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August 17, 2009
GO2-09-114

10 CFR 50.90

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

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397
LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL
SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL
STORAGE AND TESTING**

References: 1) TSTF-501, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control"
2) TSTF-374, "Revision to TS 5.5.13 and associated TS Bases for Diesel Fuel Oil"

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Energy Northwest hereby requests an amendment to the Columbia Generating Station (Columbia) Technical Specifications (TS). Energy Northwest has reviewed the proposed amendment in accordance with 10 CFR 50.92 and concludes it does not involve a significant hazards consideration.

The proposed amendment would modify the following TS:

- TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air" – The proposed changes would relocate specific values for fuel oil and lube oil storage volumes from the TS to the TS Bases consistent with the approach specified by Reference 1, which is currently under review by the Nuclear Regulatory Commission (NRC).
- TS 3.8.1, "AC Sources – Operating" – This proposed change would relocate the specific value for day tank fuel oil volume from the TS to the TS Bases.
- TS 5.5.9, "Diesel Fuel Oil Testing Program" – This proposed change would relocate the specific standard for particulate concentration testing of diesel fuel oil from the TS to the TS Bases consistent with Reference 2.

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Energy Northwest is requesting the proposed amendment in order to:

- 1) take advantage of industry initiatives (via incorporation of the References);
- 2) place Columbia in a better position to address future potential challenges to fuel oil quality and storage requirements, such as is anticipated with the transition to Ultra-Low-Sulfur Diesel fuel; and
- 3) correct a non-conservative TS in the required volume of diesel fuel oil to support seven days of continuous operation for the Division 2 emergency diesel generator (DG). A more restrictive value for the required seven day volume of diesel fuel oil will be incorporated into the TS Bases.

The precedent for implementing Reference 2 was established by the NRC with the Notice of Availability published on April 21, 2006 (71 FR 20735). Implementing the approach specified by Reference 1 was approved by the NRC for Vermont Yankee Nuclear Power Station on April 17, 2008.

The enclosure provides a description and evaluation of the proposed TS changes. Attachments to the enclosure include the TS page markups, the retyped TS pages, and the TS Bases page markups.

To support the timely transition to Ultra-Low-Sulfur Diesel Fuel, Energy Northwest requests approval of the proposed amendment by May 31, 2010. The amendment will be implemented within 90 days of approval.

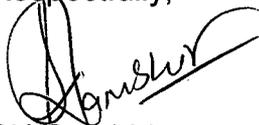
There are no new regulatory commitments made in this letter.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated Washington State Official.

Should you have any questions or require additional information regarding this matter, please contact Mr. MC Humphreys, Licensing Supervisor, at (509) 377-4025.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the date of this letter.

Respectfully,



SK Gambhir
Vice President, Technical Services

Enclosure: Description and Evaluation of the Proposed TS Changes

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Attachments to the Enclosure:

1. Technical Specification Page Markups
2. Retyped Technical Specification Pages
3. Bases Page Markups (for information only)

cc: EE Collins, Jr. – NRC RIV
NJ DiFrancesco – NRC NRR
NRC Senior Resident Inspector/988C
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
JO Luce – EFSEC
RR Cowley - WDOH

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Description and Evaluation of the Proposed TS Changes

Subject: Application for Amendment to Technical Specifications Regarding:

- 1) Diesel Fuel Oil, Lube Oil, and Starting Air consistent with TSTF-501
- 2) AC Sources - Operating
- 3) Diesel Fuel Oil Testing Program consistent with TSTF-374

1. SUMMARY DESCRIPTION

2. DETAILED DESCRIPTION

- 2.1 TS 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air
- 2.2 TS 3.8.1 – AC Sources - Operating
- 2.3 TS 5.5.9 Diesel Fuel Oil Testing Program

3. TECHNICAL EVALUATION

- 3.1 TS 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air
- 3.2 TS 3.8.1 – AC Sources - Operating
- 3.3 TS 5.5.9 Diesel Fuel Oil Testing Program

4. REGULATORY EVALUATION

- 4.1. Applicable Regulatory Requirements/Criteria
- 4.2. Precedent
- 4.3. Significant Hazards Consideration
- 4.4. Conclusions

5. ENVIRONMENTAL ASSESSMENT

6. REFERENCES

ATTACHMENTS:

1. Technical Specification Page Markups
2. Retyped Technical Specification Pages
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1. SUMMARY DESCRIPTION

This evaluation supports a request to revise the Operating License NPF-21 for Columbia Generating Station (Columbia).

This amendment request proposes the following Technical Specification (TS) changes:

- TS 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air" – The proposed changes would relocate specific values for fuel oil and lube oil storage volumes from the TS to the TS Bases consistent with the approach specified by Reference 1, which is currently under review by the Nuclear Regulatory Commission (NRC).
- TS 3.8.1, "AC Sources – Operating" – This proposed change would relocate the specific value for day tank fuel oil volume from the TS to the TS Bases.
- TS 5.5.9, "Diesel Fuel Oil Testing Program" – This proposed change would relocate the specific standard for particulate concentration testing of diesel fuel oil from the TS to the TS Bases consistent with Reference 2.

Included with the evaluation of the proposed changes for TS 3.8.3 are the Energy Northwest responses to the two NRC Request(s) for Additional Information related to Technical Specification Task Force (TSTF) Traveler TSTF-501 (References 7 and 9). The proposed revision to the Limiting Condition for Operation (LCO) 3.8.3 replaces the specific fuel oil and lube oil storage volumes with a requirement to maintain greater than or equal to a 7 day supply for both the diesel fuel oil and lube oil while retaining the specific subsystem volumes needed to meet the seven day requirement in the TS Bases. The proposed changes to the TS Bases for LCO 3.8.3 will also address a non-conservative TS value for the Division 2 emergency diesel generator (DG) by imposing a more restrictive value for the required volume of diesel fuel oil to support seven days of continuous operation.

Energy Northwest is also proposing a revision to TS 3.8.1, "AC Sources – Operating," following a similar approach to the TS 3.8.3 changes discussed above. The proposed revision to SR 3.8.1.4 replaces the specific day tank volume with the requirement that the day tank maintain greater than one hour of fuel oil. The specific volume needed to support this requirement would be relocated to the TS Bases.

The proposed changes would also revise TS 5.5.9, "Diesel Fuel Oil Testing Program," to be consistent with the changes implemented to the Standard Technical Specifications (STS) via TSTF-374 (Reference 2) by relocating references to specific American Society for Testing and Materials (ASTM) standards for fuel oil testing to the TS Bases.

These changes would address a non-conforming condition and also place Energy Northwest in a better position to efficiently revise the requirements contained in the TS Bases as needed to address updates to regulations and standards governing DG fuel oil quality. It is expected that the transition to Ultra-Low-Sulfur Diesel Fuel, which is

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required by the Environmental Protection Agency (EPA) to occur by June 1, 2010, may be one of the challenges to the storage requirements needed to support the requisite DG mission times. The requested approval date would support the timely transition to Ultra-Low-Sulfur Diesel Fuel at Columbia.

2. DETAILED DESCRIPTION

2.1 TS 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.3 changes related to fuel oil storage

Current LCO 3.8.3 Condition A states:

One or more DGs with stored fuel oil level:

1. For DG-1 or DG-2, < 55,500 gal and \geq 47,520 gal; and
2. For DG-3, < 33,000 gal and \geq 28,340 gal.

The proposed change would revise LCO 3.8.3 Condition A to state, "One or more DGs with fuel oil level less than a 7 day supply and greater than a 6 day supply." The Bases of Required Action A.1 would be revised to state:

In this Condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. For the purposes of this LCO, the fuel oil storage subsystem includes the storage tank and the available volume in the day tank (see Bases for SR 3.8.1.4) for each respective DG. Table B 3.8.3-1 specifies the fuel oil storage subsystem equivalents for a 7 day and 6 day supply.

The approach specified with this proposed change is different from TSTF-501 in that the TSTF only addresses the diesel storage tank volume whereas the Columbia design utilizes both the diesel storage tank as well as the excess volume available in the day tank to support the 7 day fuel oil supply. Where the TSTF specifies "tank" when referencing the diesel storage tank, the Columbia proposal specifies "storage subsystem" to signify both the diesel storage tank and the available volume in the associated day tank.

Current Surveillance Requirement (SR) 3.8.3.1 states:

Verify each fuel oil storage tank contains:

- a. \geq 55,500 gal of fuel for DG-1 and DG-2; and
- b. \geq 33,000 gal of fuel for DG-3.

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The proposed change would revise SR 3.8.3.1 to state, "Verify each fuel oil storage subsystem contains \geq a 7 day supply of fuel."

The TS Bases of SR 3.8.3.1 would be revised to reflect the following:

This SR provides verification that there is an adequate inventory of fuel oil in the storage subsystem to support each DG's operation for 7 days at full load. The fuel oil storage subsystem for each DG consists of the respective fuel storage tank and the volume in the day tank that is in excess of one hour at full load plus 10 percent (see Bases for SR 3.8.1.4). Table B 3.8.3-1 specifies the fuel oil level equivalent to a 7 day supply for each storage subsystem when calculated in accordance with References 2 and 3. The required fuel storage volume is determined using the most limiting energy content of the stored fuel. Using the known correlation of diesel fuel oil absolute specific gravity or API gravity to energy content, the required diesel generator output, and the corresponding fuel consumption rate, the onsite fuel storage volume required for 7 days of operation can be determined. SR 3.8.3.3 requires new fuel to be tested in accordance with ASTM D975-08 (Ref. 7) to verify that the new fuel absolute specific gravity or API gravity is within the range assumed in the diesel fuel oil consumption calculations.

The changes proposed in this section (LCO 3.8.3 related to fuel oil) would address the non-conservative TS value for the Division 2 DG by imposing a more restrictive value in the TS Bases for the required volume of diesel fuel oil to support seven days of continuous operation. Applying the same calculation, Reference 11, to the Division 1 and 3 storage requirements to support 7 days of operation yields less restrictive results than that imposed by the current TS. The proposed change would alter all DG storage requirements to reflect the minimum acceptable values determined by calculation and are listed in TS Bases Table B 3.8.3-1 as specified above.

LCO 3.8.3 changes related to lube oil storage

Current LCO 3.8.3 Condition B states:

One or more DGs with lube oil inventory:

1. For DG-1 or DG-2, < 330 gal and ≥ 283 gal; and
2. For DG-3, < 165 gal and ≥ 142 gal.

The proposed change would revise Condition B to state, "One or more DGs with lube oil inventory less than a 7 day supply and greater than a 6 day supply." The TS Bases of Required Action B.1 would be revised to state:

In this Condition, the 7 day lube oil inventory, i.e. the combined inventory of the DG lube oil sump and lube oil stored in the warehouse to support 7 days of continuous DG operation at full load conditions, is not available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. The

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lube oil equivalent to a 7 day supply is 330 gallons for Division 1 or 2 DG, and 165 gallons for the Division 3 DG. The lube oil inventory equivalent to a 6 day supply is 283 gallons for Division 1 or 2 DG, and 142 gallons for Division 3 DG.

Current SR 3.8.3.2 states:

Verify lube oil inventory is:

- a. \geq 330 gal for DG-1 and DG-2; and
- b. \geq 165 gal for DG-3.

The proposed change would revise SR 3.8.3.2 to state, "Verify lube oil inventory is \geq a 7 day supply." The TS Bases of SR 3.8.3.2 would be revised to add a sentence which states:

The lube oil level equivalent to a 7 day supply is 330 gallons for Division 1 or 2 DG, and 165 gallons for Division 3 DG.

In summary, the changes proposed above for LCO 3.8.3, will place Energy Northwest in a better position to efficiently revise the requirements contained in the TS Bases as changes may be needed to address updates to regulations and standards governing DG fuel oil quality.

2.2 TS 3.8.1 – AC Sources - Operating

Current SR 3.8.1.4 states "Verify each required day tank contains \geq 1400 gal of fuel oil." The proposed revision would change SR 3.8.1.4 to state "Verify each required day tank contains fuel oil to support greater than or equal to one hour of operation at full load plus 10%."

The current TS Bases for 3.8.1.4 states, "The level...is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%," and "The amount above the minimum 1 hour requirement helps to support the 7 day fuel oil supply."

The TS Bases for SR 3.8.1.4 would be clarified and revised as follows:

This SR ensures that the volume of fuel oil in the day tank provides for DG operation for a minimum of one hour at full load plus 10%. The minimum amount of fuel oil required to satisfy one hour at 110% correlates to 390 gallons for the Division 1 DG, 397 gallons for the Division 2 DG, and 231 gallons for the Division 3 DG. The day tank low level alarm is set at 1400 gallons for all three DGs, which is higher than the above specified minimum required values. The volume of fuel that constitutes the differential from the alarm set point and the one hour at 110% discussed above is utilized to support the 7 day and 6 day fuel oil storage requirements (see Bases for SR 3.8.3.1). For DGs 1 and 2, 1400 gallons supports approximately 3.5 hours of

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operation at 110% of the continuous rated load. For DG-3, 1400 gallons supports approximately 7 hours of operation at continuous rated load.

The proposed change to SR 3.8.1.4 and the associated TS Bases would not change the current licensing basis for Columbia. The changes proposed to SR 3.8.1.4 represent an administrative change in the presentation of the licensing basis and follow the same approach and logic for implementation as discussed in Section 2.1.

2.3 TS 5.5.9 Diesel Fuel Oil Testing Program

Current TS 5.5.9.c states, "Total particulate concentration of the fuel oil in the storage tanks is ≤ 10 mg/l when tested every 31 days in accordance with ASTM D-2276, Method A-2 or A-3."

The proposed change would revise TS 5.5.9.c to be consistent with the approved TSTF-374 change to state, "Total particulate concentration of the fuel oil is ≤ 10 mg/l when tested every 31 days."

It should be noted that one of TSTF-374 recommendations involving testing for water and sediment is already incorporated into Columbia's TS. TS 5.5.9.a.3 is consistent with the TSTF-374 recommendation regarding testing of water and sediment.

The following proposed changes to TS Bases SR 3.8.3.3 that are consistent with the recommendations of TSTF-374 include:

- Updates to the versions of the ASTM standards employed, or proposed to be employed (i.e., newer versions), at Columbia as delineated by the brackets [] in the TSTF;
- The addition of ASTM D1298 which will be used to test for API Gravity;
- ASTM D5452 will replace ASTM D2276 as the standard for determination of particulate concentrations; and
- The addition of sulfur testing standard ASTM D4294.
- TSTF-374 added ASTM D2709 as the standard for testing water and sediment content consistent with the proposed addition of this test to the TS. As discussed above, Columbia's TS already included this required testing, but was testing to the ASTM D1796 standard. Columbia is proposing to align with the recommendation of the TSTF by replacing ASTM D1796 with ASTM D2709.

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The proposed changes to Columbia's TS Bases 3.8.3 section also include the following deviations to TSTF-374:

- As discussed above, the TSTF modifies a portion of SR 3.8.3.3.b. A requirement of SR 3.8.3.3.b that the TSTF does not modify includes the range for allowed API Gravity at 60°F as being ≥ 27 degrees and ≤ 39 degrees. Based on current fuel oil volume calculations, Columbia has restricted the upper limit of allowed API gravity to 38 degrees, which is more conservative than the allowed value listed in the TSTF/STS.
- Columbia proposes to add standards ASTM D3120 and ASTM D5453 to provide for additional referee test methods or alternative methods for sulfur testing as recognized in ASTM D975 (Ref. 7). These ASTMs were not discussed in the TSTF.
- A correction to the TS Bases Background to more accurately reflect that the original guidance provided in Regulatory Guide (RG) 1.137 and ANSI N195 have since been modified with regards to fuel oil practices via the existent TS Actions and Surveillance Requirements. This issue was not addressed in the TSTF.

The changes to TS 5.5.9 are consistent with NRC approved TSTF-374 (Reference 2). The availability of this TS improvement was published in the *Federal Register* on February 22, 2006 as part of the consolidated line item improvement process (CLIP). The background for this application is adequately addressed by the NRC Notice of Availability published on April 21, 2006 (71 FR 20735) and the Notice of Opportunity to Comment published February 22, 2006 (71 FR 9179). Energy Northwest is not proposing any other variations or deviations from the changes described in TSTF-374 or the NRC staff's model safety evaluation dated February 22, 2006.

Incorporation of TSTF-374 recommended changes will better align Columbia's TS with the STS and also support the transition to Ultra-Low-Sulfur Diesel (ULSD) fuel.

3. TECHNICAL EVALUATION

3.1 TS 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

As identified in NRC Information Notice 2006-22 (Reference 10), the U.S. Environmental Protection Agency (EPA) finalized the Clean Diesel Trucks and Buses Rule and the Clean Nonroad Diesel Rule, respectively, with more stringent standards for new diesel engines and fuels. The EPA rules require a reduction in the sulfur content of highway diesel fuel from its current level of 500 parts per million (ppm) (low sulfur diesel, or LSD) to 15 ppm (Ultra Low Sulfur Diesel, ULSD). Refiners were required to start producing the cleaner-burning diesel fuel ULSD, for use in highway vehicles beginning June 1, 2006.

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The EPA requires sulfur reductions for land-based non-road diesel fuel to be accomplished in two steps, with an interim step from currently uncontrolled levels to a 500 ppm cap starting in June 2007 and the final step to 15 ppm in June 2010. Although the EPA requirements for the 15 ppm ULSD do not take effect until 2010 for non-road diesel fuel, several nuclear power plant licensees have received shipments of ULSD. The California Air Resources Board regulations required that all California users of diesel fuel oil transition to ULSD oil by June 1, 2006.

In reviewing the design calculation establishing the basis for fuel oil storage volume, Energy Northwest determined that when LSD limits are considered the current subsystem volumes specified in TS 3.8.3 and credited from TS 3.8.1 are non-conservative for Division 2 DG in regards to meeting the 7 day storage requirement. With RG 1.137 (Reference 3) the NRC endorsed ANS N195-1976 (Reference 4) as providing an acceptable method for calculating diesel fuel oil storage requirements. Reference 4 specifies that the required fuel oil storage volume for each diesel system support 7 days of operation at full power plus an explicit allowance for fuel consumption by periodic testing. ANSI/ANS-59.51-1997 (Reference 5), an updated version of Reference 4, contains the same storage calculation requirements and further specifies that the calculation will use a fuel consumption rate that is based on the minimum quality of fuel oil that is acceptable. For Columbia, standard periodic testing during the required surveillance frequency period of 31 days is mandated by SR 3.8.1.3 which requires that all three DGs be tested for a minimum of one hour at a load approximately equivalent to that corresponding to a continuous rating. The TS Bases for SR 3.8.1.4 further elaborates that the day tank storage volume requirements ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. Hence, the required fuel oil storage requirement for each DG subsystem is 7 days at full load plus one hour at 110% of full load.

Following the calculation method outlined in Reference 4, utilizing actual consumption rates determined by testing, and the minimum quality of fuel oil acceptable at Columbia, the volume of fuel oil required to support the above specified mission time for Division 2 DG is 484 gallons more than the combined volume currently required by SRs 3.8.1.4 and 3.8.3.1. The same calculation process confirmed that Division 1 and 3 DGs remain bounded by the current TS required storage volumes. Consistent with Administrative Letter 98-10, Columbia has implemented administrative controls to ensure the higher volume of fuel oil is maintained in the Division 2 DG subsystem.

By letter to the Technical Specification Task Force dated December 13, 2007 (Reference 7), the NRC requested additional information related to TSTF-501. Specifically, the NRC asked the industry to:

- 1) [d]iscuss what effects a mixture of ULSD and LSD fuel in the storage tank will have on the fuel consumption rate, in order to ensure that a [7] day supply is maintained, as required by the TS per Criterion 3 of 10 CFR 50.36(d)(2)(ii);

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- 2) [d]iscuss how storage tank sampling will be performed (including acceptance criteria), in order to verify that any assumptions used in the fuel consumption rate calculation are valid, thereby ensuring that a [7] day supply is maintained, as required by the TS per Criterion 3 of 10 CFR 50.36(d)(2)(ii); and,
- 3) [d]iscuss the effects of deleting the reference to Appendix B in ANSI N195-1976 on the current acceptable basis for maintaining the quality of fuel oil, as required in the TS per Criterion 3 of 10 CFR 50.36(d)(2)(ii).

The industry responded to the NRC questions on TSTF-501 in a letter dated March 6, 2008 (Reference 8). The industry response to question 1) above describes the correlation for using API Gravity to determine the energy content (heating value) of the fuel. Columbia follows the approach described in the industry response and utilizes the most limiting set of diesel fuel oil characteristics for determining fuel oil consumption and hence concurs that there is no need for additional assumptions regarding mixing to be factored into fuel oil consumption rates.

In the industry response to question 2) above, the requirements of the Diesel Fuel Oil Testing Program were summarized and it was noted that the acceptance criteria for new fuel are based on the limits for ASTM D975 (Reference 6) fuel oil and the assumptions in the fuel consumption calculations, exactly as they are with non-ULSD fuel, and mixing or homogeneity of the fuel has no effect. Hence, there is not expected to be any impact on the sampling program when transitioning from LSD to ULSD. Columbia's proposed change does not affect the stored fuel sampling program. Sampling will continue to be performed in accordance with TS 5.5.9, "Diesel Fuel Oil Testing Program," and the acceptance criteria will continue to be as specified for ASTM 2-D fuel oil.

In response to question 3) above, Columbia proposes to retain the reference to Appendix B of Reference 4.

By letter to the Technical Specification Task Force dated May 5, 2008 (Reference 9), NRC requested additional information related to TSTF-501. Specifically, NRC asked the industry to "[d]iscuss how a "Diesel Fuel Oil, Lube Oil, and Starting Air" TS that allows less than a 7 day fuel-oil storage requirement without requiring operator actions is in accordance with GDC 17 of Appendix A to 10 CFR 50." Columbia's proposed change incorporates the 7 day fuel oil storage requirement.

The requirements on diesel fuel oil may continue to change in the future and the addition of additives to compensate for the issues associated with ULSD discussed in NRC Information Notice 2006-22 (Reference 10) may further affect the volumetric energy content (and, as a result, the stored diesel fuel oil volume requirements). These changes would result in future license amendments to revise the stored fuel oil volume in order to ensure that the volume provides for at least 7 days of diesel generator operation. In order to facilitate the expeditious revision of the fuel oil volume requirement when needed and avoid the unnecessary expenditure of Energy Northwest and NRC resources to prepare and review future license amendment requests that

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simply revise the volume requirement to a 7 day supply, the proposed change places the requirement to have stored fuel oil sufficient to support 7 days of diesel generator operation in the TS with the equivalent numerical volume under licensee control in the TS Bases.

Regulatory Guide 1.137 (Reference 3), Regulatory Position 1 states that ANSI N195-1976 provides a method acceptable to the NRC staff for complying with the pertinent requirements of General Design Criteria 17 of Appendix A to 10 CFR Part 50. Regulatory Position 1.c states that the fuel oil storage requirements should either be based on the assumption that the diesel generator operates continuously for 7 days at its rated capacity or calculations based on time-dependent loads of the diesel generator. The NRC's Standard Review Plan, NUREG-0800, Section 9.5.4, paragraph 1.H, states that one of the areas of review by the NRC is to ensure "A minimum of seven days supply of fuel oil for each diesel generator system is onsite to meet the engineered safety feature load requirements following a loss of offsite power and a design basis accident (DBA)." Technical Specifications 3.8.3 LCO Bases states, "Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation." From these sources, it is clear that the principle safety concern with the volume of the stored diesel fuel oil is that there is a 7 day supply. The proposed change does not alter the licensing basis of the plant.

The methodology for calculating the fuel oil storage volume equivalent to a 7 day supply is well established. The TS Bases will state that the fuel oil level equivalent to a 7 day supply is calculated in accordance with RG 1.137 (Reference 3) and ANSI N195-1976 (Reference 4). The 7 day supply was calculated for the limiting API Gravity at 60°F of 38 degrees. Energy Northwest currently allows a range of API Gravity values at 60°F of greater than 27 degrees but less than or equal to 38 degrees. This range of values is more conservative than that specified in Reference 5, which allows a range of API Gravity values at 60°F of greater than 27 degrees but less than or equal to 39 degrees. The volumes will be stated in the TS Bases and changes to the volumes must be reviewed under the TS Bases Control Program, which requires changes to be evaluated under 10 CFR 50.59.

The 7 day diesel fuel oil inventory requirement is based on the concept of supporting emergency diesel generator operation for 7 days without requiring re-supply. To support that goal, a 7 day supply of lube oil for the emergency diesel generators must also be available. To maintain consistency within the Specification and to avoid future amendments to the lube oil inventory numerical value equivalent to a 7 day supply, the proposed change places the requirement to have lube oil inventory sufficient to support 7 days of diesel generator operation in the TS with the equivalent numerical volume in the TS Bases. The volume equivalent to a 7 day supply is based on supporting at least 7 days of full load operation for each DG and the diesel generator manufacturer's lube oil consumption values for the DG under those conditions.

The TS provide a limited Completion Time to continue to operate with available diesel fuel oil or lube oil inventory less than the 7 day supply, but greater than a 6 day supply.

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These circumstances may be caused by events such as full load 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 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 tank. The calculation of the volume equivalent to a 6 day supply is performed in the same manner as the calculation of the 7 day supply. The calculation was performed using the most limiting API Gravity. Relocating the specific volume in the TS with the condition that a 6 day supply is available and placing the numerical values in the Bases is acceptable for the same reasons provided above for relocating the 7 day limit.

3.2 TS 3.8.1 – AC Sources - Operating

It can be derived from Section 6.1, "Tanks," of NRC endorsed ANSI N195-1976 (Reference 4), that each diesel day tank shall maintain at least 60 minutes of fuel at the level where oil is added to the tank assuming a consumption rate based on 100% of the continuous rating plus a margin of 10%. The corresponding updated ANSI standard, ANS/ANSI-59.51-1997 (Reference 5), Section 5.5.1, "Tanks," contains the same requirements while providing more specific details as regards to the tank capacity being sufficient to maintain at least 60 minutes of operation after reaching the low level alarm setpoint (at 110% percent of continuous rated load) based on the minimum quality fuel oil that is acceptable. The NRC's Standard Review Plan, NUREG-0800, Section 9.5.4, paragraph III.6.E, describes that the safety analysis report (SAR) descriptive information and drawings are reviewed to verify whether "A low-level alarm enables the operator to accomplish minor repairs or maintenance before all fuel in the day or integral tank is consumed (assuming full-power operation)." The current TS Basis for SR 3.8.1.4 for Columbia, which is consistent with the STS, states that "The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%."

From the above it can be ascertained that the principle safety concern with the volume of stored diesel fuel oil in the day tank is that there is an equivalent supply of fuel to support one hour of operation at 110% of full load. Columbia's TS Basis for SR 3.8.1.4 also states that "The amount above the minimum 1 hour requirement helps to support the 7 day fuel oil supply." For Columbia, the day tank low level alarm value is established to support one hour of DG operation at 110%, with the remainder being credited to support the 7 days at full load mission time. The proposed change is only in the presentation of the licensing basis assumption (an hour versus gallons) and does not alter the existing licensing basis of the plant.

LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL STORAGE AND TESTING

Enclosure

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3.3 TS 5.5.9 Diesel Fuel Oil Testing Program

Energy Northwest has reviewed the safety evaluation (SE) published on February 22, 2006 (71 FR 9179), as part of the CLIIP Notice of Opportunity to Comment. Energy Northwest has concluded that the justifications presented in the SE prepared by the NRC staff are applicable to Columbia and justify this amendment to the facility TS.

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

General Design Criterion (GDC) 17, "Electric Power Systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," requires that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. In addition, GDC 17 contains requirements concerning system capacity, capability, independence, redundancy, availability, testability, and reliability.

Regulatory Guide 1.137 (Reference 3) endorsed ANSI N195-1976 (Reference 4) as providing an acceptable method for complying with the pertinent requirements of GDC 17, subject to some clarifications and additional requirements, regarding diesel fuel oil systems for standby diesel generators and assurance of adequate diesel fuel oil quality. ANSI N195-1976 requires that onsite fuel oil storage shall be sufficient to operate the minimum number of diesel generators following the limiting design basis accident for either 7 days, or the time required to replenish the oil from sources outside the plant site following any limiting design basis event without interrupting the operation of the diesel, whichever is longer. The ANSI standard also provides guidance for calculating storage requirements. It can be derived from ANSI N195-1976 that the day tank of a DG be designed to accommodate a minimum of 60 minutes of fuel at full load plus 10% margin.

Regulatory Guide 1.137 also states that Appendix B, "Recommended Fuel Oil Practices," to ANSI N195-1976 should be used as a basis for a program to ensure the initial and continuing quality of diesel fuel oil as supplemented by eight additional provisions described in the RG for maintaining the properties and quality of diesel fuel oil. Detailed requirements that Columbia adheres to for fuel oil quality are listed in the TS Bases for SR 3.8.3.3.

As discussed previously, the proposed changes will continue to meet the fuel oil storage and quality requirements endorsed by RG 1.137 and ANSI N195-1976. The proposed change does not affect the design of the onsite electric power system, the quality of the onsite electric power system, or the method of determining the necessary quantity of onsite fuel oil or lube oil.

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4.2 Precedent

The proposed changes are consistent with the approach specified in TSTF-374 and follow the approach specified in TSTF-501 with allowance for the design differences of Columbia which include utilizing the available volume of the day tank in addition to the storage tank to support the fuel oil storage requirement. Columbia's submittal is similar to license Amendment 231 issued to Entergy Nuclear Operations, Inc. on April 17, 2008 for Vermont Yankee Nuclear Power Station (VY). The VY amendment relocated specific fuel oil and lube oil volume values, and references to specific ASTM standards for fuel oil testing, from the TS to the TS Bases, as does the Columbia submittal. The VY fuel oil storage volume did not change during the relocation to the TS Bases. The Columbia proposed changes will result in a change to the values needed to ensure that the 7 and 6 day fuel oil storage requirements are met with the relocation to the TS Bases, including the correction of the current non-conservative TS value for the Division 2 DG fuel oil storage. The Energy Northwest proposal is also different than the VY approach in that the numerical value for each day tank volume is also being proposed for relocation to the TS Bases.

4.3 Significant Hazards Consideration

For the changes related to Diesel Fuel Oil Testing Program, incorporation of TSTF-374, Energy Northwest has reviewed the proposed no significant hazards consideration determination (NSHCD) published in the *Federal Register* on February 22, 2006 (71 FR 9179), as part of the CLIIP. Energy Northwest has concluded that the proposed NSHCD presented in the *Federal Register* is applicable to Columbia and is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91(a).

For the changes related to the Diesel Fuel Oil, Lube Oil, and Starting Air Specification, following the approach of TSTF-501, and the changes related to AC Sources – Operating, Energy Northwest has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92(c) as discussed 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 to the Diesel Fuel Oil, Lube Oil, and Starting Air Specification relocates the volume of diesel fuel oil and lube oil required to support 7 day operation of the onsite diesel generators, and the volume equivalent to a 6 day supply, to licensee control. A similar approach is also proposed for the AC Sources – Operating Specification which relocates the specific volume of fuel oil required to be maintained in the day tank to the TS Bases. The specific volumes of fuel oil equivalent to a 7 and 6 day supply, and the one hour day tank supply, are calculated using the NRC approved methodology described in RG 1.137 (Reference 3) and

LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL STORAGE AND TESTING

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ANS N195-1976 (Reference 4). The specific volume of lube oil equivalent to a 7 and 6 day supply is based on the DG manufacturer's consumption values for the run time of the DG. The requirement(s) to maintain a 7 day supply of diesel fuel oil in subsystem storage, a 7 day supply of lube oil on-site, and a minimum of one hour of fuel oil in the day tank, continue to be met with this proposed change and thus remain consistent with the assumptions in the accident analyses. The actions required to be taken when the volume of fuel or lube oil is less than what is specified are not affected by this proposed change. Hence, neither the probability nor the consequences of any accident previously evaluated will be affected.

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 proposed changes to the Diesel Fuel Oil, Lube Oil, and Starting Air, and the AC Sources - Operating specifications do not involve physical alterations of the plant (i.e., no new or different type of equipment will be installed) or changes in the methods of governing normal plant operation. The changes do not alter assumptions made in the safety analysis but ensure that the diesel generator operates as assumed in the accident analysis. The proposed changes are consistent with the safety analysis assumptions. Therefore, the proposed changes do 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 changes to the Diesel Fuel Oil, Lube Oil, and Starting Air, and AC Sources - Operating specifications relocates the volume of diesel fuel oil and lube oil to licensee control. As the bases for the existing limits on diesel fuel oil and lube oil are not changed and the methods used to determine these limits have been previously approved, no change is made to the accident analysis assumptions and no margin of safety is reduced as part of this change. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is a reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the

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Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5. ENVIRONMENTAL ASSESSMENT

A review has determined that the proposed changes would change a requirement with respect to the installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed changes do not involve: (i) a significant hazards consideration; (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite; or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed changes meet the eligibility criterion for categorical exclusion set for in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

6. REFERENCES

1. TSTF-501 Rev. 0, "Relocate Stored Fuel Oil and Lube Oil Volume Values to Licensee Control"
2. TSTF-374-A Rev. 0, "Revision to TS 5.5.13 and associated TS Bases for Diesel Fuel Oil"
3. Regulatory Guide 1.137 Rev. 1, "Fuel Oil Systems for Standby Diesel Generators", dated October 1979
4. ANSI N195-1976, "Fuel Oil Systems for Standby Diesel-Generators," dated April 12, 1976
5. ANSI/ANS-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," dated October 23, 1997
6. ASTM D975-08, "Standard Specification for Diesel Fuel Oils"
7. NRC letter to the Technical Specification Task Force (TSTF), "Request for Additional Information Regarding TSTF-501, Revision 0, 'Relocate Stored Fuel Oil and Lube Oil Values to Licensee Control,'" dated December 13, 2007
8. TSTF-08-02, TSTF committee letter to the NRC, "Response to NRC December 13, 2007 Request for Additional Information Regarding TSTF-501, Revision 0, 'Relocate Store Fuel Oil and Lube Oil Volume Values to Licensee Control,'" dated March 6, 2008
9. NRC letter to the Technical Specification Task Force, "Request for Additional Information Regarding TSTF-501, Revision 0, 'Relocate Stored Fuel Oil and Lube Oil Values to Licensee Control,'" dated May 5, 2008

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10. NRC Information Notice 2006-22, "New Ultra-Low-Sulfur Diesel Fuel Oil Could Adversely Impact Diesel Engine Performance," October 12, 2006
11. ME-02-92-234, "Calculation for On Site Diesel Fuel Storage for the Emergency Diesel Generators DG-1, DG-2, and DG-3," June 26, 2008

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SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL STORAGE AND
TESTING**

Attachment 1

Technical Specification Page Markups

3.8.1-7

3.8.3-1 (and insert page)

3.8.3-3

5.5-9

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.3 -----NOTES-----</p> <ol style="list-style-type: none"> 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow, without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. The endurance test of SR 3.8.1.14 may be performed in lieu of the load-run test in SR 3.8.1.3 provided the requirements, except the upper load limits, of SR 3.8.1.3 are met. <p>-----</p> <p>Verify each required DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 4000 kW and ≤ 4400 kW for DG-1 and DG-2, and ≥ 2340 kW and ≤ 2600 kW for DG-3.</p>	<p>31 days</p>
<p>SR 3.8.1.4 Verify each required day tank contains ≥ 1400 gal of fuel oil.</p>	<p>31 days</p>
<p>SR 3.8.1.5 Check for and remove accumulated water from each required day tank.</p>	<p>31 days</p>

fuel oil to support greater than or equal to one hour of operation at full load plus 10%.

(continued)

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>INSERT 1 →</p> <p>A. One or more DGs with stored fuel oil level:</p> <ol style="list-style-type: none"> 1. For DG-1 or DG-2, < 55,500 gal and ≥ 47,520 gal; and 2. For DG-3, < 33,000 gal and ≥ 28,340 gal. 	<p>A.1 Restore stored fuel oil level to within limit.</p>	<p>48 hours</p>
<p>INSERT 2 →</p> <p>B. One or more DGs with lube oil inventory:</p> <ol style="list-style-type: none"> 1. For DG-1 or DG-2, < 330 gal and ≥ 283 gal; and 2. For DG-3, < 165 gal and ≥ 142 gal. 	<p>B.1 Restore lube oil inventory to within limit.</p>	<p>48 hours</p>

(continued)

Insert 1

- A. One or more DGs with fuel oil level less than a 7 day supply and greater than a 6 day supply.

Insert 2

- B. One or more DGs with lube oil inventory less than a 7 day supply and greater than a 6 day supply.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.8.3.1 Verify each fuel oil storage tank ^{subsystem} contains: \geq a 7 day supply of fuel. a. \geq 55,500 gal of fuel for DG-1 and DG-2; and b. \geq 33,000 gal of fuel for DG-3.</p>	31 days
<p>SR 3.8.3.2 Verify lube oil inventory is: \geq a 7 day supply. a. \geq 330 gal for DG-1 and DG-2, and b. \geq 165 gal for DG-3.</p>	31 days
<p>SR 3.8.3.3 Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.</p>	In accordance with the Diesel Fuel Oil Testing Program
<p>SR 3.8.3.4 Verify each required DG air start receiver pressure is: a. \geq 230 psig for DG-1 and DG-2; and b. \geq 223 psig for DG-3.</p>	31 days
<p>SR 3.8.3.5 Check for and remove accumulated water from each fuel oil storage tank.</p>	92 days

5.5 Programs and Manuals (continued)

5.5.9 Diesel Fuel Oil Testing Program

A diesel fuel oil testing program shall establish the required testing of both new fuel oil and stored fuel oil. The program shall include sampling and testing requirements, and acceptance criteria, all in accordance with applicable ASTM Standards. The purpose of the program is to establish the following:

- a. Acceptability of new fuel oil for use prior to addition to storage tanks by determining that the fuel oil has:
 1. An API gravity, a specific gravity, or an absolute specific gravity within limits,
 2. A kinematic viscosity, if gravity was not determined by comparison with the supplier's certificate, and a flash point within limits for ASTM 2-D fuel oil,
 3. A water and sediment content within limits or a clear and bright appearance with proper color;
- b. Other properties for ASTM 2-D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and
- c. Total particulate concentration of the fuel oil in the storage tanks is ≤ 10 mg/l when tested every 31 days. ~~(1)~~
~~accordance with ASTM D-2277, Method A/2 or A/3.~~

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Diesel Fuel Oil Testing Program test Frequencies.

5.5.10 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases to these Technical Specifications.

- a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

(continued)

**LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL
SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL STORAGE AND
TESTING**
Attachment 2

Retyped Technical Specification Pages

3.8.1-7
3.8.3-1
3.8.3-3
5.5-9

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.3 -----NOTES-----</p> <ol style="list-style-type: none"> 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by, and immediately follow, without shutdown, a successful performance of SR 3.8.1.2 or SR 3.8.1.7. 5. The endurance test of SR 3.8.1.14 may be performed in lieu of the load-run test in SR 3.8.1.3 provided the requirements, except the upper load limits, of SR 3.8.1.3 are met. <p>-----</p> <p>Verify each required DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 4000 kW and ≤ 4400 kW for DG-1 and DG-2, and ≥ 2340 kW and ≤ 2600 kW for DG-3.</p>	<p>31 days</p>
<p>SR 3.8.1.4 Verify each required day tank contains fuel oil to support greater than or equal to one hour of operation at full load plus 10%.</p>	<p>31 days</p>
<p>SR 3.8.1.5 Check for and remove accumulated water from each required day tank.</p>	<p>31 days</p>

(continued)

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LC0 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with fuel oil level less than a 7 day supply and greater than a 6 day supply.	A.1 Restore stored fuel oil level to within limit.	48 hours
B. One or more DGs with lube oil inventory less than a 7 day supply and greater than a 6 day supply.	B.1 Restore lube oil inventory to within limit.	48 hours

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.3.1 Verify each fuel oil storage subsystem contains \geq a 7 day supply of fuel.	31 days
SR 3.8.3.2 Verify lube oil inventory is \geq a 7 day supply.	31 days
SR 3.8.3.3 Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.4 Verify each required DG air start receiver pressure is: <ul style="list-style-type: none"> a. \geq 230 psig for DG-1 and DG-2; and b. \geq 223 psig for DG-3. 	31 days
SR 3.8.3.5 Check for and remove accumulated water from each fuel oil storage tank.	92 days

5.5 Programs and Manuals (continued)

5.5.9 Diesel Fuel Oil Testing Program

A diesel fuel oil testing program shall establish the required testing of both new fuel oil and stored fuel oil. The program shall include sampling and testing requirements, and acceptance criteria, all in accordance with applicable ASTM Standards. The purpose of the program is to establish the following:

- a. Acceptability of new fuel oil for use prior to addition to storage tanks by determining that the fuel oil has:
 1. An API gravity, a specific gravity, or an absolute specific gravity within limits,
 2. A kinematic viscosity, if gravity was not determined by comparison with the supplier's certificate, and a flash point within limits for ASTM 2-D fuel oil,
 3. A water and sediment content within limits or a clear and bright appearance with proper color;
- b. Other properties for ASTM 2-D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and
- c. Total particulate concentration of the fuel oil in the storage tanks is ≤ 10 mg/l when tested every 31 days.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Diesel Fuel Oil Testing Program test Frequencies.

5.5.10 Technical Specifications (TS) Bases Control Program

This program provides a means for processing changes to the Bases to these Technical Specifications.

- a. Changes to the Bases of the TS shall be made under appropriate administrative controls and reviews.

(continued)

**LICENSE AMENDMENT REQUEST FOR CHANGES TO TECHNICAL
SPECIFICATIONS RELATING TO DIESEL GENERATOR FUEL OIL STORAGE AND
TESTING**

Attachment 3

Bases Page Markups
(for information only)

B 3.8.1-22 (and insert page)
B 3.8.3-1 (and insert page)
B 3.8.3-2
B 3.8.3-3 (and insert page)
B 3.8.3-4 (and insert page)
B 3.8.3-6 (and insert page)
B 3.8.3-7
B 3.8.3-8 (and insert page)
B 3.8.3-9
B 3.8.3-10 (and insert page)
B 3.8.3-11 (new page)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.1.4

INSERT B1

This SR provides verification that the level of fuel oil in the day tank is at or above the level at which the low level alarm is annunciated. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%. For DGs 1 and 2, the required fuel oil level supports approximately 3.5 hours of operation at 110% of the continuous rated load. For DG-3, the required fuel oil level supports approximately 7 hours of operation at continuous rated load. The amount above the minimum 1 hour requirement helps to support the 7 day fuel oil supply. The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and facility operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 31 days eliminates the necessary environment for bacterial survival. This is the most effective means in 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, rain water, contaminated fuel oil, and 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 Frequency is established by Regulatory Guide 1.137 (Ref. 14). This SR is for preventive maintenance. The presence of water does not necessarily represent a failure of this SR provided that accumulated water is removed during performance of this Surveillance.

(continued)

INSERT B1

This SR ensures that the volume of fuel oil in the day tank provides for DG operation for a minimum of one hour at full load plus 10%. The minimum amount of fuel oil required to satisfy one hour at 110% correlates to 390 gallons for the Division 1 DG, 397 gallons for the Division 2 DG, and 231 gallons for the Division 3 DG. The day tank low level alarm is set at 1400 gallons for all three DGs, which is higher than the above specified minimum required values. The volume of fuel that constitutes the differential from the alarm set point and the one hour at 110% discussed above is utilized to support the 7 day and 6 day fuel oil storage requirements (see Bases for SR 3.8.3.1). For DGs 1 and 2, 1400 gallons supports approximately 3.5 hours of operation at 110% of the continuous rated load. For DG-3, 1400 gallons supports approximately 7 hours of operation at continuous rated load.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

(Refs. 1 and 2).

BASES

BACKGROUND

Each diesel generator (DG) is provided with a storage tank which, in combination with the associated day tank, has a fuel oil capacity sufficient to operate that DG for a period of 7 days while the DG is supplying maximum post loss of coolant accident load demand (Ref. 1). The maximum load demand is calculated using the assumption that at least two DGs are available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources. Additional onsite storage is also provided by the auxiliary boiler fuel storage tank. The quality of the fuel in this tank is maintained in accordance with the requirements for the fuel stored in the DG storage and day tanks. However, no credit for accident mitigation is allowed for the quantity of the fuel stored in the auxiliary boiler fuel storage tank.

Fuel oil is transferred from each storage tank to its respective day tank by a transfer pump associated with each storage tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All outside tanks, pumps, and piping are located underground. The fuel oil level in the storage tank is indicated locally and is provided with high and low level switches which actuate alarm annunciators in the main control room. The transfer pump on the filter polishing skid is used to move fuel oil from the auxiliary boiler fuel storage tank to each of the DG storage tanks. The auxiliary boiler and filter polishing systems and associated components are not required to conform to all of the guidelines in Regulatory Guide 1.137 (Ref. 2), because failure of a component or rupture of the piping would not result in the loss of a DG.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 3). The fuel

INSERT B2

(continued)

INSERT B2

Regulatory Guide 1.137 (Ref. 2) and ANSI N195 (Ref. 3) address recommended fuel oil practices, as modified by 1) the ACTIONS and Surveillance Requirements (SRs) of Specification 3.8.3 and 2) the Bases for SR 3.8.3.3, which specifies the current fuel oil testing standards.

BASES

BACKGROUND
(continued)

oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity or absolute specific gravity), and impurity level, among others.

include

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. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation. This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Division 1 and 2 DGs each have an air start subsystem that includes two air start receivers (each receiver has four air tanks), each with adequate capacity for five successive starts without recharging the air start receiver. The Division 3 DG has an air start subsystem that includes two air start receivers, each with adequate capacity for three successive starts without recharging the air receivers.

APPLICABLE
SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 4) and Chapters 15 and 15.F (Ref. 5), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, reactor coolant system, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems.

Since diesel fuel oil, lube oil, and starting air subsystems support the operation of the standby AC power sources, they satisfy Criterion 3 of Reference 6.

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the

(continued)

BASES

LCO
(continued) capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 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 DBA with loss of offsite power. DG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown."

The starting air system is required to have a minimum capacity for five successive Division 1 and 2 DG starts and three successive Division 3 DG starts without recharging the air start receivers. Only one air start receiver (and associated air start header) per DG is required, since each air start receiver has the required capacity.

APPLICABILITY The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil, lube oil, and starting air subsystems support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil, and starting air are required to be within limits when the associated DG is required to be OPERABLE.

ACTIONS The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) are governed by separate Condition entry and application of associated Required Actions.

A.1

INSERT B3

~~With fuel oil level < 55,500 gallons in a Division 1 or 2 DG storage tank, or < 33,000 gallons in the Division 3 DG storage tank, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil~~

(continued)

INSERT B3

In this Condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. For the purposes of this LCO, the fuel oil storage subsystem includes the storage tank and the available volume in the day tank (see Bases for SR 3.8.1.4) for each respective DG. Table B 3.8.3-1 specifies the fuel oil storage subsystem equivalents for a 7 day and 6 day supply.

BASES

ACTIONS

A.1 (continued)

~~level reductions that maintain at least a 6 day supply.~~
These circumstances may be caused by events such as:

- a. Full load operation required after an inadvertent start while at minimum required level; or
- b. Feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations.

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of the fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

B.1

INSERT B4

~~With lube oil inventory < 330 gallons for a Division 1 or 2 DG, or < 165 gallons for the Division 3 DG, sufficient lube 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 at least a 6 day supply.~~ This restriction allows sufficient time for obtaining 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.

(continued)

INSERT B4

In this Condition, the 7 day lube oil inventory, i.e. the combined inventory of the DG lube oil sump and lube oil stored in the warehouse to support 7 days of continuous DG operation at full load conditions, is not available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. The lube oil equivalent to a 7 day supply is 330 gallons for Division 1 or 2 DG, and 165 gallons for the Division 3 DG. The lube oil inventory equivalent to a 6 day supply is 283 gallons for Division 1 or 2 DG, and 142 gallons for Division 3 DG.

BASES

ACTIONS

E.1 (continued)

for at least one start, and the DG can be considered OPERABLE while the air receiver 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.

F.1

With a Required Action and associated Completion Time of Condition A, B, C, D, or E not met, or the stored diesel fuel oil, lube oil, or starting air subsystem not within limits for reasons other than addressed by Conditions A through E, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE
REQUIREMENTS

SR 3.8.3.1

INSERT B5

This SR provides verification, in conjunction with SR 3.8.1.4, that there is an adequate inventory of fuel oil to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.3.2

INSERT B6

This Surveillance ensures that sufficient lube oil inventory (combined inventory in the DG lube oil sump(s) and in the warehouse) is available to support at least 7 days of full load operation for each DG. The 330 gallon requirement for Divisions 1 and 2 DGs and the 165 gallon requirement for

(continued)

INSERT B5

This SR provides verification that there is an adequate inventory of fuel oil in the storage subsystem to support each DG's operation for 7 days at full load. The fuel oil storage subsystem for each DG consists of the respective fuel storage tank and the volume in the day tank that is in excess of one hour at full load plus 10 percent (see Bases for SR 3.8.1.4). Table B 3.8.3-1 specifies the fuel oil level equivalent to a 7 day supply for each storage subsystem when calculated in accordance with References 2 and 3. The required fuel storage volume is determined using the most limiting energy content of the stored fuel. Using the known correlation of diesel fuel oil absolute specific gravity or API gravity to energy content, the required diesel generator output, and the corresponding fuel consumption rate, the onsite fuel storage volume required for 7 days of operation can be determined. SR 3.8.3.3 requires new fuel to be tested in accordance with ASTM D975-08 (Ref. 7) to verify that the new fuel absolute specific gravity or API gravity is within the range assumed in the diesel fuel oil consumption calculations.

INSERT B6

The lube oil level equivalent to a 7 day supply is 330 gallons for Division 1 or 2 DG, and 165 gallons for Division 3 DG.

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.3.2 (continued)

Division 3 DG are based on the DG manufacturer's consumption values for the run time of the DG. Normally, sufficient volume is maintained in the DG lube oil sump(s). However, implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG when the DG lube oil sump(s) do not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer's recommended minimum level.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run times are closely monitored by the plant staff.

SR 3.8.3.3

The tests of new fuel oil prior to addition to the storage tanks 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 and operation. 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 the sample (and corresponding results) of new fuel and addition of new fuel oil to the storage tanks 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-~~88~~ (Ref. 7);

LOG

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.3.3 (continued)

- b. Verify in accordance with the tests specified in ASTM D975-94 (Ref. 7) that: (1) the sample has an API gravity of within 0.3° at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or the sample has an absolute specific gravity at 60/60°F of ≥ 0.8348 and ≤ 0.89 or an API gravity at 60°F of $\geq 27^\circ$ and $\leq 38^\circ$; (2) a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, if gravity was not determined by comparison with the supplier's certification; and (3) a flash point of $\geq 125^\circ\text{F}$; and
- c. Verify that the new fuel oil has a water and sediment content of $\leq 0.05\%$ volume when tested in accordance with ASTM D1796/83 (Ref. 7) or a clear and bright appearance with proper color when tested in accordance with ASTM D4176-04 (Ref. 7).

INSERT B7

08

D2709-96

04

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 since the fuel oil is not added to the storage tanks.

Following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-94 (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975-94 (Ref. 7). These additional analyses are required by Specification 5.5.9, Diesel Fuel Oil Testing Program, to be performed within 31 days following sampling and addition. This 31 day requirement is intended to assure that:

INSERT B8

- a. The new fuel oil sample taken is no more than 31 days old at the time of adding the new fuel oil to the DG storage tank; and
- b. The results of the new fuel oil sample are obtained within 31 days after addition of the new fuel oil to the DG storage tank.

(continued)

INSERT B7

38° when tested in accordance with ASTM D1298-99 (Ref. 7)

INSERT B8

, except that the analysis for sulfur may be performed in accordance with ASTM D2622-94 (Ref. 7), or ASTM D4294-08 (Ref. 7), or ASTM D5453-08 (Ref. 7), or ASTM D3120-06 (Ref. 7).

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.3.3 (continued)

The 31 day period is acceptable because the fuel oil properties of interest, even if 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, mostly due to oxidation. The presence of particulate does not mean that the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment, which can cause engine failure.

Particulate concentrations should be determined in accordance with ASTM ~~D2276-93~~ ^{D5452-06} Method A (Ref. 7). This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

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

SR 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles for Division 1 and 2 DGs and three engine start cycles for the Division 3 DG without recharging. The pressure specified in this SR is intended to reflect the lowest value at which the five or three starts, as applicable, can be accomplished.

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

(continued)

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.3.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the storage tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, rain water, 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 Frequency is established by Regulatory Guide 1.137 (Ref. 2) and is 92 days since the ground water table is lower than the bottom of the fuel oil storage tanks. This SR is for preventive maintenance. The presence of water does not necessarily represent a failure of this SR provided that accumulated water is removed during performance of the Surveillance.

REFERENCES

1. FSAR, Section 9.5.4.
2. Regulatory Guide 1.137, Revision 1, October 1979.
3. ANSI N195, Appendix B, 1976.
4. FSAR, Chapter 6.
5. FSAR, Chapters 15 and 15.F.
6. 10 CFR 50.36(c)(2)(ii).

INSERT B9

7. ASTM Standards: ~~D4057-88~~; ~~D975-94~~; ~~D4176-93~~; ~~D1796-83~~; ~~D2276-93~~.
-

INSERT B9

7. ASTM Standards: D4057-06; D975-08; D1298-99; D4176-04; D2709-96; D2622-94; D4294-08; D5453-08; D3120-06; D5452-06.

BASES

**Table B 3.8.3-1
Minimum Required DG Fuel Oil Supply**

	Fuel Oil Storage Subsystem ⁽¹⁾	Division 1 DG (in Gallons)	Division 2 DG (in Gallons)	Division 3 DG (in Gallons)
7 Day supply Fuel Oil Storage Subsystem ⁽¹⁾	Fuel Oil Storage Tank	54182	55994	32758
	Day Tank ⁽²⁾	1010	1003	1169
6 Day supply Fuel Oil Storage Subsystem ⁽¹⁾	Fuel Oil Storage Tank	46302	47857	27917
	Day Tank ⁽²⁾	1010	1003	1169

- (1) The fuel oil storage subsystem consists of the fuel oil storage tank and the available volume of the day tank for each respective DG. Due to the differential temperatures of the two tanks, it is conservative (and hence acceptable) to compensate for shortfalls in the day tank volume with a corresponding volume increase in the storage tank to satisfy the 7 or 6 day storage requirement. Conversely, it is non-conservative to make up for shortfalls in the storage tank volume with a "one-for-one" increase in the day tank volume to satisfy the 7 day or 6 day storage requirement.
- (2) The low level alarm for the Day Tank is 1400 gallons. The value reflected in this table represents the volume credited towards meeting the 7 day (or 6 day) storage requirement. The remainder of the Day Tank volume that is encompassed by the low level alarm is reserved to support one hour at 110% of full load (see Bases for SR 3.8.1.4).