Omaha Public Power District
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LIC-15-0076

10 CFR 50.90

September 11, 2015
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Fort Calhoun Station (FCS), Unit 1
Renewed Facility Operating License No. DPR-40
NRC Docket No. 50-285

Subject: License Amendment Request 15-06; Adoption of Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control"

References:
1. Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control"
2. Notice of Availability of the Models for Plant-Specific Adoption of Technical Specifications Task Force Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," Federal Register published May 26, 2010 (75 FR 29588)

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," the Omaha Public Power District (OPPD) is requesting a change to the Technical Specifications (TS) of Renewed Facility Operating License No. DPR-40 for Fort Calhoun Station (FCS), Unit 1. Specifically, the proposed change will revise TS 2.7, "Electrical Systems," to replace the numerical volume requirements for stored diesel fuel oil inventory with requirements that state that volumes equivalent to seven-days and six-days of fuel oil are available. OPPD is requesting to move the diesel fuel oil numerical volumes equivalent to seven-day and six-day supplies to the TS Bases.

Regarding stored diesel fuel oil and lube oil, no changes to the current plant configuration or current 7-day basis are proposed in this application; however, a change is proposed to the 7-day diesel fuel numerical volume requirement to address non-conservative assumptions identified in the fuel calculation methodology. The proposal removes the current numerical volume requirements from the TS and places the corrected value in the TS Bases and moves the associated current 7-day basis from the TS Bases to the TS. No changes to any Surveillance Requirement (SR) Frequency, Required Actions, or Completion Times are proposed in this application.

The proposed changes are generally consistent with TSTF-501, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," (Reference 1) but include plant-specific variances. The availability of this TS improvement was announced in the Federal Register on May 26, 2010 (75 FR 29588) (Reference 2) as part of the consolidated line item improvement process (CLIIP).

In accordance with NRC Administrative Letter (AL) 98-10, administrative controls are currently in place at FCS to address the TS 2.7 non-conservatisms. These non-conservatisms were identified through analyses of TS fuel oil storage requirements considering the impact of several analytical discrepancies that were identified during various internal and external audits. The proposed changes will address these non-conservatisms. Consistent with the guidance in AL 98-10, OPPD is submitting the proposed change as a required license amendment request to resolve a non-conservative TS; consequently, the proposed change is not a voluntary request to change the FCS licensing basis. Therefore, this request is not subject to "forward fit" considerations as discussed in a letter from S. G. Burns (NRC General Counsel) to E. C. Ginsburg (NEI), dated July 14, 2010.

Attachment 1 provides an evaluation supporting the proposed change. Attachment 2 includes the marked-up TS pages with the proposed changes indicated. Attachment 3 includes the marked-up TS Bases pages with the proposed changes indicated. The TS Bases pages are provided for information only, and do not require NRC approval. Attachment 4 contains retyped (clean) TS pages. Attachment 5 contains clean TS Bases pages and Attachment 6 contains a markup of Section 8.4 of the Updated Safety Analysis Report (USAR) describing the fuel oil calculation methodology, which will be processed following approval of the amendment.

No commitments to the NRC are contained in this letter. OPPD requests approval of the proposed change by September 30, 2016, with the amendment being implemented within 60 days of issuance. In accordance with 10 CFR 50.91, a copy of this application and its attachments is being provided to the designated State of Nebraska Official.

The proposed amendment has been reviewed by the FCS Plant Operations Review Committee (PORC) and approved by the Nuclear Safety Review Board (NSRB) in accordance with the requirements of the OPPD Quality Assurance Program.

If you should have any questions, please contact Mr. Bill Hansher at (402) 533-6894.

I declare under penalty of perjury that the foregoing is true and correct. Executed on September 11, 2015.

Respectfully,

Louis P. Cortopassi
Site Vice President and CNO

LPC/EN/mle

Attachment 1: Evaluation of Proposed Change
Attachment 2: Markup of Proposed Technical Specifications Page Changes
Attachment 3: Markup of Proposed Technical Specifications Bases Page Changes
Attachment 4: Clean Technical Specifications Page Changes
Attachment 5: Clean Technical Specification Bases Page Changes
Attachment 6: Markup of USAR Section 8.4, Pages 7 and 8

OPPD's Evaluation of the Proposed Change

License Amendment Request 15-06; Adoption of
Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1,

"Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control"

1.0 DESCRIPTION

This evaluation supports a license amendment request (LAR) to amend Renewed Facility Operating License DPR-40 for Fort Calhoun Station (FCS) Unit No. 1, operated by the Omaha Public Power District (OPPD).

The proposed change revises Technical Specification (TS) 2.7, "Electrical Systems," by removing the current stored diesel fuel and lubricating oil numerical volume requirements and replacing them with a requirement for a 7-day supply for the operation of a single diesel generator. This change is consistent with NRC approved Technical Specifications Task Force (TSTF) Improved Standard Technical Specifications (ISTS) Change Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," (Reference 7.1). The proposed change will also address non-conservatisms in calculations that provide the basis for the existing TS requirement for diesel fuel inventory. Consideration of these non-conservatisms has resulted in diesel fuel inventory requirements that are greater than the values currently stated in TS 2.7.

A change is also proposed for TS 3.2, Table 3-5, surveillance requirements (SR) 9a and 9b for diesel fuel inventory and diesel lubricating oil inventory respectively. Currently these SRs only specify that diesel fuel and diesel lubricating oil inventory must be checked monthly but no numerical limits are specified. The change will state that diesel fuel and lubricating oil inventories must be greater than or equal to a seven-day supply to make the SR consistent with Combustion Engineering Owners Groups (CEOG) Standard Technical Specifications (STS) and TSTF-501.

This LAR is required to correct the non-conservative TS 2.7 requirement for diesel fuel inventory. Administrative controls (Reference 7.2) are currently in place at FCS to address the TS 2.7 non-conservatisms in accordance with NRC Administrative Letter (AL) 98-10. Consistent with the guidance in AL 98-10, OPPD is submitting this change as a required LAR to resolve a non-conservative TS. Consequently, the proposed change is not a voluntary request to change the FCS licensing basis and thus should not be subject to "forward fit" considerations as discussed in the letter from S. G. Burns (NRC General Counsel) to E. C. Ginsburg (Nuclear Energy Institute), dated July 14, 2010 (ADAMS Accession Number ML101960180).

Minor differences between the proposed plant-specific TS changes, and the changes proposed by TSTF-501 are described below. The availability of this TS improvement was announced in the *Federal Register* on May 26, 2010 (75 FR 29588) (Reference 7.3) as part of the consolidated line item improvement process (CLIIP).

2.0 PROPOSED CHANGES

The existing TS 2.7(1)m, Minimum (Operability) Requirement for the diesel fuel storage system, states that the system, comprised of diesel fuel storage tanks FO-1 and FO-10, must contain a minimum volume of 16,000 gallons in FO-1 and 10,000 gallons in FO-10. The minimum required volume of fuel in FO-1 and FO-10 is intended to ensure that adequate fuel is available for the operation of a single diesel generator (DG) for seven

days under the worst case loading conditions corresponding to a design basis accident coincident with a loss of offsite power.

Currently, TS 2.7(3)a, permits the volume of diesel fuel stored in FO-1 and FO-10 to fall below the requirements of TS 2.7(1)m as long as the combined volume of fuel is not less than 23,350 gallons. TS 2.7(3)a also requires that the inventory be restored within 48 hours. The 23,350-gallon limit is intended to ensure that adequate fuel is available for a minimum of six days of operation of a single DG. OPPD proposes a change to remove the numerical fuel oil volume requirements from TS 2.7(1)m and TS 2.7(3)a and substitute an equivalent requirement for seven-days and six-days of fuel. OPPD also proposes a revision to the Bases of TS 2.7 to include the numerical fuel oil volume requirements for the diesel fuel storage system. It should be noted that the fuel storage tank inventory requirements are indicated values so that operators may apply the limits directly using the installed tank instrumentation. Calculations (References 7.10 & 7.11) support the proposed changes and consider instrument error, the possibility of vortexing during fuel transfer, and fuel unavailability due to the location of tank foot valves.

The proposed change also includes a revised value for the required fuel inventory in storage tank FO-10. This is necessary due to a revision to the calculations providing the basis for required and available fuel for seven days of DG operation. Previous revisions of the calculations were determined to contain a number of non-conservatisms including:

- Crediting the manual reduction in DG operating frequency after 24 hours of operation.
- Crediting the load shed of non-safety loads using non-qualified electrical components.
- Failure to account for the operation of non-safety ventilation equipment during DG operation.
- Failure to account for the operation of equipment necessary to transfer fuel from storage tank FO-10 to FO-1.
- Crediting the DG day tank for the non-running DG without a means for transferring fuel to the running DG.
- Failure to account for the possibility that the day tank and the base tank may not contain 100% of the rated tank volume due to vortexing and other factors.

Revision of the calculations to account for these non-conservatisms has resulted in updated required inventories. FO-1 is still required to contain a minimum indicated inventory of 16,000 gallons and FO-10 is now required to contain a minimum indicated inventory of 13,000 gallons in order to ensure seven days of single DG operation. Further, a combined inventory of 25,000 gallons is required to ensure six days of single DG operation. These updated values for minimum diesel fuel inventory are included in the proposed change to the Basis of TS 2.7.

The following table summarizes current and proposed diesel fuel minimum inventory requirements.

Table 1: Minimum On-site Diesel Fuel Inventory Requirements

Seven-Day Minimum Inventory (See Note 1)		**Six-Day Minimum Inventory (See Note 1)**	
Current	**Proposed**	**Current**	**Proposed**
26,000 gallons (16,000 in FO-1 and 10,000 in FO-10)	29,000 gallons (16,000 in FO-1 and 13,000 in FO-10)	23,350 gallons (Specific tank allocation not designated)	25,000 gallons (Specific tank allocation not designated)

Note 1: All values in Table 1 are intended to reflect indicated inventory using installed instrumentation. Instrument uncertainty is addressed in a supporting calculation.

The existing TS 2.7(1)n, Minimum (Operability) Requirements for DG lubricating oil, states that inventory must be ≥ 500 gallons to ensure adequate lubricating oil for seven days of DG operation. Currently, TS 2.7(3)b, permits the available inventory of lubricating oil to fall below 500 gallons as long as it is not less than 450 gallons and the 500 gallon minimum is restored within 48 hours. The 450-gallon requirement is intended to ensure a minimum of six days of single DG operation. The proposed change removes the numerical lubricating oil volume requirements from TS 2.7(1)n and TS 2.7(3)b and replaces them with equivalent seven-day and six-day requirements. OPPD also proposes a revision to the TS 2.7 Basis to include the numerical lubricating oil volume requirements for DG operation.

Currently, TS 3.2, Table 3-5, SRs 9a, and 9b for diesel fuel inventory and lubricating oil inventory respectively only specify a minimum frequency for checking inventory and do not specify numerical limits. The proposed change will state that the minimum inventory for diesel fuel and lubricating oil must be greater than or equal to a seven-day supply. This change is consistent with TSTF-501. The Bases of TS 3.2 is revised to include the numerical fuel oil volume requirements for seven days of DG operation.

Proposed revisions to the TS Bases are included in this application. Adoption of the TS Bases associated with TSTF Traveler-501, Revision 1, is an integral part of implementing this TS amendment. The changes to the affected TS Bases pages will be incorporated in accordance with the TS Bases Control Program. Please note that incorporation of the proposed change to the Bases of TS 3.2 requires the renumbering of pages in TS 3.2.

Proposed Deviation from TSTF-501, Revision 1

OPPD is proposing a deviation from the TS changes described in TSTF-501, Revision 1. The change below described in TSTF-501, Revision 1 is not relevant to FCS because of plant specific differences between the FCS TS and the CEOG STS. Specifically, TSTF-501, Revision 1 includes a change to the CEOG STS Bases to modify the reference to ANSI N195-1976 (Reference 7.4) to note that the standard addresses the methodology for calculating minimum fuel inventory requirements. However, OPPD is not committed to ANSI N195-1976 and thus a similar revision to the Basis of TS 2.7 is not proposed.

Nevertheless, OPPD's method for calculating fuel consumption is generally consistent with one method discussed in the ANSI Standard. In accordance with the April 3, 2014 NRC letter to TSTF members (Reference 7.5), a markup of Section 8.4 of the FCS Updated Safety Analysis Report (USAR) is provided to identify that the calculation methodology is one of the two methods specified in Regulatory Guide (RG) 1.137, Revision 1, "Fuel Oil Systems for Standby Diesel Generators," Regulatory Position C.1.c.

3.0 BACKGROUND

In the original FCS plant design, the diesel fuel storage system included two 18,000-gallon storage tanks, designated FO-1 and FO-10. Storage tank FO-1 was originally intended to be dedicated to the operation of diesel generators DG-1 and DG-2 and storage tank FO-10 was dedicated primarily to the operation of the auxiliary boiler (AS-1). The two storage tanks were installed in physically separate areas of the plant and there were no physical piping connections between FO-1 and FO-10. The design basis of FO-1, as explained in the Safety Evaluation for the original plant license, dated August 9, 1972, (Reference 7.6) was that the tank would contain adequate inventory to support the operation of a single DG, under post-accident loading requirements, for at least seven days. Storage tank FO-10 was not credited for support of FO-1 or the DGs in the original licensing basis.

In October 1988, Licensee Event Report (LER) 88-020 (Reference 7.7) was submitted because of the determination that FO-1 did not contain adequate inventory for seven days of DG operation. After consideration of various options to address this deficiency, a decision was made to credit some of the inventory in FO-10 for support of DG operation for the required seven days. Since no piping existed between FO-1 and FO-10, operator action would be credited for the installation of a hose between the two tanks to allow transfer of fuel from FO-10 to FO-1 using a small motor-driven pump, (i.e., FO-37), which was originally installed to transfer fuel between FO-10 and the diesel driven auxiliary feedwater pump, FW-54. In the event of a failure of FO-37, a backup method of fuel transfer between the two tanks was a manually operated portable pump that required no external power source.

This strategy for using FO-10 inventory to supplement FO-1 and DG operation was approved by Amendment No. 162 (Reference 7.8), which established the use of an actual DG loading profile as a basis for calculating fuel consumption and required 8,000 gallons of fuel in FO-10 to be reserved for DG operation.

In 2002, a change to the calculation that determined the minimum required fuel inventory for seven days of DG operation concluded that the 8,000-gallon FO-10 inventory reserved for DG operation was approximately 35 gallons insufficient due primarily to the consideration of FO-10 fuel consumed by the operation of FW-56, the auxiliary feedwater pump diesel engine. The operation of FW-56 had not previously been considered in the fuel consumption calculations. As a result of this determination, Amendment No. 213 (Reference 7.9) was approved in December 2002 to revise the FO-10 inventory reserved for DG operation from 8,000 gallons to 10,000 gallons. The 10,000-gallon value included approximately 1965 gallons of margin.

In 2008, the DG fuel consumption calculation was again revised to address the use of Ultra Low Sulfur Diesel (ULSD) fuel as discussed in Information Notice 2006-22. The use of ULSD was determined to increase the amount of fuel required due to its lowered volumetric energy content. At FCS, the impact of the lowered energy content of the fuel was determined to cause a 3.38% increase in diesel fuel consumption. Thus, the impact of using low sulfur diesel fuel was to increase the required minimum inventory by approximately 900 gallons. However, a change to the TS minimum required inventory was not necessary at that time due to the previous implementation of Amendment No. 213, which had adequate margin to accommodate the increased fuel consumption from use of ULSD fuel.

In 2014, various internal and external audits identified several non-conservative assumptions made in the calculations used to establish minimum required and minimum available fuel inventories for seven days of diesel generator operation. (The non-conservative assumptions are described in detail in Section 2.0 above.) Revisions to the calculations to address the identified discrepancies determined it was necessary to increase the credited FO-10 inventory needed to supplement FO-1. Current revisions of the calculations indicate that an inventory of 13,000 gallons is needed in FO-10 to support seven days of DG operation. Note that the 13,000 gallon value does contain some margin, (i.e., approximately 850 gallons), to address potential future discrepancies. By crediting 13,000 gallons in FO-10 for DG operation, calculations conclude that a total inventory of 27,592 gallons will be available for supporting DG operation (Reference 7.10). In contrast, the fuel consumption calculation determined that 26,739 gallons will be consumed during the seven-day DG operating time (Reference 7.11).

As the requirements for minimum diesel fuel oil and/or lubricating oil inventory may change in the future, a LAR would be required if the numerical volumes were to remain in the TS. In contrast, the change proposed by this LAR places the requirement to have stored fuel oil and lubricating oil sufficient for seven days of DG operation in the TS with the equivalent numerical volumes under licensee control in the TS Bases. This facilitates future revisions to numerical fuel oil and/or lubricating oil volume requirements by licensees and avoids unnecessary expenditures of licensee and NRC resources to prepare and review LARs that simply revise these figures to be equivalent to a seven-day (or six-day) supply.

4.0 TECHNICAL ANALYSIS

The FCS TS requirements for minimum diesel fuel oil inventory, as described in the Basis of TS 2.7, provide verification that there is an adequate inventory of fuel oil available for seven days of operation of a single DG. Usable volumes in the combined fuel oil storage tanks FO-1 and FO-10, engine base tank and day tank are sufficient to support single DG operation for seven days with a worst-case accident loading profile. This capability, in conjunction with an ability to obtain replacement fuel and lubricating oil supplies within seven days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated Design Basis Accident (DBA) with loss of offsite power. Therefore, the principal safety concern with the volume of stored diesel fuel oil is ensuring that there is a seven-day supply. This proposed change does not alter the

licensing basis of the plant to maintain a seven-day supply; it revises the minimum required fuel inventory in fuel storage tank FO-10 and removes the numerical minimum inventory requirements for FO-1 and FO-10 from TS 2.7 and places them in the Basis of TS 2.7.

The change proposed for TS 3.2, Table 3-5, SRs 9a and 9b clearly specifies that the inventory of diesel fuel and lubricating oil must be greater than or equal to a seven-day supply. This change also makes the SRs more consistent with CEOG STS and TSTF-501.

The FCS methodology for calculating the minimum required fuel inventory makes use of DG loading profiles that are intended to bound the actual worst case loads that would be operating during a DBA throughout the seven-day period. This loading profile would also bound any non-DBA DG loading scenario since engineered safeguard loads that operate during a DBA are not typically operating during loss of offsite power events during which no accident occurs. The use of actual load profiles for calculating DG fuel consumption is consistent with fuel calculation methods described in ANSI Standard N195-1976, "Fuel Oil Systems for Standby Diesel Generators" (Reference 7.4) and the method used in support of Amendment No. 162 (Reference 7.8). The fuel consumption calculation uses DG fuel consumption rates that are based on testing performed to verify data from the DG vendor. The fuel consumption calculation assumes that a single diesel generator operates for seven days but also includes the operation of the redundant DG for the first eight hours since both DGs are expected to automatically start and load in response to any design basis scenario in which offsite power is lost. The eight-hour operating assumption for the second DG gives operators reasonable time to shut down one DG in accordance with Emergency Operating Procedures steps, which are intended to conserve diesel fuel inventory.

It must be noted that the methodology used to calculate diesel fuel consumption deviates slightly from the direction provided in ANSI Standard N195-1976 in regard to the margin included in the fuel consumption calculation. ANSI N195-1976 states that a minimum margin of 10% shall be added to the fuel storage requirements if the calculation uses a method that is based on the time-dependence of diesel generator loads. As stated above, the FCS calculation (Reference 7.11) uses a time dependent load calculation but includes a margin of approximately 3%. Since fuel storage tank FO-10 provides fuel to the auxiliary boiler as well as to the diesel generators (Reference 7.14), some allowance must be made for the possibility that the auxiliary boiler will be operated at some point during the seven-day diesel operating period. If a 10% margin were included in the diesel fuel consumption calculation, there would be very little fuel remaining to operate the auxiliary boiler. The 3% margin was selected as a compromise between the two competing uses of fuel inventory in FO-10. The 3% margin is based on guidance provided in Emergency Plan Implementing Procedure (EPIP)-RR-17A, Technical Support Center (TSC) Logistics Coordinator Actions, which requires emergency staff to arrange for continuous delivery of diesel fuel to the site within 10 hours if the diesel generators are loaded. Expedited ordering and continuous delivery of additional diesel fuel ensures that adequate supplies are on hand to compensate for operation of the auxiliary boiler. EPIP-RR-17A was one of the FCS procedures that the NRC reviewed for Amendment No. 162 and is mentioned in the accompanying Safety Evaluation Report (Reference 7.8).

Since the fuel calculation methodology relies on fuel inventory in fuel storage tank FO-10 to supplement the fuel in storage tank FO-1, it is necessary to consider the impact of increasing the FO-10 inventory dedicated to DG operation from 10,000 gallons to 13,000 gallons. In the analysis supporting Amendment No. 162, which first credited FO-10 for seven days of DG operation, an evaluation of the impact on auxiliary boiler operation time was performed. The evaluation determined that if FO-10 were normally maintained at an inventory of 16,000 gallons as required by administrative controls and 8,000 gallons were dedicated to DG operation, then adequate fuel would be available to supply the auxiliary boiler for 53 hours of operation at maximum boiler fuel consumption rates (Reference 7.14). The evaluation demonstrated that the seven-day DG operating time could be supported. With the proposed change to dedicate 13,000 gallons in FO-10 to DG operation, the auxiliary boiler operating time is reduced to 20 hours at maximum fuel consumption rates. This reduction in auxiliary boiler operating time is concluded to be acceptable due to the fact that the auxiliary boiler is not specifically credited for operation to mitigate design basis events and the fact that additional fuel is normally expected to be available from offsite sources to supplement the operation of the auxiliary boiler.

The requirement for seven days of diesel fuel oil inventory is based on the concept of supporting diesel generator operation for seven days without requiring resupply. To support that goal, a seven-day supply of lubricating oil for the diesel generators must also be available. The lubricating oil volume equivalent to a seven-day supply is based on supporting at least seven days of full load operation for each DG at the diesel generator manufacturer's lube oil consumption values under those conditions. In addition, NRC Information Notice 96-67, "Vulnerability of Emergency Diesel Generators to Fuel Oil/Lubricating Oil Incompatibility," noted that the reduced amount of sulfur in ULSD will result in more unreacted additive in the lubricating oil. This may result in the formation of deposits when some of the oil is burned, which may affect the volume of lube oil required to support seven-day operation. Placing the specific volume of lube oil equivalent to a seven-day supply in the TS Bases subject to licensee control will allow licensees to adjust the required volume without submitting a LAR to the NRC.

The numerical DG fuel oil and lube oil volumes equivalent to a seven-day supply are removed from TS 2.7 and replaced with a requirement that a seven-day supply be available. TS 3.2, Table 3-5, SRs 9a and 9b are revised to clearly specify that the respective inventory of diesel fuel oil and diesel lubricating oil must be greater than or equal to a seven-day supply. The Bases of TS 2.7 and TS 3.2 are changed to specify the numerical DG fuel oil volumes necessary for a seven-day supply. Any changes to the numerical volume will be reviewed under the TS Bases Control Program in accordance with TS 5.20, which allows changes to the Bases subject to appropriate administrative controls and reviews. Future changes to the fuel oil or lubricating oil volume or method of calculation that do not meet the criteria in 10 CFR 50.59(c)(1) will be submitted to the NRC for prior review in accordance with 10 CFR 50.90.

TS 2.7 provides a limited time to continue to operate with available diesel fuel less than the seven-day supply, but greater than a six-day supply. These circumstances may be caused by events such as DG operation required for an inadvertent start while at minimum required level, or feed and bleed operations that may be necessitated by increasing particulate levels or any number of other fuel oil quality degradations. This restriction allows sufficient time to obtain the requisite replacement volume and to

perform the analyses required prior to addition of the fuel oil to the storage tank. The calculation of the volume equivalent to a six-day supply is performed in the same manner as the calculation of the seven-day supply.

Justification for removing the numerical fuel oil and lubricating oil volumes equivalent to a six-day supply and replacing them with a requirement for a six-day supply and making supporting changes to the Bases of TS 2.7 and TS 3.2 is the same as that for replacing the numerical volumes for the seven-day limit described above. The resulting change to the page numbering in TS 3.2 to accommodate the Bases change is administrative in nature.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration Determination

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Omaha Public Power District (OPPD) is requesting a change to the Technical Specifications (TS) of Renewed Facility Operating License No. DPR-40 for Fort Calhoun Station (FCS), Unit 1. Specifically, the proposed change will revise TS 2.7, "Electrical Systems," to replace the numerical volume requirements for stored diesel fuel oil inventory and diesel lubricating oil inventory with a requirement that a seven-day supply be available. The diesel fuel oil and diesel lubricating oil numerical volumes equivalent to a six-day supply, used in the Modification of Minimum Requirements, are replaced with a statement that there is a six-day supply. The diesel fuel oil numerical volumes equivalent to seven-day and six-day supplies are removed from TS 2.7. The change proposed for TS 3.2, Table 3-5, SRs 9a and 9b for inventory of diesel fuel and diesel lubricating oil respectively clarifies that the volumes must be greater than or equal to a seven-day supply. The Basis of TS 2.7 and the Basis of TS 3.2 specify the numerical diesel generator (DG) fuel oil and lubricating oil volumes necessary for a seven-day supply.

The proposed change also includes revised values for the required fuel inventory in onsite diesel fuel storage tanks FO-1 and FO-10. This change is necessary due to a revision to the calculations that provide the basis for required and available fuel for seven days of DG operation. The revision to these calculations was necessary due to a number of non-conservatisms identified in the calculations. As a result, the current TS value for required inventory in onsite fuel storage tanks is not adequate to support DG operation for the required time.

As numerical volume requirements for diesel fuel oil inventory and/or lubricating oil inventory may continue to change in the future, this would otherwise require the submittal of a license amendment request (LAR). The proposed license amendment places the numerical volumes equivalent to seven-day and six-day supplies in the TS Bases subject to licensee control and reduces the burden on licensee and NRC resources to prepare and review such LARs while ensuring that adequate quantities are available.

Due to the calculational non-conservatisms previously discussed, compensatory measures are in place at FCS to ensure that operators maintain diesel fuel volumes

equivalent to a seven-day supply. This maintains the safety function of the DGs during the period of transition to updated TS diesel fuel inventory values by an approved amendment.

As required by 10 CFR 50.91(a), the OPPD analysis of the issue of no significant hazards consideration is presented below:

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

   Response: No

   The proposed change places the numerical volume of diesel fuel oil and lube oil required to support seven-day operation of the onsite DGs, and the numerical volume equivalent to a six-day supply, in the TS Bases under licensee control. The required volumes of fuel oil equivalent to a seven-day and six-day supply is calculated considering the DG manufacturer's fuel oil consumption rates and worst DG loading resulting from a loss of offsite power coincident with a design basis accident. The numerical volume of lube oil equivalent to a seven-day and six-day supply is based on the DG manufacturer's consumption values for the run time of the DG. The requirement to meet Updated Safety Analysis Report (USAR) diesel loading assumptions, maintain a seven-day supply, and the actions taken when the volume of fuel oil available is less than a seven-day or a six-day supply have not changed. These requirements remain consistent with the assumptions in the accident analyses, and neither the probability nor the consequences of any accident previously evaluated will be affected by the proposed change.

   Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No

   The change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The change does not alter assumptions made in the safety analysis but ensures that diesel generator loads operate as assumed in the accident analysis. The proposed change is consistent with the safety analysis assumptions.

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

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

   Response: No

The proposed change places the numerical volume of diesel fuel oil and lubricating oil required to support 7-day operation of an onsite diesel generator, and the numerical volume equivalent to a 6-day supply, in the TS Bases under licensee control. As the basis for the existing limits on diesel fuel oil, and lubricating oil are unchanged, no change is made to the accident analysis assumptions and no margin of safety is reduced as a result of this change.

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

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

5.2 Applicable Regulatory Requirements/Criteria

Fort Calhoun Station was licensed for construction prior to May 21, 1971, and at that time committed to the draft General Design Criteria (GDC) reflected in Appendix G of the FCS USAR (Reference 7.12), which are similar to 10 CFR 50, Appendix A, *General Design Criteria for Nuclear Power Plants*. The draft GDC criteria that govern emergency power sources are 24 and 39 shown below.

- Criterion 24 – Emergency Power for Protection Systems, states: "In the event of loss of all offsite power, sufficient alternate sources of power shall be provided to permit the required functioning of the protection systems." This criterion is met. Emergency power is available from two completely independent diesel generator sets and from the two completely independent 125 VDC systems for essential DC loads. Each unit has sufficient capacity to start sequentially the loads that must be supplied for the engineered safeguards equipment for the hypothetical accident concurrent with the loss of outside power.

- Criterion 39 – Emergency Power for Engineered Safety Features states: "Alternate power systems shall be provided and designed with adequate independency, redundancy, capacity and testability to permit the functioning required of the engineered safety features. As a minimum, the onsite power system and the offsite power system shall each, independently, provide this capacity assuming a failure of a single active component in each power system." Onsite power is provided by two diesel generator sets. Each independent diesel generator set is adequate for supplying the minimum engineered safeguards equipment for the hypothetical accident concurrent with loss of outside power.

The proposed changes were evaluated in consideration of these criteria and the fuel storage requirements of Institute of Electrical and Electronic Engineers (IEEE)-308, referenced in USAR Section 1.6.7, "Onsite Diesel Oil Storage Capacity" (Reference 7.13), to meet the need for seven days of continuous diesel generator operation. The proposed changes were found to be consistent with these requirements.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and would change an inspection or surveillance requirement. However, the proposed change 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 change 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 change.

7.0 REFERENCES

7.1 Technical Specifications Task Force (TSTF) Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," dated February 20, 2009

7.2 OP-ST-SHIFT-0001, "Operations Technical Specification Required Shift Surveillance," Revision 120

7.3 Notice of Availability of the Models for Plant Specific Adoption of Technical Specifications Task Force Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," Federal Register published May 26, 2010 (75 FR 29588)

7.4 ANSI N195-1976, "Fuel Oil Systems for Standby Diesel Generators"

7.5 Letter from NRC (A. J. Mendiola) to Technical Specification Task Force, "Identification and Resolution of Issues Regarding Plant-Specific Adoption of Traveler TSTF-501, Revision 1, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control," dated April 3, 2014 (ML14084A512)

7.6 Safety Evaluation of the Omaha Public Power District Fort Calhoun Station Unit No. 1 Operating License, Docket No. 50-285, Dated August 9, 1972

7.7 Letter from OPPD (K. J. Norris) to NRC (Document Control Desk), "Licensee Event Report 88-020 for the Fort Calhoun Station," dated October 3, 1988 (LIC-88-870)

7.8 Letter from NRC (S. Bloome) to OPPD (T. L. Patterson), "Fort Calhoun Station, Unit No. 1 - Amendment No. 162 to Facility Operating License No. DPR-40 (TAC No. M83960)," dated March 29, 1994 (NRC-94-091)

7.9 Letter from NRC (A. B. Wang) to OPPD (R. T. Ridenoure), "Fort Calhoun Station, Unit No. 1 - Amendment (TAC No. MB6471)," dated December 18, 2002 (NRC-02-184)

7.10 Fort Calhoun Station Calculation FC06871, Revision 3, "Diesel Generator Fuel Inventory"

7.11 Fort Calhoun Station Engineering Analysis EA92-072, Revision 8A, "Diesel Generator Loading Transient Analysis"

7.12 FCS Updated Safety Analysis Report, Appendix G, "Responses to 70 Criteria," Revision 26

7.13 FCS Updated Safety Analysis Report, Section 1.6, "Significant Design Changes Since Award of Construction Permit," Revision 14

7.14 Letter from OPPD (W. G. Gates) to NRC (Document Control Desk), "Application for Amendment of Operating License," dated September 17, 1993 (LIC-93-0093)

Markup of Proposed Technical Specifications Page Changes[1]

[1] Deletions shown in ~~strikeout~~, new text in double underline.

2.0 LIMITING CONDITIONS FOR OPERATION

2.7 Electrical Systems

Applicability

Applies to the availability of electrical power for the operation of plant components.

Objective

To define those conditions of electrical power availability necessary to provide for safe reactor operation and the continuing availability of engineered safety features.

Specifications

(1) Minimum Requirements

The reactor shall not be heated up or maintained at temperatures above 300°F unless the following electrical systems are operable:

a. Unit auxiliary power transformers T1A-1 or T1A-2 (4,160 V).

b. House service transformers T1A-3 and T1A-4 (4,100 V).

c. 4,160 V engineered safety feature buses 1A3 and 1A4.

d. 4,160 V/480 V Transformers T1B-3A, T1B-3B, T1B-3C, T1B-4A, T1B-4B, T1B-4C.

e. 480 V distribution buses 1B3A, 1B3A-4A, 1B4A, 1B3B, 1B3B-4B, 1B4B, 1B3C, 1B3C-4C, 1B4C.

f. MCC No. 3A1, 3A2, 3B1, 3C1, 3C2, 4A1, 4A2, 4B1, 4C1 and 4C2.

g. 125 V d-c buses No. 1 and 2 (Panels EE-8F and EE-8G).

h. 125 V d-c distribution panels AI-41A and AI-41B.

i. 120V a-c instrument buses A, B, C, and D (Panels AI-40-A, B, C and D).

j. Two (2) 125 V d-c bus No. 1 required inverters: (A and C), or (A and associated swing inverter), or (C and associated swing inverter) AND;

Two (2) 125 V d-c bus No. 2 required inverters: (B and D), or (B and associated swing inverter), or (D and associated swing inverter).

k. Station batteries No. 1 and 2 (EE-8A and EE-8B) including one battery charger on each 125 V d-c bus No. 1 and 2 (EE-8F and EE-8G).

l. Two emergency diesel generators (DG-1 and DG-2).

m. One diesel fuel oil storage system containing a ~~minimum volume of 16,000 gallons of diesel fuel in FO-1, and a minimum volume of 10,000 gallons of diesel fuel in FO-10~~volume of diesel fuel which is ≥ a 7-day supply.

n. Lubricating oil inventory for each DG is ≥ ~~500 gallons~~a 7-day supply.

o. Each required starting air receiver bank pressure is ≥ 190 psig.

2.0 LIMITING CONDITIONS FOR OPERATION
2.7 Electrical Systems (Continued)

o. One of the required inverters may be inoperable for up to 24 hours provided the reactor protective and engineered safeguards systems instrument channels supplied by the remaining three required inverters are all operable and the 120V a-c instrument bus associated with the inoperable inverter is powered from its bypass source.

(3) Modification of Minimum Requirements for Diesel Fuel Oil, Diesel Lube Oil, and Starting Air

The minimum requirements may be modified to the extent that any of the following conditions will be allowed after the reactor coolant has been heated above 300°F. However, the reactor shall not be made critical unless all minimum requirements are met.

a. If the inventory of diesel fuel oil in the diesel fuel storage system is less than a 7-day supply, but ~~FO-1 is less than 16,000 gallons and/or FO-10 is less than 10,000 gallons, but the combined inventory in FO-1 and FO-10 is~~ greater than a 6 day supply ~~(23,350 gallons)~~, then restore the required inventory within 48 hours.

b. If one or more diesel generators has lube oil inventory < a 7-day supply ~~500 gallons~~ and > a 6 day supply ~~450 gallons~~, then restore the lube oil inventory to within limits within 48 hours.

c. If the total particulates of fuel oil stored in FO-1 or FO-10 is not within limits, then restore fuel oil total particulates to within limits within 7 days.

d. If the properties of new fuel oil stored in FO-1 or FO-10 is not within limits, then restore stored fuel oil properties to within limits within 30 days.

e. If one or more diesel generators has the required starting air receiver bank with pressure < 190 psig and > 150 psig, then restore starting air receiver bank pressure to > 190 psig within 48 hours.

f. If the Required Action and associated Completion Time of a, b, c, d or e are not met or one or more diesel generators have diesel fuel oil, lube oil, or a required starting air subsystem not within limits for reasons other than a, b, c, d, or e, then declare the associated DG inoperable immediately.

TABLE 3-4

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis	Sample and Analysis Frequency
1. Reactor Coolant		
(a) Power Operation (Operating Mode 1)	(1) Gross Radioactivity (Gamma emitters)	1 per 3 days
	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 14 days
		(ii) 1 per 8 hours[1] whenever the radioactivity exceeds 1.0 ΦCi/gm DOSE EQUIVALENT I-131.
		(iii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) E Determination	1 per 6 months[2]
	(4) Dissolved oxygen and chloride	1 per 3 days
(b) Hot Standby (Operating Mode 2)	(1) Gross Radioactivity (Gamma emitters)	1 per 3 days
Hot Shutdown (Operating Mode 3)	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 8 hours[1] whenever the radioactivity exceeds 1.0 ΦCi/gm DOSE EQUIVALENT I-131.
		(ii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) Dissolved oxygen and chloride	1 per 3 days

TABLE 3-4 (Continued)

MINIMUM FREQUENCIES FOR SAMPLING TESTS

		Type of Measurement and Analysis	Sample and Analysis Frequency
1.	Reactor Coolant (Continued)		
	(c) Cold Shutdown (Operating Mode 4)	(1) Chloride	1 per 3 days
	(d) Refueling Shutdown (Operating Mode 5)	(1) Chloride (2) Boron Concentration	1 per 3 days(3) 1 per 3 days(3)
	(e) Refueling Operation	(1) Chloride (2) Boron Concentration	1 per 3 days(3) 1 per 3 days(3)
2.	SIRW Tank	Boron Concentration	M
3.	Concentrated Boric Acid Tanks	Boron Concentration	W
4.	SI Tanks	Boron Concentration	M
5.	Spent Fuel Pool	Boron Concentration	See Footnote 4 below
6.	Steam Generator Blowdown (Operating Modes 1 and 2)	Isotopic Analysis for Dose Equivalent I-131	W(5)

(1) Until the radioactivity of the reactor coolant is restored to #1 ΦCi/gm DOSE EQUIVALENT I-131.

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

(3) Boron and chloride sampling/analyses are not required when the core has been off-loaded. Reinitiate boron and chloride sampling/analyses prior to reloading fuel into the cavity to assure adequate shutdown margin and allowable chloride levels are met.

(4) Prior to placing unirradiated fuel assemblies in the spent fuel pool or placing fuel assemblies in a spent fuel cask in the spent fuel pool, and weekly when unirradiated fuel assemblies are stored in the spent fuel pool, or every 48 hours when fuel assemblies are in a spent fuel storage cask in the spent fuel pool.

(5) When Steam Generator Dose Equivalent I-131 exceeds 50 percent of the limits in Specification 2.20, the sampling and analysis frequency shall be increased to a minimum of 5 times per week. When Steam Generator Dose Equivalent I-131 exceeds 75 percent of this limit, the sampling and analysis frequency shall be increased to a minimum of once per day.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
1.	Control Element Assemblies	Drop times of all full-length CEA's	Prior to reactor criticality after each removal of the reactor vessel closure head	7.5.3
2.	Control Element Assemblies	Partial movement of all CEA's (Minimum of 6 in)	Q	7
3.	Pressurizer Safety Valves	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be 2485 psig ±1% and 2530 psig ±1% respectively.	In accordance with the In-service Testing Program[1]	7
4.	Main Steam Safety Valves	Set Point	R	4
5.	DELETED			
6.	DELETED			
7.	DELETED			
8a.	Reactor Coolant System Leakage[3]	Evaluate	D[2]	4
8b.	Primary to Secondary Leakage[4]	Continuous process radiation monitors or radiochemical grab sampling	D[2]	4
9a	Diesel Fuel Supply	~~Fuel Inventory~~ Verify diesel fuel inventory ≥ a 7 day supply of fuel.	M	8.4
9b.	Diesel Lubricating Oil Inventory	~~Lube Oil Inventory~~ Verify lubricating oil inventory ≥ a 7 day supply.	M	8.4
9c.	Diesel Fuel Oil Properties	Test Properties	In accordance with the Diesel Fuel Oil Testing Program	8.4
9d.	Required Diesel Generator Air Start Receiver Bank Pressure	Air Pressure	M	8.4

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
9e.	Check for and Remove Accumulated Water from Each Fuel Oil Storage Tank	Check for Water and Remove	Q	8.4
10a.	Charcoal and HEPA Filters for Control Room Air Filteration System (CRAFS)	1. In-Place Testing[5] Charcoal adsorbers and HEPA filter banks shall be leak tested and show ≥99.95% Freon (R-11 or R-112) and cold DOP particulates removal, respectively.	On a refueling frequency or every 720 hours of system operation or after each complete or partial replacement of the charcoal adsorber/HEPA filter banks, or after any major structural maintenance on the system housing or following significant painting, fire or chemical releases in a ventilation zone communicating with the system.	9.10
		2. Laboratory Testing[5] Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 0.175% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Test	Frequency	USAR Section Reference
10a. (continued)	3. Overall System Operation		
	a. Each train shall be operated.	Ten continuous hours every month with heaters operating.	
	b. The pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 9 inches of water at system design flow rate.	R	
	c. Fan shall be shown to operate within ± 10% design flow.	R	
	4. Automatic and manual initiation of each train shall be demonstrated.	R	
10b. Charcoal Adsorbers for Spent Fuel Storage Pool Area	1. In-Place Testing[5] Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	6.2 9.10
	2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10b.	(continued)	3. Overall System Operation a. Operation of each circuit shall be demonstrated.	Ten hours every month.	
		b. Volume flow rate through charcoal filter shall be shown to be between 4500 and 12,000 cfm.	R	
		4. Manual initiation of the system shall be demonstrated.	R	
10c.	Charcoal Adsorbers for S.I. Pump Room	1. In-Place Testing[5] Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in any ventilation zone communicating with the system.	9.10 6.2
		2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or following 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	
		3. Overall System Operation a. Operation of each circuit shall be demonstrated.	Ten hours every month.	
		b. Volume flow rate shall be shown to be between 3000 and 6000 cfm.	R	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10c.	(continued)	4. Automatic and/or manual initiation of the system shall be demonstrated.	R	
11.	Containment Ventilation System Fusible Linked Dampers	1. Demonstrate damper action. 2. Test a spare fusible link.	1 year, 2 years, 5 years, and every 5 years thereafter.	9.10
12.	Diesel Generator Under-Voltage Relays	Calibrate	R	8.4.3
13.	Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321)	Verify the contactor pickup value at ≤85% of 460 V.	R	
14.	Pressurizer Heaters	Verify control circuits operation for post-accident heater use.	R	
15.	Spent Fuel Pool Racks	Test neutron poison samples for dimensional change, weight, neutron attenuation change and specific gravity change.	1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter.	
16.	Reactor Coolant Gas Vent System	1. Verify all manual isolation valves in each vent path are in the open position.	During each refueling outage just prior to plant start-up.	
		2. Cycle each automatic valve in the vent path through at least one complete cycle of full travel from the control room. Verification of valve cycling may be determined by observation of position indicating lights.	R	
		3. Verify flow through the reactor coolant vent system vent paths.	R	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
17.	DELETED			
18.	Shutdown Cooling	1. Verify required shutdown cooling loops are OPERABLE and one shutdown cooling loop is IN OPERATION.	S (when shutdown cooling is required by TS 2.8).	
		2. Verify correct breaker alignment and indicated power is available to the required shutdown cooling pump that is not IN OPERATION.	W (when shutdown cooling is required by TS 2.8).	
19.	Refueling Water Level	Verify refueling water level is ≥ 23 ft. above the top of the reactor vessel flange.	Prior to commencing, and daily during CORE ALTERATIONS and/or REFUELING OPERATIONS inside containment.	
20.	Spent Fuel Pool Level	Verify spent fuel pool water level is ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks.	Prior to commencing, and weekly during REFUELING OPERATIONS in the the spent fuel pool.	
21.	Containment Penetrations	Verify each required containment penetration is in the required status.	Prior to commencing, and weekly during CORE ALTERATIONS and/or REFUELING OPERATIONS in containment.	
22.	Spent Fuel Assembly Storage	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-10.	Prior to storing the fuel assembly in Region 2 (including peripheral cells).	
23.	P-T Limit Curve	Verify RCS Pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified by the P-T limit Figure(s) shown in the PTLR.	This test is only required during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. While these operations are occurring, this test shall be performed every 30 minutes.	
24.	Spent Fuel Cask Loading	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-11.	Prior to placing the fuel assembly in a spent fuel cask in the spent fuel pool.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Test	Frequency	USAR Section Reference
25. River Level	Verify water level is within limits by measurement at least once per 24 hours, when the water level is less than 1004 feet and greater than or equal to 976 feet 9 inches above mean sea levels.	D	9.8
26. HPSI Throttle Valves	Verify, for each HPSI throttle valve listed below, each position stop is in the correct position. HCV-311 HCV-312 HCV-314 HCV-315 HCV-317 HCV-318 HCV-330 HCV-321	R	

[1] The provisions of Technical Specification 3.0.1 and 3.0.5 do not apply.
[2] Whenever the system is at or above operating temperature and pressure.
[3] Not applicable to primary to secondary LEAKAGE.
[4] Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG. This surveillance is not required to be performed until 12 hours after establishment of steady state operation.
[5] Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

Markup of Proposed Technical Specifications Bases Page Changes

TS Bases Pages are Included
for Information Only

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

Equipment served by 4.16 kV and 480 V auxiliary buses and MCC's is arranged so that loss of an entire 4.16 kV bus does not compromise safety of the plant during DBA conditions. For example, if 4.16 kV bus 1A3 is lost, two raw water pumps, one low pressure safety injection pump, two high pressure safety injection pumps, one auxiliary feedwater pump, two component cooling water pumps, one containment spray pump and two containment air fans are lost. This leaves two raw water pumps, one low pressure safety injection pump, one high pressure safety injection pump, one component cooling water pump, one containment spray pumps and two containment air fans which is more than sufficient to control containment pressure below the design value during the DBA.

Each diesel generator has sufficient capacity to start and run at design load required by engineered safety features equipment. The safety features operated from one diesel generator can adequately cool the core for any loss of coolant accident and also maintain the containment pressure within the design value. TS 2.7(2)j limits a single period of inoperability for one diesel generator (DG) to 7 consecutive days and states that the cumulative total time of inoperability for both DGs during any calendar month shall not exceed 7 days. This is to ensure that a DG is not taken out in excess of 7 consecutive days in 2 months (e.g., 7 days at the end of 1 calendar month followed by up to 7 days at the beginning of the next month). The engine base tank capacity of 550 gallons on each diesel provides 3 hours running time (worst case loading) before transfer of fuel oil from the 18,000 gallon capacity emergency diesel generator fuel oil storage tank FO-1 is mandatory. Two fuel oil transfer pumps per diesel, with each being powered from the associated diesel, are available for transferring fuel oil from FO-1 to the day tanks. The minimum diesel fuel oil inventories available to the diesel generators from the emergency diesel generator fuel oil storage tanks FO-1, FO-10, base tanks, and day tanks are maintained to assure there is a 7-day supply of fuel (Ref. 6).

Engineering calculations have determined that 26,739 gallons of diesel fuel will be required to operate both diesel generators for eight hours and a single diesel generator for the remainder of the required 7-day operating period assuming a loss of offsite power coincident with a design basis accident. If diesel fuel storage tanks FO-1 and FO-10 are maintained at a minimum indicated inventory of 16,000 gallons and 13,000 gallons, respectively, the available onsite storage of fuel will provide 7 days of diesel operating time with approximately 850 gallons of margin. In the event that a 7-day supply of diesel fuel is not available, a 6-day supply will be available if the total combined (indicated) inventory in FO-1 and FO-10 is at least 25,000 gallons.

A minimum amount of diesel fuel oil is reserved in the auxiliary boiler fuel oil storage tank FO-10 for transfer to the emergency diesel generator fuel oil storage tank in the event of an emergency to extend the fuel supply for diesel generator operation to 7 days. Methods of transfer of the fuel oil from this tank to FO-1 have been established and procedures have been developed so that the transfer can be made in a timely manner without adversely impacting diesel generator operation.

Therefore, a minimum diesel fuel oil inventory available to the diesel generators from the total on-site diesel fuel oil storage capacity is maintained to assure the operation of one diesel generator at the required post accident loads for 7 days. The fuel inventory is allowed below the 7 day supply, but above a 6 day supply, for a period of 48 hours.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to initiating a plant shutdown as required by Specification 2.7(3). This period is acceptable based on the remaining capacity (more than 6 days), the fact that procedures are in place to obtain replenishment, and the low probability of an event during this brief period.

Additional supplies of diesel fuel oil are available in the Omaha area and from nearby terminals. Ample facilities exist to assure deliveries to the site within 24 hours.

One battery charger on each battery shall be operating so that the batteries will always be at full charge; this ensures that adequate d-c power will be available for all emergency uses. Each battery has one battery charger permanently connected with a third charger capable of being connected to either battery bus. The chargers are each rated for 400 amperes at 130 volts. Following a DBA the batteries and the chargers will handle all required loads. Each of the reactor protective channels instrumentation channels is supplied by one of the safety-related a-c instrument buses. The removal of one of the safety-related a-c instrument buses is permitted as the 2-of-4 logic may be manually changed to a 2-of-3 logic without compromising safety.

The engineered safeguards instrument channels use safety-related a-c instrument buses (one redundant bus for each channel) and d-c buses (one redundant bus for each logic circuit). The removal of one of the safety-related a-c instrument buses is permitted as the two of four logic automatically becomes a two of three logic.

The requirement in Specification 2.7(2)j, to declare required redundant feature(s) inoperable, is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related components.

Redundant required feature failures consist of inoperable features with a component redundant to the component that has an inoperable DG. The steam driven auxiliary feedwater pump FW-10 is required to be considered a redundant required feature to motor driven auxiliary feedwater pump FW-6, and, is therefore, required to be determined OPERABLE, since there are only two safety-related AFW pumps. With FW-10 and DG-1 INOPERABLE, coincident with a single failure of house service transformer T1A-3, would result in a complete loss of a safety function. With FW-6 and DG-2 INOPERABLE, coincident with a single failure of house service transformer T1A-4, would not result in a complete loss of a safety function since FW-10 would still be OPERABLE.

Redundant required features for an inoperable DG do not include components powered from 125 VDC or 120 VAC sources, since a loss of function would not occur with an inoperable DG coincident with a single failure of its associated house service transformer. Radiation Monitors RM-051, RM-052, and RM-062 are required to be considered redundant features since the monitors are contained on a skid assembly which is powered from 480 VAC.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

The time allowed for declaring a redundant required feature(s) inoperable is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This also allows for an exception to the normal beginning for the limiting condition for operation time. In this required action, the time only begins upon discovery that both:

a. An inoperable DG exists and
b. A required feature associated with the other 4160V bus is inoperable.

If at any time during the existence of this Condition (one DG inoperable) a required feature subsequently becomes inoperable, this time begins to be tracked. Discovering one required DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the time for the required action. Four hours from the discovery of these events existing concurrently, is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this modified Condition (one DG inoperable and loss of required component on the opposite DG), the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite electrical distribution system. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, the function has not been lost. The 4-hour allowed time takes into account the operability of the redundant counterpart to the inoperable required feature. Additionally, the 4-hour allowed time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

When a system has installed spare components, the spare component is not required to be OPERABLE to meet required feature operability. As an example, there are three installed 100% capacity high pressure safety injection (HPSI) pumps, one (SI-2B) associated with 4160V bus 1A4, and two (SI-2A and SI-2C) associated with 4160V bus 1A3. Specification 2.3(1) *Minimum Requirements* are that there be one HPSI pump on each associated 4160V bus and each safety injection refueling water tank-containment sump header. This requires that SI-2A OR SI-2C be OPERABLE, not both.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. The onsite storage of 500 gallons in addition to the engine oil sump is sufficient to ensure 7 days of continuous operation. This supply is sufficient supply to allow the operator to replenish lube oil from outside sources. With lube oil inventory < 500 gallons, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain a minimum of 450 gallons, which is at least a 6 day supply. This restriction allows sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. FCS has a Diesel Fuel Oil Testing Program which includes proper fuel oil quality. This program includes purchasing, receipt testing of new fuel oil, and periodic analyses of the stored fuel oil. FCS is not committed to the fuel analysis portion of Regulatory Guide 1.137 (Ref. 4) or ANSI N195-1976 (Ref. 5); however, these standards were utilized as guidance in the development of the Diesel Fuel Oil testing program. The fuel oil properties governed by these Surveillance Requirements are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level. TS 2.7(3)c is entered as a result of a failure to meet the acceptance criterion of Table 3-5, Item 9c. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

With the new fuel oil properties defined in the Bases for Table 3-5, Item 9c not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the DG would still be capable of performing its intended function.

Each DG has two starting air subsystems (primary and secondary), each with adequate capacity for five successive start attempts of the DG without recharging the air start receivers. Either subsystem can fulfill the function of starting the DG, however the requirements of TS 3.7(1)a.i must be met for the required starting air subsystem. With starting air receiver bank pressure < 190 psig, sufficient capacity for five successive DG start attempts does not exist. However, as long as the receiver bank pressure is > 150 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver bank pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

References

(1) USAR, Section 8.3.1.2
(2) USAR, Section 8.4.1
(3) USAR, Section 8.2.2
(4) Regulatory Guide 1.137
(5) ANSI N195-1976
(6) USAR, Section 8.4.1.2

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

The RCS water inventory balance must be performed with the reactor at stable operating conditions (stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and Reactor Coolant Pump (RCP) seal leakoff flows). Therefore, a note is added allowing that this surveillance requirement is not required to be performed until after establishing normal operating temperature and pressure.

Stable operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational leakage determined by water inventory balance, stable operation is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal leakoff flows. The water inventory balance should be performed as soon as practical after stable conditions are met.

During Plant startup, a visual leak check is performed at normal system pressure prior to entering MODE 3. This verification is performed to ensure no RCPB leaks exist.

Table 3-5, Item 9a, ensures that there is an adequate inventory of fuel oil in the storage tanks to operate both diesel generators for eight hours and a single diesel generator for the remainder of the required 7-day operating period. If diesel fuel storage tanks FO-1 and FO-10 are maintained at a minimum indicated inventory of 16,000 gallons and 13,000 gallons respectively, the available onsite capacity will provide 7 days of diesel operating time with approximately 850 gallons of margin.

Table 3-5, Item 9b ensures that sufficient lube oil inventory is available to support at least 7 days of full load operation for each DG. The 500 gallon requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this Surveillance Requirement is the requirement to assure the capability to transfer the lube oil from its storage location to the DG, since the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level. A 31 day Surveillance interval is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.

For Table 3-5, Item 9c, the tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 (Ref. 2),

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

b. Verify in accordance with the tests specified in ASTM D975 (Ref. 2) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89, or an API gravity at 60°F of ≥ 27° and ≤ 39° when tested in accordance with ASTM D287 (Ref. 2), a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point ≥ 125°F, and

c. Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176 or a water and sediment content within limits when tested in accordance with ASTM D2709 (Ref. 2).

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975 (Ref. 3) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 2), except that the analysis for sulfur may be performed in accordance with ASTM D2622 (Ref. 2). The 31-day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations should be determined in accordance with ASTM 6217 (Ref. 2) with the exception that the filters specified in the ASTM method may have a nominal pore size of up to 3 microns. 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. For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately. The Surveillance interval of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Surveillance intervals.

Table 3-5, Item 9d ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. A start cycle is defined as the cranking time required to accelerate the DG to firing speed. The pressure specified in this Surveillance Requirement is intended to reflect the lowest value at which the five starts can be accomplished. The 31-day Surveillance interval 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.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

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 fuel storage tanks once every 92 days per Table 3-5, Item 9e, 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, ground water, rain water, and 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 interval is established to ensure excessive water does not accumulate in the fuel oil system, which meets the intent of Regulatory Guide 1.137 (Ref. 4). This Surveillance Requirement is for preventative maintenance. The presence of water does not necessarily represent failure of this Surveillance Requirement provided the accumulated water is removed during performance of the Surveillance

Table 3-5, Item 8b verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this surveillance requirement is not met, compliance with LCO 3.17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a footnote which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency of daily is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

Table 3-5, Item 25 verifies adequate measurements are taken to ensure that facility protective actions will be taken (and power operation will be terminated) in the event of high and/or low river level conditions. The high river level limit of less than 1004 feet mean sea level is based on the maximum elevation at which facility flood control measures provide protection to safety related equipment (i.e., due to restricted access/egress to the intake structure veranda once the flood barriers are installed prior to river level reaching 1004 feet msl). A continuous watch will be established at 1002 feet mean sea level to provide adequate response time for rising river levels in accordance with the abnormal operating procedure. The river level surveillance requirement specified also ensures sufficient net positive suction head is available for operating the RW pumps.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

The minimum river level of 976 feet 9 inches provides adequate suction to the RW pumps for cooling plant components. The surveillance frequency of "Daily" is a reasonable interval and models guidance provided in NUREG-0212, Revision 2, "Standard Technical Specifications for Combustion Engineering Pressurized Water Reactors," Section 4.7.6. This surveillance requirement verifies that the Missouri River water level is maintained at a level greater than or equal to 976 feet 9 inches mean sea level. A continuous watch is established to monitor the river level when the river level reaches 980 feet mean sea level to assure no sudden loss of water supply occurs.

Table 3-5, Item 26 verifies the proper position of stops on high pressure safety injection system valves. The valves have stops to position them properly so that flow is restricted to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. The refueling frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned transients if the Surveillances were performed with the reactor at power.

References

1) USAR, Section 9.10
2) ASTM D4057, ASTM D975, ASTM D4176, ASTM D2622, ASTM D287, ASTM 6217, ASTM D2709
3) ASTM D975, Table 1
4) Regulatory Guide 1.137
5) EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

Clean Technical Specification Pages

2.0 LIMITING CONDITIONS FOR OPERATION

2.7 Electrical Systems

Applicability

Applies to the availability of electrical power for the operation of plant components.

Objective

To define those conditions of electrical power availability necessary to provide for safe reactor operation and the continuing availability of engineered safety features.

Specifications

(1) Minimum Requirements

The reactor shall not be heated up or maintained at temperatures above 300°F unless the following electrical systems are operable:

a. Unit auxiliary power transformers T1A-1 or T1A-2 (4,160 V).

b. House service transformers T1A-3 and T1A-4 (4,160 V).

c. 4,160 V engineered safety feature buses 1A3 and 1A4.

d. 4,160 V/480 V Transformers T1B-3A, T1B-3B, T1B-3C, T1B-4A, T1B-4B, T1B-4C.

e. 480 V distribution buses 1B3A, 1B3A-4A, 1B4A, 1B3B, 1B3B-4B, 1B4B, 1B3C, 1B3C-4C, 1B4C.

f. MCC No. 3A1, 3A2, 3B1, 3C1, 3C2, 4A1, 4A2, 4B1, 4C1 and 4C2.

g. 125 V d-c buses No. 1 and 2 (Panels EE-8F and EE-8G).

h. 125 V d-c distribution panels AI-41A and AI-41B.

i. 120V a-c instrument buses A, B, C, and D (Panels AI-40-A, B, C and D).

j. Two (2) 125 V d-c bus No. 1 required inverters: (A and C), or (A and associated swing inverter), or (C and associated swing inverter) AND;

Two (2) 125 V d-c bus No. 2 required inverters: (B and D), or (B and associated swing inverter), or (D and associated swing inverter).

k. Station batteries No. 1 and 2 (EE-8A and EE-8B) including one battery charger on each 125 V d-c bus No. 1 and 2 (EE-8F and EE-8G).

l. Two emergency diesel generators (DG-1 and DG-2).

m. One diesel fuel oil storage system containing a volume of diesel fuel which is ≥ a 7-day supply.

n. Lubricating oil inventory for each DG is ≥ a 7-day supply.

o. Each required starting air receiver bank pressure is ≥ 190 psig.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

o. One of the required inverters may be inoperable for up to 24 hours provided the reactor protective and engineered safeguards systems instrument channels supplied by the remaining three required inverters are all operable and the 120V a-c instrument bus associated with the inoperable inverter is powered from its bypass source.

(3) Modification of Minimum Requirements for Diesel Fuel Oil, Diesel Lube Oil, and Starting Air

The minimum requirements may be modified to the extent that any of the following conditions will be allowed after the reactor coolant has been heated above 300°F. However, the reactor shall not be made critical unless all minimum requirements are met.

a. If the inventory of diesel fuel oil in the diesel fuel storage system is less than a 7-day supply, but greater than a 6 day supply, then restore the required inventory within 48 hours.

b. If one or more diesel generators has lube oil inventory < a 7-day supply and > a 6 day supply, then restore the lube oil inventory to within limits within 48 hours.

c. If the total particulates of fuel oil stored in FO-1 or FO-10 is not within limits, then restore fuel oil total particulates to within limits within 7 days.

d. If the properties of new fuel oil stored in FO-1 or FO-10 is not within limits, then restore stored fuel oil properties to within limits within 30 days.

e. If one or more diesel generators has the required starting air receiver bank with pressure < 190 psig and > 150 psig, then restore starting air receiver bank pressure to > 190 psig within 48 hours.

f. If the Required Action and associated Completion Time of a, b, c, d or e are not met or one or more diesel generators have diesel fuel oil, lube oil, or a required starting air subsystem not within limits for reasons other than a, b, c, d, or e, then declare the associated DG inoperable immediately.

TABLE 3-4

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis		Sample and Analysis Frequency
1. Reactor Coolant			
(a) Power Operation (Operating Mode 1)	(1) Gross Radioactivity (Gamma emitters)		1 per 3 days
	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i)	1 per 14 days
		(ii)	1 per 8 hours[1] whenever the radioactivity exceeds 1.0 ΦCi/gm DOSE EQUIVALENT I-131.
		(iii)	1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) E Determination		1 per 6 months[2]
	(4) Dissolved oxygen and chloride		1 per 3 days
(b) Hot Standby (Operating Mode 2)	(1) Gross Radioactivity (Gamma emitters)		1 per 3 days
Hot Shutdown (Operating Mode 3)	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i)	1 per 8 hours[1] whenever the radioactivity exceeds 1.0 ΦCi/gm DOSE EQUIVALENT I-131.
		(ii)	1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) Dissolved oxygen and chloride		1 per 3 days

TABLE 3-4 (Continued)

MINIMUM FREQUENCIES FOR SAMPLING TESTS

		Type of Measurement and Analysis	Sample and Analysis Frequency
1.	Reactor Coolant (Continued)		
	(c) Cold Shutdown (Operating Mode 4)	(1) Chloride	1 per 3 days
	(d) Refueling Shutdown (Operating Mode 5)	(1) Chloride (2) Boron Concentration	1 per 3 days(3) 1 per 3 days(3)
	(e) Refueling Operation	(1) Chloride (2) Boron Concentration	1 per 3 days(3) 1 per 3 days(3)
2.	SIRW Tank	Boron Concentration	M
3.	Concentrated Boric Acid Tanks	Boron Concentration	W
4.	SI Tanks	Boron Concentration	M
5.	Spent Fuel Pool	Boron Concentration	See Footnote 4 below
6.	Steam Generator Blowdown (Operating Modes 1 and 2)	Isotopic Analysis for Dose Equivalent I-131	W(5)

(1) Until the radioactivity of the reactor coolant is restored to #1 ΦCi/gm DOSE EQUIVALENT I-131.

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

(3) Boron and chloride sampling/analyses are not required when the core has been off-loaded. Reinitiate boron and chloride sampling/analyses prior to reloading fuel into the cavity to assure adequate shutdown margin and allowable chloride levels are met.

(4) Prior to placing unirradiated fuel assemblies in the spent fuel pool or placing fuel assemblies in a spent fuel cask in the spent fuel pool, and weekly when unirradiated fuel assemblies are stored in the spent fuel pool, or every 48 hours when fuel assemblies are in a spent fuel storage cask in the spent fuel pool.

(5) When Steam Generator Dose Equivalent I-131 exceeds 50 percent of the limits in Specification 2.20, the sampling and analysis frequency shall be increased to a minimum of 5 times per week. When Steam Generator Dose Equivalent I-131 exceeds 75 percent of this limit, the sampling and analysis frequency shall be increased to a minimum of once per day.

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
1.	Control Element Assemblies	Drop times of all full-length CEA's	Prior to reactor criticality after each removal of the reactor vessel closure head	7.5.3
2.	Control Element Assemblies	Partial movement of all CEA's (Minimum of 6 in)	Q	7
3.	Pressurizer Safety Valves	Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be 2485 psig ±1% and 2530 psig ±1% respectively.	In accordance with the In-service Testing Program[1]	7
4.	Main Steam Safety Valves	Set Point	R	4
5.	DELETED			
6.	DELETED			
7.	DELETED			
8a.	Reactor Coolant System Leakage[3]	Evaluate	D[2]	4
8b.	Primary to Secondary Leakage[4]	Continuous process radiation monitors or radiochemical grab sampling	D[2]	4
9a	Diesel Fuel Supply	Verify diesel fuel inventory ≥ a 7 day supply of fuel.	M	8.4
9b.	Diesel Lubricating Oil	Verify lubricating oil inventory ≥ a 7 day supply.	M	8.4
9c.	Diesel Fuel Oil Properties	Test Properties	In accordance with the Diesel Fuel Oil Testing Program	8.4
9d.	Required Diesel Generator Air Start Receiver Bank Pressure	Air Pressure	M	8.4

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
9e.	Check for and Remove Accumulated Water from Each Fuel Oil Storage Tank	Check for Water and Remove	Q	8.4
10a.	Charcoal and HEPA Filters for Control Room Air Filteration System (CRAFS)	1. In-Place Testing[5] Charcoal adsorbers and HEPA filter banks shall be leak tested and show ≥99.95% Freon (R-11 or R-112) and cold DOP particulates removal, respectively.	On a refueling frequency or every 720 hours of system operation or after each complete or partial replacement of the charcoal adsorber/HEPA filter banks, or after any major structural maintenance on the system housing or following significant painting, fire or chemical releases in a ventilation zone communicating with the system.	9.10
		2. Laboratory Testing[5] Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 0.175% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Test	Frequency	USAR Section Reference
10a. (continued)	3. Overall System Operation		
	a. Each train shall be operated.	Ten continuous hours every month with heaters operating.	
	b. The pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 9 inches of water at system design flow rate.	R	
	c. Fan shall be shown to operate within ± 10% design flow.	R	
	4. Automatic and manual initiation of each train shall be demonstrated.	R	
10b. Charcoal Adsorbers for Spent Fuel Storage Pool Area	1. In-Place Testing[5] Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	6.2 9.10
	2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10b.	(continued)	3. Overall System Operation a. Operation of each circuit shall be demonstrated. b. Volume flow rate through charcoal filter shall be shown to be between 4500 and 12,000 cfm.	Ten hours every month. R	
		4. Manual initiation of the system shall be demonstrated.	R	
10c.	Charcoal Adsorbers for S.I. Pump Room	1. In-Place Testing[5] Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal.	On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in any ventilation zone communicating with the system.	9.10 6.2
		2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%.	On a refueling frequency or following 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system.	
		3. Overall System Operation a. Operation of each circuit shall be demonstrated. b. Volume flow rate shall be shown to be between 3000 and 6000 cfm.	Ten hours every month. R	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
10c.	(continued)	4. Automatic and/or manual initiation of the system shall be demonstrated.	R	
11.	Containment Ventilation System Fusible Linked Dampers	1. Demonstrate damper action.	1 year, 2 years, 5 years, and every 5 years thereafter.	9.10
		2. Test a spare fusible link.		
12.	Diesel Generator Under-Voltage Relays	Calibrate	R	8.4.3
13.	Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321)	Verify the contactor pickup value at ≤85% of 460 V.	R	
14.	Pressurizer Heaters	Verify control circuits operation for post-accident heater use.	R	
15.	Spent Fuel Pool Racks	Test neutron poison samples for dimensional change, weight, neutron attenuation change and specific gravity change.	1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter.	
16.	Reactor Coolant Gas Vent System	1. Verify all manual isolation valves in each vent path are in the open position.	During each refueling outage just prior to plant start-up.	
		2. Cycle each automatic valve in the vent path through at least one complete cycle of full travel from the control room. Verification of valve cycling may be determined by observation of position indicating lights.	R	
		3. Verify flow through the reactor coolant vent system vent paths.	R	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

		Test	Frequency	USAR Section Reference
17.	DELETED			
18.	Shutdown Cooling	1. Verify required shutdown cooling loops are OPERABLE and one shutdown cooling loop is IN OPERATION.	S (when shutdown cooling is required by TS 2.8).	
		2. Verify correct breaker alignment and indicated power is available to the required shutdown cooling pump that is not IN OPERATION.	W (when shutdown cooling is required by TS 2.8).	
19.	Refueling Water Level	Verify refueling water level is ≥ 23 ft. above the top of the reactor vessel flange.	Prior to commencing, and daily during CORE ALTERATIONS and/or REFUELING OPERATIONS inside containment.	
20.	Spent Fuel Pool Level	Verify spent fuel pool water level is ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks.	Prior to commencing, and weekly during REFUELING OPERATIONS in the the spent fuel pool.	
21.	Containment Penetrations	Verify each required containment penetration is in the required status.	Prior to commencing, and weekly during CORE ALTERATIONS and/or REFUELING OPERATIONS in containment.	
22.	Spent Fuel Assembly Storage	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-10.	Prior to storing the fuel assembly in Region 2 (including peripheral cells).	
23.	P-T Limit Curve	Verify RCS Pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified by the P-T limit Figure(s) shown in the PTLR.	This test is only required during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. While these operations are occurring, this test shall be performed every 30 minutes.	
24.	Spent Fuel Cask Loading	Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-11.	Prior to placing the fuel assembly in a spent fuel cask in the spent fuel pool.	

TABLE 3-5
MINIMUM FREQUENCIES FOR EQUIPMENT TESTS

	Test	Frequency	USAR Section Reference
25. River Level	Verify water level is within limits by measurement at least once per 24 hours, when the water level is less than 1004 feet and greater than or equal to 976 feet 9 inches above mean sea levels.	D	9.8
26. HPSI Throttle Valves	Verify, for each HPSI throttle valve listed below, each position stop is in the correct position. HCV-311 HCV-312 HCV-314 HCV-315 HCV-317 HCV-318 HCV-330 HCV-321	R	

[1] The provisions of Technical Specification 3.0.1 and 3.0.5 do not apply.
[2] Whenever the system is at or above operating temperature and pressure.
[3] Not applicable to primary to secondary LEAKAGE.
[4] Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG. This surveillance is not required to be performed until 12 hours after establishment of steady state operation.
[5] Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

Clean Technical Specification Bases Pages

TS Bases Pages are Included
for Information Only

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

Equipment served by 4.16 kV and 480 V auxiliary buses and MCC's is arranged so that loss of an entire 4.16 kV bus does not compromise safety of the plant during DBA conditions. For example, if 4.16 kV bus 1A3 is lost, two raw water pumps, one low pressure safety injection pump, two high pressure safety injection pumps, one auxiliary feedwater pump, two component cooling water pumps, one containment spray pump and two containment air fans are lost. This leaves two raw water pumps, one low pressure safety injection pump, one high pressure safety injection pump, one component cooling water pump, one containment spray pumps and two containment air fans which is more than sufficient to control containment pressure below the design value during the DBA.

Each diesel generator has sufficient capacity to start and run at design load required by engineered safety features equipment. The safety features operated from one diesel generator can adequately cool the core for any loss of coolant accident and also maintain the containment pressure within the design value. TS 2.7(2)j limits a single period of inoperability for one diesel generator (DG) to 7 consecutive days and states that the cumulative total time of inoperability for both DGs during any calendar month shall not exceed 7 days. This is to ensure that a DG is not taken out in excess of 7 consecutive days in 2 months (e.g., 7 days at the end of 1 calendar month followed by up to 7 days at the beginning of the next month). The engine base tank capacity of 550 gallons on each diesel provides 3 hours running time (worst case loading) before transfer of fuel oil from the 18,000 gallon capacity emergency diesel generator fuel oil storage tank FO-1 is mandatory. Two fuel oil transfer pumps per diesel, with each being powered from the associated diesel, are available for transferring fuel oil from FO-1 to the day tanks. The minimum diesel fuel oil inventories available to the diesel generators from the emergency diesel generator fuel oil storage tanks FO-1, FO-10, base tanks, and day tanks are maintained to assure there is a 7-day supply of fuel (Ref. 6).

Engineering calculations have determined that 26,739 gallons of diesel fuel will be required to operate both diesel generators for eight hours and a single diesel generator for the remainder of the required 7-day operating period assuming a loss of offsite power coincident with a design basis accident. If diesel fuel storage tanks FO-1 and FO-10 are maintained at a minimum indicated inventory of 16,000 gallons and 13,000 gallons, respectively, the available onsite storage of fuel will provide 7 days of diesel operating time with approximately 850 gallons of margin. In the event that a 7-day supply of diesel fuel is not available, a 6-day supply will be available if the total combined (indicated) inventory in FO-1 and FO-10 is at least 25,000 gallons.

A minimum amount of diesel fuel oil is reserved in the auxiliary boiler fuel oil storage tank FO-10 for transfer to the emergency diesel generator fuel oil storage tank in the event of an emergency to extend the fuel supply for diesel generator operation to 7 days. Methods of transfer of the fuel oil from this tank to FO-1 have been established and procedures have been developed so that the transfer can be made in a timely manner without adversely impacting diesel generator operation.

Therefore, a minimum diesel fuel oil inventory available to the diesel generators from the total on-site diesel fuel oil storage capacity is maintained to assure the operation of one diesel generator at the required post accident loads for 7 days. The fuel inventory is allowed below the 7 day supply, but above a 6 day supply, for a period of 48 hours.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to initiating a plant shutdown as required by Specification 2.7(3). This period is acceptable based on the remaining capacity (more than 6 days), the fact that procedures are in place to obtain replenishment, and the low probability of an event during this brief period.

Additional supplies of diesel fuel oil are available in the Omaha area and from nearby terminals. Ample facilities exist to assure deliveries to the site within 24 hours.

One battery charger on each battery shall be operating so that the batteries will always be at full charge; this ensures that adequate d-c power will be available for all emergency uses. Each battery has one battery charger permanently connected with a third charger capable of being connected to either battery bus. The chargers are each rated for 400 amperes at 130 volts. Following a DBA the batteries and the chargers will handle all required loads. Each of the reactor protective channels instrumentation channels is supplied by one of the safety-related a-c instrument buses. The removal of one of the safety-related a-c instrument buses is permitted as the 2-of-4 logic may be manually changed to a 2-of-3 logic without compromising safety.

The engineered safeguards instrument channels use safety-related a-c instrument buses (one redundant bus for each channel) and d-c buses (one redundant bus for each logic circuit). The removal of one of the safety-related a-c instrument buses is permitted as the two of four logic automatically becomes a two of three logic.

The requirement in Specification 2.7(2)j, to declare required redundant feature(s) inoperable, is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related components.

Redundant required feature failures consist of inoperable features with a component redundant to the component that has an inoperable DG. The steam driven auxiliary feedwater pump FW-10 is required to be considered a redundant required feature to motor driven auxiliary feedwater pump FW-6, and, is therefore, required to be determined OPERABLE, since there are only two safety-related AFW pumps. With FW-10 and DG-1 INOPERABLE, coincident with a single failure of house service transformer T1A-3, would result in a complete loss of a safety function. With FW-6 and DG-2 INOPERABLE, coincident with a single failure of house service transformer T1A-4, would not result in a complete loss of a safety function since FW-10 would still be OPERABLE.

Redundant required features for an inoperable DG do not include components powered from 125 VDC or 120 VAC sources, since a loss of function would not occur with an inoperable DG coincident with a single failure of its associated house service transformer. Radiation Monitors RM-051, RM-052, and RM-062 are required to be considered redundant features since the monitors are contained on a skid assembly which is powered from 480 VAC.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

The time allowed for declaring a redundant required feature(s) inoperable is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This also allows for an exception to the normal beginning for the limiting condition for operation time. In this required action, the time only begins upon discovery that both:

a. An inoperable DG exists and
b. A required feature associated with the other 4160V bus is inoperable.

If at any time during the existence of this Condition (one DG inoperable) a required feature subsequently becomes inoperable, this time begins to be tracked. Discovering one required DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the time for the required action. Four hours from the discovery of these events existing concurrently, is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this modified Condition (one DG inoperable and loss of required component on the opposite DG), the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite electrical distribution system. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, the function has not been lost. The 4-hour allowed time takes into account the operability of the redundant counterpart to the inoperable required feature. Additionally, the 4-hour allowed time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

When a system has installed spare components, the spare component is not required to be OPERABLE to meet required feature operability. As an example, there are three installed 100% capacity high pressure safety injection (HPSI) pumps, one (SI-2B) associated with 4160V bus 1A4, and two (SI-2A and SI-2C) associated with 4160V bus 1A3. Specification 2.3(1) *Minimum Requirements* are that there be one HPSI pump on each associated 4160V bus and each safety injection refueling water tank-containment sump header. This requires that SI-2A OR SI-2C be OPERABLE, not both.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. The onsite storage of 500 gallons in addition to the engine oil sump is sufficient to ensure 7 days of continuous operation. This supply is sufficient supply to allow the operator to replenish lube oil from outside sources. With lube oil inventory < 500 gallons, sufficient lubricating oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain a minimum of 450 gallons, which is at least a 6 day supply. This restriction allows sufficient time to obtain the requisite replacement volume. A period of 48 hours is considered sufficient to complete restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.7 Electrical Systems (Continued)

Basis (continued)

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. FCS has a Diesel Fuel Oil Testing Program which includes proper fuel oil quality. This program includes purchasing, receipt testing of new fuel oil, and periodic analyses of the stored fuel oil. FCS is not committed to the fuel analysis portion of Regulatory Guide 1.137 (Ref. 4) or ANSI N195-1976 (Ref. 5); however, these standards were utilized as guidance in the development of the Diesel Fuel Oil testing program. The fuel oil properties governed by these Surveillance Requirements are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level. TS 2.7(3)c is entered as a result of a failure to meet the acceptance criterion of Table 3-5, Item 9c. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, resampling, and re-analysis of the DG fuel oil.

With the new fuel oil properties defined in the Bases for Table 3-5, Item 9c not within the required limits, a period of 30 days is allowed for restoring the stored fuel oil properties. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the DG would still be capable of performing its intended function.

Each DG has two starting air subsystems (primary and secondary), each with adequate capacity for five successive start attempts of the DG without recharging the air start receivers. Either subsystem can fulfill the function of starting the DG, however the requirements of TS 3.7(1)a.i must be met for the required starting air subsystem. With starting air receiver bank pressure < 190 psig, sufficient capacity for five successive DG start attempts does not exist. However, as long as the receiver bank pressure is > 150 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver bank pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

References

(1) USAR, Section 8.3.1.2
(2) USAR, Section 8.4.1
(3) USAR, Section 8.2.2
(4) Regulatory Guide 1.137
(5) ANSI N195-1976
(6) USAR, Section 8.4.1.2

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

The RCS water inventory balance must be performed with the reactor at stable operating conditions (stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and Reactor Coolant Pump (RCP) seal leakoff flows). Therefore, a note is added allowing that this surveillance requirement is not required to be performed until after establishing normal operating temperature and pressure.

Stable operation is required to perform a proper water inventory balance since calculations during maneuvering are not useful. For RCS operational leakage determined by water inventory balance, stable operation is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal leakoff flows. The water inventory balance should be performed as soon as practical after stable conditions are met.

During Plant startup, a visual leak check is performed at normal system pressure prior to entering MODE 3. This verification is performed to ensure no RCPB leaks exist.

Table 3-5, Item 9a, ensures that there is an adequate inventory of fuel oil in the storage tanks to operate both diesel generators for eight hours and a single diesel generator for the remainder of the required 7-day operating period. If diesel fuel storage tanks FO-1 and FO-10 are maintained at a minimum indicated inventory of 16,000 gallons and 13,000 gallons respectively, the available onsite capacity will provide 7 days of diesel operating time with approximately 850 gallons of margin.

Table 3-5, Item 9b ensures that sufficient lube oil inventory is available to support at least 7 days of full load operation for each DG. The 500 gallon requirement is based on the DG manufacturer consumption values for the run time of the DG. Implicit in this Surveillance Requirement is the requirement to assure the capability to transfer the lube oil from its storage location to the DG, since the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer recommended minimum level. A 31 day Surveillance interval is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the unit staff.

For Table 3-5, Item 9c, the tests listed below are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 (Ref. 2),

3.0 **SURVEILLANCE REQUIREMENTS**

3.2 Equipment and Sampling Tests (continued)

b. Verify in accordance with the tests specified in ASTM D975 (Ref. 2) that the sample has an absolute specific gravity at 60/60°F of ≥ 0.83 and ≤ 0.89, or an API gravity at 60°F of ≥ 27° and ≤ 39° when tested in accordance with ASTM D287 (Ref. 2), a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point ≥ 125°F, and

c. Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176 or a water and sediment content within limits when tested in accordance with ASTM D2709 (Ref. 2).

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975 (Ref. 3) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 2), except that the analysis for sulfur may be performed in accordance with ASTM D2622 (Ref. 2). The 31-day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations should be determined in accordance with ASTM 6217 (Ref. 2) with the exception that the filters specified in the ASTM method may have a nominal pore size of up to 3 microns. 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. For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately. The Surveillance interval of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Surveillance intervals.

Table 3-5, Item 9d ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. A start cycle is defined as the cranking time required to accelerate the DG to firing speed. The pressure specified in this Surveillance Requirement is intended to reflect the lowest value at which the five starts can be accomplished. The 31-day Surveillance interval 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.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

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 fuel storage tanks once every 92 days per Table 3-5, Item 9e, 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, ground water, rain water, and 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 interval is established to ensure excessive water does not accumulate in the fuel oil system, which meets the intent of Regulatory Guide 1.137 (Ref. 4). This Surveillance Requirement is for preventative maintenance. The presence of water does not necessarily represent failure of this Surveillance Requirement provided the accumulated water is removed during performance of the Surveillance

Table 3-5, Item 8b verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this surveillance requirement is not met, compliance with LCO 3.17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a footnote which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency of daily is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

Table 3-5, Item 25 verifies adequate measurements are taken to ensure that facility protective actions will be taken (and power operation will be terminated) in the event of high and/or low river level conditions. The high river level limit of less than 1004 feet mean sea level is based on the maximum elevation at which facility flood control measures provide protection to safety related equipment (i.e., due to restricted access/egress to the intake structure veranda once the flood barriers are installed prior to river level reaching 1004 feet msl). A continuous watch will be established at 1002 feet mean sea level to provide adequate response time for rising river levels in accordance with the abnormal operating procedure. The river level surveillance requirement specified also ensures sufficient net positive suction head is available for operating the RW pumps.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (continued)

The minimum river level of 976 feet 9 inches provides adequate suction to the RW pumps for cooling plant components. The surveillance frequency of "Daily" is a reasonable interval and models guidance provided in NUREG-0212, Revision 2, "Standard Technical Specifications for Combustion Engineering Pressurized Water Reactors," Section 4.7.6. This surveillance requirement verifies that the Missouri River water level is maintained at a level greater than or equal to 976 feet 9 inches mean sea level. A continuous watch is established to monitor the river level when the river level reaches 980 feet mean sea level to assure no sudden loss of water supply occurs.

Table 3-5, Item 26 verifies the proper position of stops on high pressure safety injection system valves. The valves have stops to position them properly so that flow is restricted to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. The refueling frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned transients if the Surveillances were performed with the reactor at power.

References

1) USAR, Section 9.10
2) ASTM D4057, ASTM D975, ASTM D4176, ASTM D2622, ASTM D287, ASTM 6217, ASTM D2709
3) ASTM D975, Table 1
4) Regulatory Guide 1.137
5) EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

**Markup of USAR Section 8.4,
Pages 7 and 8**

The engines are started with stored pressurized air. Each engine is provided with two completely independent starting air systems. Each engine has a primary starting air system and a secondary starting air system. Each primary starting air system has a motor driven booster compressor and each secondary starting air system has a motor driven booster compressor. The booster compressors draw air from the instrument air system. Each engine is also provided with a single diesel driven, emergency, air compressor that uses ambient air. Each of the three compressors, provided for each engine, is capable of supplying air to the primary starting air system receiver tanks, the secondary starting air system receiver tanks, or both. The receiver tanks of the primary starting air systems are maintained between 200 and 240 psig. The primary starting air system on each engine has the capacity, when fully charged, for five engine starts. The secondary starting air system on each engine also has the capacity, when fully charged for five engine starts. The compressors are not required for engine starting; the receivers are required.

Fuel for both diesels is supplied from a common 18,000 gallon underground storage tank, FO-1, by a separate supply line to each diesel. The required inventory for this tank is 16,000 gallons.

A minimum of ~~10,000~~ 13,000 gallons of diesel fuel oil is available from the auxiliary boiler underground storage tank, FO-10, for transfer to the diesel generator storage tank to permit operation of a diesel generator for 7 days in the event of an emergency. Fuel oil transfer pump, FO-37, normally serving FW-54, the Diesel engine-driven auxiliary feedwater pump, can be used, with temporary hoses, to transfer fuel between FO-10 and FO-1. An alternate manual method is also available.

The minimum required inventories for storage tanks FO-1 and FO-10 are expressed as indicated values so that operators may apply them directly to installed diesel inventory instrumentation without concern about the impact of instrument error. Factors which adversely impact the availability of diesel fuel in the storage tanks, such as instrument error, elevation of storage tank suction valves and potential vortexing around the suction valves, are conservatively addressed in applicable engineering calculations.

The specific Emergency Diesel Generator (EDG) fuel oil volumes contained in the diesel fuel oil storage tanks FO-1 and FO-10 necessary to ensure that EDG run-duration requirements are calculated using Section 5.4 of American National Standards (ANSI) N195-1976, "Fuel Oil Systems for Standby Diesel-Generators." The required volume in FO-1 and FO-10 is based on consideration of the time dependence of diesel generator loads including operation of engineered safety features.

This fuel oil calculation methodology is one of the two approved methods specified in Regulatory Position 1.c of Regulatory Guide 1.137, Revision 1, "Fuel Oil Systems for Standby Diesel Generators." One exception to the fuel oil margin requirement of ANSI N195-1976 is taken. The ANSI standard requires that the fuel calculation include a 10% margin if a time dependent load is used to determine fuel consumption.

However, the actual margin is calculated to be approximately 3% to ensure that storage tank FO-10 contains a minimal amount of fuel allocated for the operation of the auxiliary boiler.