



Monticello Nuclear Generating Plant
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Monticello, MN 55362

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

Monticello Nuclear Generating Plant
Docket 50-263
Renewed Facility Operating License No. DPR-22

Response to Request for Additional Information Concerning NRC Unresolved Item
(URI) 2009-007-005

In accordance with 10 CFR 50.90, Northern States Power Company – Minnesota, doing business as Xcel Energy, Inc., appreciates the opportunity to provide information in response to requests for information (Enclosure 1, Reference 1) to support development of the U. S. Nuclear Regulatory Commission (NRC) Unresolved Item (URI) 2009-007-05 resolution by Task Interface Agreement (TIA) 2011-03 for the Monticello Nuclear Generating Plant.

Enclosure 1 provides a general description of the Emergency Diesel Generator (EDG) licensing basis and the response to the two NRC requests for additional information (RAI) for the Monticello Nuclear Generating Plant.

Summary of Commitments

This letter proposes no new commitments and does not revise any existing commitments.

A handwritten signature in black ink, appearing to read 'Mark A. Schimmel'.

Mark A. Schimmel
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION CONCERNING NRC UNRESOLVED ITEM 2009-007-005

1.0 BACKGROUND

The Northern States Power Company – Minnesota (NSPM), doing business as Xcel Energy, Inc., appreciates the opportunity to provide information in response to a request for additional information (RAI) (Reference 1) to support development of the U. S. Nuclear Regulatory Commission (NRC) Unresolved Item (URI) 2009-007-005 resolution by Task Interface Agreement (TIA) 2011-03 for the Monticello Nuclear Generating Plant (MNGP).

2.0 MNGP LICENSING HISTORY DISCUSSION

The original design proposed by Northern States Power (NSP) for the MNGP Emergency Diesel Generator (EDG) system (described in Amendment 4 to the Facility Description and Safety Analysis Report (FDSAR), dated December 30, 1966) was for a single diesel-generator with a day tank and a larger outside fuel oil storage tank to supply fuel oil. The Atomic Energy Commission (AEC) in "Amendment 4, Answers to AEC Questions," in the FDSAR asked NSP to provide the design bases for the EDG system and justify why a second redundant diesel-generator was not required.⁽¹⁾ As part of the response NSP stated:

< The quoted paragraphs are labeled to facilitate further licensing basis discussions herein. >

< Paragraph A > A diesel-fuel system will be provided complete with fuel oil filters and a local fuel day tank with connection to a fuel supply pump for delivering oil from an outdoor tank. A lubricating system, including oil sump, circulating oil pump, oil coolers, strainers, and filters, will be provided.

The local tank will have a minimum capacity for eight hours of operation at rated load. Low level will be annunciated at a level which provides a minimum of one-hour operation of the engine at rated load. A level control device for controlling level in the tank by starting and stopping the oil transfer pump electrically will also be provided. The tank and transfer pump will be located in a concrete structure resistant to the most severe conditions anticipated at the location in the plant.

1. NSP provided a "Fault Tree" analysis indicating that the availability that a single EDG would start was approximately 0.99 and the availability of retaining off-site power was 0.9999 to support a plant design with one EDG.

The outdoor tank will be of sufficient capacity for one week's supply of fuel oil. ...
(Emphasis added)

The Advisory Committee on Reactor Safeguards (ACRS) disagreed with the Fault Tree analysis approach and recommended by a letter dated April 13, 1967:

< Paragraph B > It is of great importance that sufficient electrical power is available at the plant to operate emergency core cooling equipment in the unlikely event of a loss of normal coolant to the core. Although reliability of the off-site power was stated to be very high, it is the recommendation of the ACRS that the Monticello plant include a second diesel generator of the same capacity as the one proposed.

NSP agreed to install a second EDG of the same capacity as the first EDG in response to the ACRS recommendation. On completion of their review the AEC issued a Safety Evaluation Report (SER). AEC SER Section 3.6.3, "Electric Power Systems," issued March 18, 1970 (Reference 2) states:

< Paragraph C > Two diesel generators provide power for the two essential buses, each bus having its own source of power. Both diesel generator units start automatically and are ready to accept load ten seconds after initiation by anyone of the following signals; low reactor water level, high containment pressure, or loss of offsite power. The diesel generators are separate and independent with respect to physical location, cooling systems, air start systems, control and sequential loading circuits and fuel supplies. The onsite diesel fuel storage capacity is sufficient to run one diesel generator unit fully loaded for one week without the need for resupply.
(Emphasis added)

Note the SER only includes a one paragraph discussion of the EDG system and does not explicitly discuss in any detail the configuration of the support systems for the EDGs. The AEC concluded within the 1970 SER:

< Paragraph D > On the basis of our review, we conclude that the onsite emergency electric power system is acceptable since no single failure should prevent power from being supplied to the engineered safety features from onsite sources.

3.0 LICENSING IMPLICATIONS

NSP defined, and the AEC accepted, the design of the EDG fuel oil system as illustrated by the first portion of the sentence underlined below from the response to "Amendment 4 Answers to AEC Questions," and the subsequent March 1970 AEC SER. NSP stated:

< Portion of Paragraph A > A diesel-fuel system will be provided complete with fuel oil filters and a local fuel day tank with connection to a fuel supply pump for

delivering oil from an outdoor tank. ... The local fuel [day] tank will have a minimum capacity for eight hours of operation at rated load. (Emphasis added)

The second clause concerning the fuel supply pump and outdoor tank above, i.e., the portion of the sentence above in italics, is logically distinct and separate from the earlier portion of the sentence that defined the "diesel-fuel system."

For Monticello the redundant, safety related, portion of the EDG fuel oil system begins at each EDGs day tank and continues downstream to the respective EDG. Hence, the importance of the eight hour capacity of the local EDG day tanks at rated load. Viewed in this light, the determination made by the AEC with respect to the separate and independent nature of the EDG fuel supplies as reflected in Section 3.6.3, "Electric Power Systems," of the March 18, 1970 AEC SER is clear, as emphasized below.

< Portion of Paragraph C > The diesel generators are separate and independent with respect to physical location, cooling systems, air start systems, control and sequential loading circuits and fuel supplies. The onsite diesel fuel storage capacity is sufficient to run one diesel generator unit fully loaded for one week without the need for resupply. (Emphasis added)

Also, based in part on this, the determination made by the AEC with respect to application of the single failure criteria to the EDG (onsite emergency electric power system – which would include the EDG fuel oil system), reflected in the March 1970 AEC SER, is also clear, as emphasized below.

< Paragraph D > On the basis of our review, we conclude that the onsite emergency electric power system is acceptable since no single failure should prevent power from being supplied to the engineered safety features from onsite sources. (Emphasis added)

A review of the previous MNGP custom TS (CTS) did not provide additional clarity to the current design or configuration. CTS surveillance requirement (SR) 4.9 B.3.b.2 stated:

During the monthly generator test, the diesel fuel oil transfer pump and diesel oil service pump shall be operated.⁽²⁾

Subsequently, with the adoption of Improved TS (ITS), this surveillance requirement was translated as SR 3.8.1.5, performed at a 31 day frequency, which reads:

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2. The custom TS Bases did not provide any amplifying information, they only reiterate the surveillance test requirement stating, "During the monthly load test of the diesel generators, the diesel fuel oil transfer pump and diesel oil service pump will be operated."

Verify the fuel oil transfer system operates to transfer fuel oil from the storage tank to the day tanks and from each day tank to the associated base tank.

Also, note that there are a number of TS (which can be found in the CTS, old STS and ITS) that rely upon non-safety related equipment / systems to perform the credited safety function, e.g., Specification 3.7.7, "Main Turbine Bypass System" and Specification 3.3.2.2, "Feedwater Pump and Main Turbine High Water Level Trip Instrumentation," (Reference 3), among others. Therefore, utilization of non-safety related equipment to perform TS required safety functions, while somewhat unusual, is not prohibited.

4.0 RAI RESPONSE

NRC RAI 1

Monticello Improved Technical Specifications (ITS) 3.8.1, AC Sources – Operating, requires two Emergency Diesel Generators (EDGs) to be operable during Modes 1, 2 and 3. ITS 3.8.3, Diesel Fuel Oil, Lube Oil, and Starting Air, require that the subsystems shall be within limits for each EDG. Furthermore, Condition G for ITS 3.8.3 requires for the licensee to declare the affected EDG inoperable immediately if the above subsystems are not within limits for reasons other than Condition A, B, C, D, E, or F.

The two EDGs and their associated day tanks share a common pipeline, which is serviced by both the fuel oil transfer pump (safety-related) and the fuel oil service pump (nonsafety-related), and is connected to a common storage tank. The fuel oil service pump provides fuel oil to both day tanks in order to satisfy ITS 3.8.3 during normal conditions. In the event of loss of offsite power (LOOP), the power to the fuel oil service pump is lost and must be manually re-energized by the operators by procedure. Furthermore, if the fuel oil transfer pump fails to start to provide the fuel oil transfer to either day tanks, the licensee will have to declare the affected EDG inoperable per Condition G of ITS 3.8.3.

Please describe how the determination is made to declare which EDG is inoperable based on the above scenario.

RAI 1 RESPONSE

As described above, the two EDGs and their associated day tanks share a common pipeline, which is serviced by both the fuel oil transfer pump (safety related) (P-11) and the fuel oil service pump (non-safety related) (P-77), connected to a common fuel oil storage tank.

The normally in service, non-safety related, fuel oil service pump (P-77) operates continuously to supply fuel oil to both EDG day tanks (T-45A and B) to support EDG OPERABILITY to meet the Limiting Condition for Operation (LCO) for Specification 3.8.1, "AC Sources – Operating." The safety-related 11 EDG supplies Load Center 103, which in turn, supplies power to Motor Control Center (MCC) 131. Electrical power for the fuel oil service pump is supplied from MCC 131. The source breaker for MCC 131 is tripped (but not locked out) during load transfer from offsite power to the 11 EDG (or to the 1AR Transformer). MCC 131 can be re-energized to supply power to the fuel oil service pump following a loss of offsite power (LOOP) by pushing a button to close this source breaker as described later herein. Monticello has procedures in place to perform this action.

The redundant safety related fuel oil transfer pump (P-11) is normally maintained in a backup status to supply fuel oil to both EDG day tanks in the event that fuel oil service pump (P-77) is not in operation. Electrical power for the fuel oil transfer pump is supplied by MCC 142A which is supplied by the 12 EDG. MCC 142A remains energized during loss-of-power conditions.

In the event of a loss of the 11 EDG, coincident with a LOOP, the non-safety related, fuel oil service pump (P-77) is out-of-service (OOS). In the event of a loss of the 12 EDG, the safety related, fuel oil transfer pump (P-11) is OOS, again coincident with a LOOP. Monticello also has a procedure in place to crosstie the safety related (Division 1) Load Center 103 to the safety related (Division 2) Load Center 104 which could then be used repower a fuel oil pump, if required. Specification 3.8.1, Condition B provides 7 days for restoration with one EDG inoperable. If both EDGs were inoperable, Specification 3.8.1, Condition E provides 2 hours for restoration.⁽³⁾

In the event of a LOOP, the normally in service, non-safety related, fuel oil service pump (P-77) is initially load shed (i.e., de-energized due to the MCC 131 source breaker trip), and to restore it must be manually re-energized in accordance with the loss of normal offsite power procedure (C.4-B.09.02.B). On a loss of fuel oil flow to the EDG day tanks an alarm comes in and the Operators start the safety related fuel oil transfer pump (P-11) from the Control Room.

3. Specification 3.8.3, "Diesel Fuel Oil, Lube Oil, and Starting Air," is not applicable since the specification only provides actions for when the required inventory (or properties) of the parameters; fuel oil and lube oil inventory, fuel oil properties (or total particulates), and starting air receiver(s) pressure is not within limits.

If the safety related fuel oil transfer pump (P-11) were to fail to start, re-energization of the fuel oil service pump (P-77) would be expedited. The loss of normal offsite power procedure directs operations to re-energize MCC-131 (single push button⁽⁴⁾ on Load Center 103), which supplies the fuel oil service pump. The 8 hour operational capacity of the EDG day tank for the respective EDG allows both EDGs to start and continue to operate while this action is being performed. Only if the fuel oil service pump or the fuel oil transfer pump failed to start would the respective pump and associated EDG be declared inoperable.⁽⁵⁾

Additionally, the operators monitor the EDGs when they are in operation, including the fuel oil transfer system (pump running), as well as the respective EDG diesel fuel oil day tank volume.

NRC RAI 2

10 CFR 50.59(c)(1) states that “A licensee may make changes in the facility as described in the final safety analysis report (as updated), make changes in the procedures as described in the final safety analysis report (as updated), and conduct tests or experiments not described in the final safety analysis report (as updated) without obtaining a license amendment pursuant to Sec. 50.90 only if:

- (i) A change to the technical specifications incorporated in the license is not required, and**
- (ii) The change, test, or experiment does not meet any of the criteria in paragraph (c)(2) of this section.**

Furthermore, 10 CFR 50.59(c)(2)(iv) states that a license amendment should be obtained if the change “[r]esult in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the final safety analysis report (as updated)...”

Revision 27 of Monticello’s Updated Safety Analysis Report (USAR) Section 8.4.1, Safeguards Emergency Diesel Generator (EDG) Systems, states that “Operator action may be required within 8 hours to establish fuel oil transfer capability from the storage tank to the day tanks so that EDG operation may continue as long as needed.” This appears to be in the event of the fuel oil transfer pump failing to start during a LOOP event to provide fuel oil to either one of the two EDG day

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- 4. Therefore no electrical realignments / switching operations are necessary.
 - 5. Additionally, there is available a procedurally controlled portable gasoline powered pump available that can be lined up to transfer fuel from the diesel oil storage tank to either day tank. The portable pump has the necessary capacity to fill both day tanks with both EDGs operating, and is normally available within 8 hours. The pump is periodically tested to verify its readiness for service.

tanks. However, considering that the fuel oil transfer function is a safety-related function, the NRC staff could not identify any references that discuss the inclusion of the manual action to re-establish the fuel oil transfer function. The NRC staff considers performing a manual action for a safety-related function, such as re-establishing the fuel oil transfer, to meet the criteria 10 CFR 50.59(c)(2)(iv), in which the manual action could potentially impact the EDGs if not performed in a timely manner or incorrectly.

Please provide the USAR revision reference and justification for including the operator action in the USAR without the NRC staff's review.

RAI 2 RESPONSE

Consistent with 10 CFR 50.59(c)(1), NSPM has not made any changes in the facility as described in the Final Safety Analysis Report (FSAR) (as updated) since there was no identified discussion of the above considerations in the original FSAR (or docketed correspondence), which was later transformed into the Updated Safety Analysis Report (USAR). NSPM did *add* more detail to the USAR, as described in Revision 12 of Monticello USAR Section 8.4.1, Safeguards Diesel Generator Systems, that:

Operator action may be required within 8 hours to establish fuel oil transfer capability from the storage tank to the day tanks so that EDG operation may continue as long as needed.

This sentence, however, is a statement of fact reflecting the plant design, from initial licensing, and did not involve the addition of a new manual action. The necessity to perform this manual action was included in the design basis prior to initial licensing. The FSAR (and later the USAR) did not go into this level of detail until Revision 12. Again, no statement in the FSAR was identified where it can be shown that the AEC relied upon to make their determination of the safety adequacy conclusion. Also, the AEC SER's are silent with respect to this level of detail.

Hence, NSPM did not establish a new manual action requiring prior NRC approval; NSPM specified additional detail in USAR Revision 12 to clarify the design of the fuel oil transfer system. NSPM did not substitute a manual action for an automatic action, which would require Staff approval; NSPM more clearly specified the original design basis that was not specified previously. As such, NSPM controls the addition of this design information to the licensing basis.

Additionally, this does not appear to be an oversight or reflect an inadequate review by the AEC reviewer(s) during initial licensing, but reflects the common practice and the level of detail determined acceptable at the time. For example, a contemporaneous plant to Monticello, was designed and licensed with a similar EDG fuel oil transfer

system.⁽⁶⁾ This fuel oil transfer system design was reviewed by the NRC as part of the Systematic Evaluation Program (SEP) and determined acceptable as discussed in the associated NRC safety evaluation (Reference 4).

Also, the NRC determined in response to Generic Safety Issue (GSI) – 156, recognizing that the early licensed plants, of which Monticello was one, that licensing requirements had changed substantially in the early-to mid-1970's from when these early plants were licensed, and determined that a selected sample of these plants under the SEP was warranted to determine if changes, backfits, were required. The overall conclusion was for each of the individual generic issues of concern here, that backfit or establishment of additional licensing considerations on these plants were unnecessary, or were being addressed through other regulatory initiatives, and the GSIs were closed.

Consequently, imposing changes from the existing MNGP design (and licensing basis) for these systems, of which the EDG fuel oil transfer was one, is considered by NSPM to constitute a change in position by the NRC.

6. This plant has a similar configuration to MNGP with a non-Class 1E fuel oil transfer system; with a single supply line, a non-safety related and a safety related transfer pump, where one of the pumps normally supplied power from a non-Class 1E source.

REFERENCES

1. NRC e-mail from P. Tam to R. Loeffler, "Monticello - Draft RAI regarding TIA 2012-03 (TAC ME7933)," dated April 05, 2012. (Accession No. ML12096A461)
2. U. S. NRC to Northern States Power Company, "Safety Evaluation by the Division of Reactor Licensing U. S. Atomic Energy Commission in the Matter of Northern States Power Company Monticello Nuclear Generating Plant, Unit 1, Docket 50-263," dated March 18, 1970.
3. NUREG-0933, Report with Supplements 1-24, Resolution of Generic Safety Issues: Issue 63: Use of Equipment Not Classified as Essential to Safety in BWR Transient Analysis (Rev.1).
4. U. S. NRC to Consumers Power Company, "Palisades – Evaluation of SEP Topic VII-3, Systems Required from Safe Shutdown (EICS Matters)," dated December 31, 1981.