not be planned concurrent with maintenance unavailability of the Division 1 or 2 DC components (i.e., batteries or chargers).
4. Entry into the extended inverter CT will not be planned concurrent with maintenance unavailability of the Division 1 NSPS regulating transformer.

During Modes 1, 2 and 3, should the Division 1 NSPS inverter be removed from service for more than 24 hours, then, within 24 hours of removal from service the following will be performed.

1. Conduct walkdowns in Fire Zones A-2k, A-3d, A-3f, CB-1f, CB-2, CB-3a, CB-4, R-1i (southwest corner of R-S line), R-1p (southwest corner of R-S line), R-1t, and T-1f (south end of R-S line), confirming that there are no unauthorized combustibles or other unusual fire hazards in these areas.
2. Inspect Main Control Room panel 1H13-P870, confirming that there are no unauthorized combustibles or other unusual fire hazards in the cabinet.
3. Ensure that the fire protection sprinklers are available for Fire Zones CB-2, CB-3a and CB-4.
4. Hot work will not be permitted in the above areas during this extended maintenance period.

To minimize the potential for a plant trip, when either a Division 1 or 2 NSPS inverter is unavailable, the following compensatory action will be taken.

1. Entry into the extended inverter CT will not be planned concurrent with planned maintenance on another RPS channel that could result in that channel being in a tripped condition.

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(continued)

BASES

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ACTIONS

A.1 (continued)

In addition to the above, the following evaluations will be performed as part of the CPS risk management program whenever inverter maintenance is required.

1. Evaluate simultaneous switchyard maintenance and reliability.
2. Evaluate concurrent maintenance or inoperable status of any of the remaining three instrument bus inverters for the unit.
3. Evaluate simultaneous EDG maintenance.

B.1

With one or more Division 3 or 4 inverters inoperable, the associated Division 3 ECCS subsystem may be incapable of performing intended function and must be immediately declared inoperable. This also requires entry into applicable Conditions and Required Actions for LCO 3.5.1, "ECCS—Operating."

C.1.1, C.1.2, and C.2

With one RPS solenoid bus inverter inoperable it may be incapable of providing voltage and frequency regulated power sufficient to protect the loads connected to the bus. In this condition, the source of power must be transferred or removed from service. If the RPS bus power is transferred to its alternate source, an additional ACTION is required to periodically monitor the frequency on the bus. This frequency is designed to be limited by the in-line RPS electric power monitoring assembly (required by LCO 3.3.8.2, "RPS Electric Power Monitoring"), however, in the event of a single failure, frequency protection would not be available. Should frequency be discovered < 57 Hz, additional ACTIONS are required in LCO 3.3.8.2 due to the inoperable RPS electric power monitoring assembly.

The 1 hour Completion Time is sufficient for plant personnel to take corrective actions and is acceptable because it minimizes risk while allowing time for restoration, transfer or removal of the RPS bus power supply from service.

(continued)

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BASES

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ACTIONS  
(continued)

D.1

With both RPS solenoid bus inverters inoperable both RPS buses may be incapable of providing voltage and frequency regulated power sufficient to protect the loads connected to the buses. In this condition, the source of power must be transferred or removed from service, however, only one RPS bus is allowed to be powered from an alternate source at any one time. Therefore, at least one RPS solenoid bus must be de-energized. The remaining affected bus will be de-energized or powered from its alternate source in accordance with Condition C.

The 1 hour Completion Time is sufficient for plant personnel to take corrective actions and is acceptable because it minimizes risk while allowing time for restoration or removal of the RPS bus power supply from service.

E.1 and E.2

If the inoperable devices or components cannot be restored to OPERABLE status within the associated 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.

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(continued)

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and uninterruptible AC buses energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the instrumentation connected to the uninterruptible AC buses. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

With regard to voltage and frequency 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).

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REFERENCES

1. USAR, Chapter 8.
  2. USAR, Chapter 6.
  3. USAR, Chapter 15.
  4. Calculation IP-0-0131.
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