Duke Power
A Duke Energy Company

Duke Power Company
A Duke Energy Company
Energy Center
P.O. Box 1006
Charlotte, NC 28201-1006

June 18, 2003

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Subject: Duke Energy Corporation
Catawba Nuclear Station (CNS), Units 1 and 2
Docket Numbers 50-413 and 50-414
McGuire Nuclear Station (MNS), Units 1 and 2
Docket Numbers 50-369 and 50-370
Proposed Technical Specifications (TS) Amendments to TS 5.5.13 (Diesel Fuel Oil Testing Program), Surveillance Requirement (SR) 3.8.3.5(MNS) and 3.8.3.6 (CNS), and Bases 3.8.3.

This letter is a response to a verbal request for information to answer the following questions:

1. Explain the plans for the 10-year inspections and tank cleanings at each site.
2. Describe the results of the last 10-year tank cleanings and inspections at each site.
3. Provide justification for using ASTM D6217 for particulate analysis in lieu of ASTM D5452 specified in TSTF-374.
4. Provide revised Technical Specification pages for each site.

Pursuant to Question 1:

The plans for 10-year inspections and cleanings of the diesel fuel oil tanks at both Catawba and McGuire will not change as a result of this amendment. Based on past experience, this 10-year interval is appropriate to detect any corrosion problems or debris buildup.

A047
A001

Pursuant to Question 2:

During the last 10-year tank inspections ultrasonic testing was performed on the Catawba and McGuire tanks in addition to visual inspections. There were no adverse indications of general corrosion on any of the diesel fuel tanks. An engineering review noted that all pits discovered on the tanks were satisfactory pending re-inspection at the next 10-year interval.

Pursuant to Question 3:

Duke initially planned to leave the original standard D2276 in place since it allowed samples of the fuel oil to be collected in the field and filtered in the laboratory. A review of D5452 showed that it does allow laboratory filtration of aviation fuel, but required a much more complex apparatus.

When researching this issue to develop a response to this question, the existence of a more applicable ASTM was discovered: ASTM D6217, Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration. The problems with using D5452 and D2276 are that these tests were developed for pristine aviation fuel which is different than the 2-D middle distillate fuel used for the Emergency Diesel Generators. Thus, exceptions to both of these procedures would have to be made for sample size since it is unreasonable to filter the same quantities of 2-D middle distillate as aviation fuel due to the inordinate amount of time required due to the type of fuel.

Thus, Duke proposes using D6217,in lieu of D5452, since it is more applicable to the type of fuel being used. It appears that this new method was developed at approximately the same time this new revision of TSTF 374 was issued and thus was not included as part of the TSTF.

As part of this revision, certain wording in the TS Bases document will require revision. For clarity, the originally

submitted reprinted pages are marked-up with an explanation of the changes as Attachments 1a and 1b.

Pursuant to Question 4:

The Finalized reprinted pages are included as Attachments 2a and 2b.

There are no regulatory commitments contained in this letter or its attachments.

The previous conclusions of the No Significant Hazards Consideration as stated in the August 26, 2002 amendment request are not affected by this response.

Pursuant to 50.91, a copy of this response letter is being sent to the appropriate State of South Carolina and North Carolina officials.

Inquiries on this matter should be directed to A.P Jackson at (803) 831-3742.

Very truly yours,

K.S.Canady

APJ/apj

Attachments

K.S.Canady affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

K.S.Canady, Vice President

Subscribed and sworn to me: June 18, 2003
Date

Notary Public

My commission expires: JAN 22, 2006
Date

SEAL

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NCEMC
PMPA
SREC
Catawba Document Control File: 813.20
McGuire Document Control File: 813.20
Catawba RGC Date File
ELL-EC050

Attachment 1a

Marked up TS Bases Pages for
Catawba Nuclear Station

Attachment 1b

Marked up TS Bases Pages for
McGuire Nuclear Station

Attachment 2a

Revised TS and TS Bases Pages
for Catawba Nuclear Station

Attachment 2b

Revised TS and TS Bases Pages
for McGuire Nuclear Station

Attachment 1a

Marked up TS Bases Pages for
Catawba Nuclear Station

Explanation of Changes to
TS Bases Revision

A. The original statement:

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.

is being modified to state:

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

Water and sediment test may be performed in lieu of a failed clear and bright test based on this TS amendment. Since water and sediment is a quantitative test, it will yield a more accurate result than clear and bright. Thus, a tanker of diesel fuel that fails on clear and bright may be resampled and tested via water and sediment. If the water and sediment passes, then the fuel would be deemed acceptable.

B. Sulfur analysis per ASTM Method D4294 was added to match the TSTF 374, Rev.0. The McGuire and Catawba sites had no plans to use this analysis procedure, thus it was not included as an option in the original submittal.

C. ASTM Method D6217 is being added since it is the correct method to use for particulate contamination in middle distillate fuels. The previous methods were for jet fuel and thus statements were included in the Bases to account for exceptions to the test method. This change simply takes those exceptions out of the Bases, such as allowing field sampling and larger

micron filters, since they will no longer be required. Then it adds a correct description of the test method D6217.

D. This section corrects the Reference Section to ensure the newly added ASTMs are properly referenced.

Inserts for TS Bases Revision for Catawba Nuclear Station

Insert 1:

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

Insert 2:

This test method is used for assessing the mass quantity of particulates in middle distillate fuels, which includes 2-D diesel fuel.

SURVEILLANCE REQUIREMENTS (continued)

tests are to be conducted prior to adding the new fuel to the storage tank(s). The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 (Ref. 7);

b. Verify in accordance with the tests specified in ASTM D975 (Ref. 7) that the sample has a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point of ≥ 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 (Ref. 7) or a water and sediment content within limits when tested in accordance with ASTM D2709 or D1796 (Ref.7) and

d. Verify that new fuel has an absolute specific gravity at 60/60 °F or ≥ 0.83 and ≤ 0.89 when tested in accordance with the ASTM D1298 or an API gravity at 60 °F of ≥ 27° and ≤ 39° when tested in accordance with ASTM D287 (Ref.7).

(A) INSERT 1 → DELETE

~~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.~~

(B) D4294 (Ref. 7)

Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in ASTM D975 are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 7), except that the analysis for sulfur may be performed in accordance with ASTM D1552 (Ref. 7) or ASTM D2622 (Ref. 7). 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.

(C) INSERT 2 → DELETE

Particulate concentrations should be determined based on ASTM ~~D2276~~ D6217 (Ref. 7). ~~The test described in this Standard is for jet fuel. It is therefore permissible to determine particulate concentration using a 3 micron filter instead of the 0.8 micron required by the Standard.~~ This method involves a gravimetric determination of total particulate

SURVEILLANCE REQUIREMENTS (continued)

(C) Delete (Continued)

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 Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly 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 without recharging. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is intended to reflect the lowest value at which the five starts 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.

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 fuel storage tanks once every 31 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, 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 Frequencies are established by

SURVEILLANCE REQUIREMENTS (continued)

Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

REFERENCES

1. UFSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
7. ASTM Standards: D4057; D975; D1298; D4176; D2709; D1552; D2622; D1796; ~~D2276~~; and D287.

(D)

D4294; D6217;

Attachment 1b

Marked up TS Bases Pages for
McGuire Nuclear Station

Explanation of Changes to
TS Bases Revision

A. The original statement:

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.

is being modified to state:

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

Water and sediment test may be performed in lieu of a failed clear and bright test based on this TS amendment. Since water and sediment is a quantitative test, it will yield a more accurate result than clear and bright. Thus, a tanker of diesel fuel that fails on clear and bright may be resampled and tested via water and sediment. If the water and sediment passes, then the fuel would be deemed acceptable.

B. Sulfur analysis per ASTM Method D4294 was added to match the TSTF 374, Rev.0. The McGuire and Catawba sites had no plans to use this analysis procedure, thus it was not included as an option in the original submittal.

C. ASTM Method D6217 is being added since it is the correct method to use for particulate contamination in middle distillate fuels. The previous methods were for jet fuel and thus statements were included in the Bases to account for exceptions to the test method. This change simply takes those exceptions out of the Bases, such as allowing field sampling and larger

micron filters, since they will no longer be required. Then it adds a correct description of the test method D6217.

D. This section corrects the Reference Section to ensure the newly added ASTMs are properly referenced.

Inserts for TS Bases Revision for McGuire Nuclear Station

Insert 1:

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

Insert 2:

This test method is used for assessing the mass quantity of particulates in middle distillate fuels, which includes 2-D diesel fuel.

BASES

SURVEILLANCE REQUIREMENTS (continued)

c. Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176 (Ref. 7) or a water and sediment content within limits when tested in accordance with ASTM D2709 or D1796 (Ref. 7) and

d. Verify that new fuel has an absolute specific gravity at 60/60 °F or ≥ 0.83 and ≤ 0.89 when tested in accordance with the ASTM D1298 or an API gravity at 60 °F of ≥ 27° and ≤ 39° when tested in accordance with ASTM D287 (Ref.7).

(A) INSERT 1 → 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 ASTM D975 (Ref. 7) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 7), except that the analysis for sulfur may be performed in accordance with ASTM D1552 (Ref. 7), or ASTM D2622 (Ref. 7), or D4294 (Ref. 7) (B) 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 based on ASTM ~~D2276~~ D6217 (Ref. 7). The test described in this standard is for jet fuel. It is therefore permissible to determine particulate concentrations using a 3 micron filter instead of the 0.8 micron required by the standard. 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.

(C) DELETE AND INSERT 2 → DELETE →

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

BASES

REFERENCES

1. UFSAR, Section 8.3.1.1.7.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii). D4294; D6217;
(E) 7. ASTM Standards: D4057; D975; D1298; D4176; D2709; D1552; D2622; ~~and~~ D1796; and D287.

Attachment 2a

Revised TS and TS Bases Pages
for Catawba Nuclear Station

5.5 Programs and Manuals

5.5.13 Diesel Fuel Oil Testing Program (continued)

3. a clear and bright appearance with proper color or a water and sediment content within limits;

b. Other properties for ASTM 2D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and

c. Total particulate concentration of the fuel oil 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.

5.5.14 Technical Specifications (TS) Bases Control Program

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

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

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not require either of the following:

1. a change in the TS incorporated in the license; or

2. a change to the updated FSAR or Bases that requires NRC approval pursuant to 10 CFR 50.59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the UFSAR.

d. Proposed changes that meet the criteria of Specification 5.5.14.b.1 or 5.5.14.b.2 above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e), with approved exemptions.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.3.2	Verify lubricating oil inventory is $\geq$ 400 gal.	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 DG air start receiver pressure is $\geq$ 210 psig.	31 days
SR 3.8.3.5	Check for and remove accumulated water from each fuel oil storage tank.	31 days

SURVEILLANCE REQUIREMENTS (continued)

tests are to be conducted prior to adding the new fuel to the storage tank(s). The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 (Ref. 7);

b. Verify in accordance with the tests specified in ASTM D975 (Ref. 7) that the sample has a kinematic viscosity at 40°C of $\geq$ 1.9 centistokes and $\leq$ 4.1 centistokes, and a flash point of $\geq$ 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 (Ref. 7) or a water and sediment content within limits when tested in accordance with ASTM D2709 or D1796 (Ref. 7); and

d. Verify that the new fuel oil has an absolute specific gravity at 60/60°F of $\geq$ 0.83 and $\leq$ 0.89 when tested in accordance with ASTM D1298 or an API gravity at 60°F of $\geq$ 27° and $\leq$ 39° when tested in accordance with ASTM D287 (Ref. 7).

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

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. 7) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 7), except that the analysis for sulfur may be performed in accordance with ASTM D1552 (Ref. 7), D4294 (Ref. 7) or ASTM D2622 (Ref. 7). 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 based on ASTM D6217 (Ref. 7). This test method is used for assessing the mass quantity of

SURVEILLANCE REQUIREMENTS (continued)

particulates in middle distillate fuels, which includes 2-D diesel fuel. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. 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 Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly 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 without recharging. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is intended to reflect the lowest value at which the five starts 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.

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 fuel storage tanks once every 31 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, 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 Frequencies are established by

BASES

SURVEILLANCE REQUIREMENTS (continued)

Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

REFERENCES

1. UFSAR, Section 9.5.4.2.
2. Regulatory Guide 1.137.
3. ANSI N195-1976, Appendix B.
4. UFSAR, Chapter 6.
5. UFSAR, Chapter 15.
6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
7. ASTM Standards: D4057; D975; D1298; D4176; D2709; D4294; D6217; D1552; D2622; D1796; and D287.

Attachment 2b

Revised TS and TS Bases Pages
for McGuire Nuclear Station

5.5 Programs and Manuals

5.5.12 Explosive Gas and Storage Tank Radioactivity Monitoring Program (continued)

b. A surveillance program to ensure that the quantity of radioactivity contained in each gas storage tank or connected gas storage tanks and fed into the offgas treatment system is less than the amount that would result in a Deep Dose Equivalent of $\geq$ 0.5 rem to any individual in an unrestricted area, in the event of an uncontrolled release of the tanks' contents; and

c. A surveillance program to ensure that the quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the Liquid Radwaste Treatment System is less than the amount that would result in concentrations exceeding the limits of 10 CFR 20, Appendix B, Table 2, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tanks' contents.

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Explosive Gas and Storage Tank Radioactivity Monitoring Program surveillance frequencies.

5.5.13 Diesel Fuel Oil Testing Program

A diesel fuel oil testing program to implement required testing of both new fuel oil and stored fuel oil shall be established. 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 or an absolute specific gravity within limits,

2. a flash point and kinematic viscosity within limits for ASTM 2D fuel oil, and

3. a clear and bright appearance with proper color or a water and sediment content within limits;

b. Other properties for ASTM 2D fuel oil are within limits within 31 days following sampling and addition to storage tanks; and

(continued)

5.5 Programs and Manuals

5.5.13 Diesel Fuel Oil Testing Program (continued)

c. Total particulate concentration of the fuel oil 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.

5.5.14 Technical Specifications (TS) Bases Control Program

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

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

b. Licensees may make changes to Bases without prior NRC approval provided the changes do not require either of the following:

1. A change in the TS incorporated in the license; or

2. A change to the updated FSAR or Bases that requires NRC approval pursuant to 10 CFR 50. 59.

c. The Bases Control Program shall contain provisions to ensure that the Bases are maintained consistent with the UFSAR.

d. Proposed changes that meet the criteria of Specification 5.5.14.b.1 or 5.5.14.b.2 above shall be reviewed and approved by the NRC prior to implementation. Changes to the Bases implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e).

5.5.15 Safety Function Determination Program (SFDP)

This program ensures loss of safety function is detected and appropriate actions taken. Upon entry into LCO 3.0.6, an evaluation shall be made to determine if loss of safety function exists. Additionally, other appropriate actions may be taken as a result of the support system inoperability and corresponding exception to entering supported system Condition and Required Actions. This program implements the requirements of LCO 3.0.6. The SFDP shall contain the following:

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify the fuel oil storage system contains ≥ 39,500 gal of fuel for each DG.	31 days
SR 3.8.3.2	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 3.8.3.3	Verify each DG air start receiver pressure is ≥ 210 psig.	31 days
SR 3.8.3.4	Check for and remove accumulated water from the fuel oil storage tank.	31 days

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with a storage tank having a fuel oil capacity sufficient to operate that diesel for a period of 5 days while the DG is supplying maximum post loss of coolant accident load demand discussed in the UFSAR, Section 8.3.1.1.7 (Ref. 1). The maximum load demand is calculated using the assumption that a minimum of any two DGs is 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.

Fuel oil is transferred from storage tank to day tank by either of two transfer pumps 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.

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

Each DG has an air start system with adequate capacity for five successive start attempts on the DG without recharging the air start receiver(s).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 4), and in the UFSAR, Chapter 15 (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 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of 10 CFR 50.36 (Rev. 6).

BASES

LCO

Stored diesel fuel oil is required to have sufficient supply for 5 days of full load operation. It is also required to meet specific standards for quality. 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." This requirement, in conjunction with an ability to obtain replacement supplies within 4 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.

The starting air system is required to have a minimum capacity for 5 successive DG start attempts without recharging the air start receivers.

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 and the starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel 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

In this Condition, the 5 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 4 day supply. These circumstances may be caused by events, such as full load operation required after an inadvertent start while at minimum required level, or feed and bleed operations, which 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 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 (> 4 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

ACTIONS (continued)

B.1

This Condition is entered as a result of a failure to meet the acceptance criterion of SR 3.8.3.4. 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 Frequency 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.

C.1

With the new fuel oil properties defined in the Bases for SR 3.8.3.2 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 to 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.

D.1 and D.2

DG starting air system normal alignment allows air from both receivers to enter both left and right starting air headers. Therefore, with one receiver isolated, both left and right starting air headers will be supplied from the remaining receiver. With the degraded receiver isolated and the remaining receiver $\geq$ 210 psig, the capacity for 5 starts exists. In the interim prior to manually isolating the degraded receiver, part of the starting air would be lost to pressurizing the degraded receiver. Therefore, this period must be minimized and action to isolate the degraded receiver shall be initiated immediately.

With the degraded starting air receiver isolated and the remaining receiver pressure $\geq$ 210 psig, the capacity for 5 starts exists, and the DG can be considered OPERABLE while the degraded air receiver pressure is

ACTIONS (continued)

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 period.

E.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 5 days at full load. The 4 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

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). The tests, limits, and applicable ASTM Standards are as follows:

a. Sample the new fuel oil in accordance with ASTM D4057 (Ref. 7);

b. Verify in accordance with the tests specified in ASTM D975 that the sample has a kinematic viscosity at 40°C of ≥ 1.9 centistokes and ≤ 4.1 centistokes, and a flash point of ≥ 125°F; and

SURVEILLANCE REQUIREMENTS (continued)

c. Verify that the new fuel oil has a clear and bright appearance with proper color when tested in accordance with ASTM D4176 (Ref. 7) or a water and sediment content within limits when tested in accordance with ASTM D2709 or D1796 (Ref. 7); and

d. Verify that the new fuel oil has an absolute specific gravity at 60 / 60°F of $\geq$ 0.83 and $\leq$ 0.89 when tested in accordance with ASTM D1298 or an API gravity at 60°F of $\geq$ 27° and $\leq$ 39° when tested in accordance with ASTM D287 (Ref.7).

Failure to meet any of the above limits, except for clear and bright, is cause for rejecting the fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. If the fuel oil fails on clear and bright, it may be accepted if it passes water and sediment. The specifications for water and sediment recognize that a small amount of water and sediment is acceptable. Thus, this test may be used after a clear and bright test to provide a more quantitative result.

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. 7) are met for new fuel oil when tested in accordance with ASTM D975 (Ref. 7), except that the analysis for sulfur may be performed in accordance with ASTM D1552 (Ref. 7), D4294 (Ref. 7) or ASTM D2622 (Ref. 7). 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 based on ASTM D6217 (Ref. 7). This test method is used for assessing the mass quantity of particulates in middle distillate fuels, which includes 2-D diesel fuel. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. 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 Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3

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 without recharging. A start cycle is defined as the period of time required to reach 95% speed from standby prelubed condition. The pressure specified in this SR is intended to reflect a conservative value at which a single fast start and five total starts 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.

SR 3.8.3.4

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 31 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, 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 Frequencies are established by Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during performance of the Surveillance.

REFERENCES

1. UFSAR, Section 8.3.1.1.7.

2. Regulatory Guide 1.137.

3. ANSI N195-1976, Appendix B.

4. UFSAR, Chapter 6.

5. UFSAR, Chapter 15.

6. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

7. ASTM Standards: D4057; D975; D1298; D4176; D2709; D4294; D6217; D1552; D2622; D1796; and D287.