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Monticello Nuclear Generating Plant
Operated by Nuclear Management Company, LLC

February 23, 2004

L-MT-04-010
10 CFR Part 50
Appendix A, GDC 19

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

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

Generic Letter 2003-01: Control Room Habitability - Smoke Assessment

Reference 1: U.S. Nuclear Regulatory Commission Letter to NMC, "NRC Generic Letter 2003-01: Control Room Habitability," dated June 12, 2003.

Reference 2: NMC Letter to NRC, "Generic Letter 2003-01: "Control Room Habitability 60-Day Response," (L-MT-03-057) dated August 5, 2003.

Reference 3: NMC Letter to NRC, "Generic Letter 2003-01: "Control Room Habitability – Response To Commitments," dated November 25, 2003.

On June 12, 2003, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2003-01 requesting information concerning control room habitability (Reference 1). On August 5, 2003 (Reference 2), the Nuclear Management Company, LLC (NMC) provided a partial response and proposed an alternative course of action for the 60-day response as prescribed for in the generic letter. On November 25, 2003, NMC provided a schedule for the Monticello Nuclear Generating Plant (MNGP) for the commitments discussed within Reference 2. This submittal provides the response to the following commitment made in Reference 2:

> "Provide the results of a smoke assessment (GL 2003-01 item 1(b) part 2) for MNGP by February 23, 2004."

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This letter contains no new commitments and no revisions to other existing commitments. If you have any questions regarding this submittal, please contact Rick Loeffler, Senior Regulatory Affairs Engineer, at 763-295-1247.

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Nuclear Management Company, LLC

Enclosure

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

ENCLOSURE 1

GENERIC LETTER 2003-01: CONTROL ROOM HABITABILITY

SMOKE ASSESSMENT

On June 12, 2003, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2003-01 (Reference 1) requesting information concerning control room habitability. On August 5, 2003, (Reference 2) the Nuclear Management Company, LLC (NMC) provided a partial response and proposed an alternative course of action for the 60-day response as prescribed for in the generic letter. On November 25, 2003, (Reference 3) the NMC provided a schedule for the commitments made in the August 5, 2003 letter for the Monticello Nuclear Generating Plant (MNGP). This submittal provides the response to the following commitment made in the August 5, 2003 letter:

> "Provide the results of a smoke assessment (GL 2003-01 item 1(b) part 2) for MNGP by February 23, 2004."

The full text of the NRC request in GL 2003-01 for item 1(b) is shown in 'bold' text below. The commitment to provide the results of a smoke assessment in the February 23, 2004, letter pertains to the second part of the NRC request within GL 2003-01 for Item 1(b), underlined below.

1. **Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs [control room habitability systems] are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases. Emphasis should be placed on confirming:**

   (b) That the most limiting unfiltered inleakage into your CRE [control room envelope] is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. <u>Also, confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke</u>. [emphasis added]

Control Room Habitability Related Systems and Structures Description

The MNGP Control Room envelope (CRE) consists of the Control Room (CR) and the first and second floors of the Emergency Filtration Treatment (EFT) Building. The Control Room Heating and Ventilation and Emergency Filtration Train (CRV-EFT) System consists of two redundant heating, ventilation and air conditioning (HVAC) trains designed to maintain a habitable environment in the CR during normal and accident conditions. The system is designed to maintain the CRE at a positive pressure for radiological events and at a neutral pressure for events involving the release of toxic or hazardous chemicals. It is composed of the Control Room Ventilation (CRV) and the

Emergency Filtration Treatment (EFT) subsystems. The CRV Subsystem provides HVAC to the CRE during normal operation and accident conditions. One train of the CRV Subsystem is normally in operation with the redundant train in standby. The EFT Subsystem provides the CRE with filtered air to minimize the activity and dose under accident conditions. For a toxic or hazardous chemical release the EFT Subsystem is manually actuated and operates in a recirculation mode to isolate the CRE from outside air. The EFT Subsystem satisfies Section III.D.3.4 of NUREG-0737 (Reference 4), which imposes General Design Criteria 19 of 10 CFR 50 Appendix A.

The major system components of the CRV-EFT System are located within the CRE with the exception of the Seismic Class I ducts between the EFT Building and the CR. The CRE walls in the EFT Building are reinforced poured concrete with few penetrations. The CR ceiling and floor are steel reinforced concrete. Cable penetrations from the CR to the Cable Spreading Room are sealed. Periodic cable penetration seal inspections are performed to ensure that fire protection boundaries are maintained. Normal pathways (i.e., unfiltered supply ventilation pathways) have been sealed with blank flanges to eliminate potential sources of inleakage. Preventive maintenance procedures periodically direct the inspection of the system ductwork and dampers (including the damper seals). The integrity of the other system components have been reviewed during system walkdowns. Technical Specification (TS) surveillance testing verifies the capability of the EFT Subsystem to maintain a positive relative pressure. Test results confirm the ability to pressurize the CRE to greater than 0.25 inch water-column (WC), which provides margin to the TS limit of greater than 0.0 inch WC. Therefore, due to the design, construction and testing of the CRE, fires internal to the envelope should not spread outside the envelope.

The ASDS Panel area is located on the third floor of the EFT Building. The CRE consists of the CR and the first and second floors of the EFT Building. The ASDS Panel area on the third floor of the EFT Building is constructed the same as the rest of the EFT Building, i.e., of reinforced concrete construction. The integrity of the boundary between the CRE and the third floor of the EFT Building, where the ASDS Panel is located is demonstrated by periodic surveillance testing as described above. Also, the ASDS Panel area on the third floor of the EFT Building is continuously ventilated (pressurized) with outside air from a fan, when occupied, precluding smoke infiltration into this area from adjacent internal room structures.

Additionally, the CR is served by a breathing air system and self-contained breathing apparatuses (SCBA) are located within the CR for the use of the Operations shift complement. The SCBAs are equipped with a dual-purpose option allowing a wearer to connect to the Control Room Breathing Air System extending the time an SCBA may be worn.

Response

Guidance with respect to smoke assessment was taken from the most current available guidance, i.e., Appendix A, "Smoke Evaluation," contained in the first revision to NEI 99-03 (Reference 5).[1][2] Items from Appendix A to NEI 99-03 are shown in 'bold' text below and the NMC reply is provided in 'standard' text immediately thereafter.

1. **Verify that a single credible smoke event does not simultaneously result in contamination of the control room and alternate shutdown locations such that reactor control cannot be maintained from one of the locations.**

   Four different potential fire / smoke scenarios involving the CR or the Alternate Shutdown System Panel (located on the third floor of the EFT Building – outside the CRE) were considered.

   - Small electrical or transient combustible fire within the CRE.
   - Severe smoke condition within the CRE.
   - Smoke propagation within the Plant Administrative Building
   - Smoke propagation from outside - vicinity of the CR ventilation system intake

   <u>Small electrical or transient combustible fire within the CRE</u>

   In the event of a small fire within the CRE, which produces a modest amount of smoke, Operations or fire brigade personnel would extinguish the fire. Purging of smoke could be accomplished either by using the kitchen exhaust fan or by propping the CR door(s) open and manually deploying portable fans to exhaust the smoke, as deemed appropriate.

   <u>Severe smoke condition within the CRE</u>

   In the event of a severe smoke condition resulting from a fire within the CRE, the procedure for shutdown from outside the CR addresses evacuation of the CR and use of the ASDS Panel. This procedure addresses both immediate and delayed evacuation based on the extent of degraded habitability conditions within the CR. The CRE design and construction, as demonstrated by pressurization testing between the second and third floors of the EFT Building, demonstrate that a single fire cannot render both the CR and ASDS Panel uninhabitable, and that reactor control can be maintained from at least one of these locations.

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1 Note that NEI 99-03, Revision 2, Appendix A indicates that a design basis event does not need to be assumed simultaneous with the smoke event.

2 The original version of NEI 99-03, "Control Room Habitability Assessment Guidance," dated June 2001, contains Appendix E, "Smoke Infiltration Impact on Safe Shutdown," which was endorsed with small changes by the NRC in Regulatory Guide (RG) 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors," dated May 2003. The guidance of Appendix A is very similar to the previous Appendix E that was reviewed and found acceptable by the NRC in RG 1.196.

Smoke propagation within the Plant Administrative Building

In the event of a fire external to the CR, e.g., the Plant Administrative Building (a different fire zone from the CR), Operation Shift Supervision would take action by placing the CRV-EFT System in the Recirculation Mode in accordance with the system operating procedure, isolating the CR from the source. Depending on the specific location and severity of the smoke condition within the Plant Administration Building, Operations Shift Supervision could elect after a period of time to pressurize the CRE by activation of the appropriate EFT Subsystem ventilation unit (i.e., V-FE-11 or V-FE-12) in accordance with the operating procedure for the CRV-EFT Systems. This would stop or prevent smoke infiltration into the CRE, allowing safe shutdown to be achieved from the CR.

Smoke propagation from outside - vicinity of the CR ventilation system intake

Smoke propagation from an external plant fire (outside) that discharged smoke in the vicinity of both the CR and ASDS Panel ventilation system intakes, would be detected by a smoke detector located in the CR ventilation intake ductwork. Given a smoke alarm Operations Shift Supervision is instructed to isolate the CRE from the outside by placing the EFT Subsystem in the Recirculation Mode. Placing the system in the Recirculation Mode would prevent smoke infiltration into the CRE through the intake, allowing safe shutdown to be achieved from the CR.

As discussed above, only a severe smoke condition resulting from a fire within the CRE is expected to result in the need to evacuate the CR. The CRE[(3)] design and construction, as demonstrated by testing, demonstrate that a single fire cannot simultaneously render both the CR and ASDS Panel areas uninhabitable. Therefore, reactor control can be maintained from at least one of these locations.

2. Verify that a credible smoke event does not exist that could affect control room habitability while simultaneously blocking the normal egress path to the alternate shutdown panels or controls. Otherwise, verify that an alternate egress path exists and that it is addressed in plant procedures.

As discussed in the response to question 1, the only credible smoke event requiring CR evacuation is a fire in the CRE. Given the high degree of boundary integrity between the CRE and surrounding areas (including the third floor of the EFT Building) and that the normal route via the Plant Administration Building is supplied by a different ventilation system from the CRV-EFT System, a fire in the CR would not prevent reaching the ASDS Panel via the preferred path. However, even if this were the case, an alternate route to the ASDS Panel is available via the Turbine Building that traverses different fire zones. A credible

[3] Note that the third floor of the EFT Building housing the ASDS Panel shares the same construction as the first and second floors that are part of the CRE.

smoke event that could affect CR habitability while simultaneously blocking the preferred and alternate egress path to the ASDS Panel was not identified.

3. **Verify that sufficient procedural guidance exists to mitigate credible smoke events. Smoke response-procedures should contain provisions to manually align ventilation systems to exhaust smoke away from the control room and alternate shutdown panel when practical.**

   Operating procedures address maintaining CR habitability in the event of a toxic gas release and for reactor shutdown from outside the CR. Additional guidance is available to the operators with respect to smoke event response. A revision, tracked under the Monticello corrective action program,[4] is being made to the procedure for shutdown from outside the CR to enhance the response to smoke events.

4. **Verify that a sufficient number of control room operators per shift are qualified in the use of self-contained breathing apparatus (SCBA) if SCBAs are credited for success.**

   SCBAs are provided for use in the CR. Currently SCBA use is not relied upon for mitigation of a smoke event in the CR. However, all licensed operators standing watch are qualified in SCBA use and in the use of the Control Room Breathing Air System.

5. **Verify that the appropriate SCBA and smoke removal equipment are available and properly staged if credited for success.**

   SCBA equipment is staged and maintained by a procedure that provides for a periodic inspection and functional check. This procedure is performed monthly. SCBAs are located within the CR for use by the shift complement. Smoke removal equipment, i.e., smoke ejectors are staged and maintained by a procedure that also provides for a periodic inspection and functional check. Smoke ejectors are maintained at the Fire Brigade Room.

6. **Verify that initial and continuing training is performed to ensure familiarity with the success paths credited in a licensee's response to smoke events.**

   Training on the operating procedures for shutdown from outside the CR (which includes smoke response) and for responding to a toxic gas event is performed during initial licensed operator training and repeated periodically during licensed operator requalification training. Training is specifically provided to the operators on the use of SCBAs and the Control Room Breathing Air Supply System.

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4 The changes to the procedure for shutdown from outside the Control Room are being made to provide additional guidance. No situation was identified as described in Appendix A to NEI 99-03, Revision 1, where a success path was not assured.

References

1. U.S. Nuclear Regulatory Commission Letter to NMC, “NRC Generic Letter 2003-01: Control Room Habitability,” dated June 12, 2003.

2. NMC Letter to NRC, “Generic Letter 2003-01: “Control Room Habitability 60-Day Response,” (L-MT-03-057) dated August 5, 2003.

3. NMC Letter to NRC, “Generic Letter 2003-01: “Control Room Habitability – Response To Commitments,” dated November 25, 2003.

4. U.S. Nuclear Regulatory Commission, NUREG-0737, “Clarification of TMI Action Plan Requirements.”

5. Nuclear Energy Institute (NEI) 99-03, Revision 1, “Control Room Habitability Guidance,” dated March 2003.