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Monticello Nuclear Generating Plant
Operated by Nuclear Management Company, LLC

September 16, 2005

L-MT-05-099
10 CFR Part 54

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Monticello Nuclear Generating Plant
Docket 50-263
License No. DPR-22

Response to Three Requests for Additional Information Regarding the Monticello License Renewal Application (TAC No. MC6440)

References:
1) NMC letter to NRC, "Application for Renewed Operating License," dated March 16, 2005 (ADAMS Accession No. ML050880241)
2) NRC letter NMC, "Request for Additional Information (RAI) for the Review of the Monticello Nuclear Generating Plant License Renewal Application (TAC No. MC6440)," dated August 18, 2005 (ADAMS Accession No. ML052310013)
3) NRC letter NMC, "Request for Additional Information (RAI) for the Review of the Monticello Nuclear Generating Plant License Renewal Application (TAC No. MC6440)," dated August 18, 2005 (ADAMS Accession No. ML052310044)
4) NRC letter NMC, "Request for Additional Information (RAI) for the Review of the Monticello Nuclear Generating Plant License Renewal Application (TAC No. MC6440," dated August 18, 2005 (ADAMS Accession No. ML052310055)

Pursuant to 10 CFR Part 54, the Nuclear Management Company, (NMC) LLC submitted a License Renewal Application (LRA) (Reference 1) to renew the operating license for the Monticello Nuclear Generating Plant (MNGP).

On August 18, 2005, The U.S. Nuclear Regulatory Commission (NRC) issued three Requests for Additional Information (RAIs) regarding the LRA for the MNGP (References 2, 3, and 4).

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NMC responses to References 2, 3, and 4 are provided in their entirety in Enclosures 1, 2, and 3, respectively.

This letter contains no new regulatory commitments.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on September 16, 2005.

John T. Conway

John T. Conway
Site Vice President, Monticello Nuclear Generating Plant
Nuclear Management Company, LLC

Enclosures (3)

cc: Administrator, Region III, USNRC
Project Manager, Monticello, USNRC
License Renewal Project Manager, Monticello, USNRC
Resident Inspector, Monticello, USNRC
Minnesota Department of Commerce
Pillsbury, Winthrop, Shaw, Pittman; LLP (David Lewis)

ENCLOSURE 1

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION DATED AUGUST 18, 2005 (ADAMS ACCESSION NO. ML052310013)

A. NRC RAI 2.5.1-1

In Section 2.5.1.1 of the LRA, under the system function listing of 480V Station Auxiliary, it is stated that Motor Control Centers (MCCs) 132, 133A, and 142A are credited as supporting an Anticipated Transient Without Scram (ATWS) event. However, according to license renewal drawing LR-36298, MCC 132 is not included in the scope of license renewal. Please resolve the discrepancy.

NMC Response

MCC 132 Breaker B3230 supplies power to the tank heater for Standby Liquid Control (SLC) Tank T-200. The SLC System mitigates an ATWS event. The drawing is in error. Drawing LR-36298 will be revised to show MCC 132 as being within the scope of License Renewal.

B. NRC RAI 2.5.1-2

In Section 2.5.1.6 of the LRA, under the description of DC Battery, it is stated that the 24 Vdc batteries provide power for the nuclear instrumentation, process radiation monitors, and H2/O2 analyzer isolation valve position indication. Further, under the system function listing, it is stated that the 24 Vdc system continuously provides DC electrical power to the safety-related and nonsafety-related loads. However, the 24 Vdc system is not considered safety-related since the system is not required to provide the safety-related function of these loads. Please provide specific safety loads which are powered by 24 Vdc, and provide an explanation how these loads will perform the safety-related function in case the 24 Vdc non-safety power supply fails.

NMC Response

The 24 Vdc system provides power to the Source Range Monitors (SRMs) and the Intermediate Range Monitors (IRMs) in the Neutron Monitoring System (NMS). With the mode switch in SHUTDOWN and RUN, SRMs and IRMs are not required to be operable. Per the Technical Specifications, the SRMs and IRMs are only required to be operable when the mode switch is in REFUEL and STARTUP. The 24 Vdc system provides power to the SRMs and IRMs, but is not required for them to provide their Safety Related function. Failure of 24 Vdc power will initiate the safety functions (rod block and scram).

The Division I 24 Vdc system provides power for the output trip relaying (not the radiation monitors) for the Off-Gas Pretreatments monitors. In the event of a 24 Vdc failure for this relaying, offgas trip timers will conservatively trip the operating recombiner train after a 30-minute delay. Operability of the monitors themselves is not affected.

The Division I 24 Vdc system also provides power for the Flux-Tilt monitor. This monitor is classified as non-safety related and is not required for normal operation.

The Division II 24 Vdc system provides power for the Discharge Canal, Service Water, Radwaste Effluent, and Reactor Building Closed Cooling Water process liquid radiation monitors. These monitors are all classified as non-safety related. In the event of loss of Division II 24 Vdc, compensatory measures would be implemented for these radiation monitors in accordance with the applicable MNGP site procedures.

Finally, each divisions of 24 Vdc supplies power for the corresponding division of containment atmosphere monitoring system isolation valve position indication. Control power for the valves is provided by other sources. The valve position indication function does not meet the criteria of 10 CFR 54.4(a)(i), (ii), or (iii) for being within the scope of license renewal.

C. <u>NRC RAI 2.5.2-1</u>

In Section 2.5.2.4 of the LRA, under the description of Offsite Power/SBO Recovery Path, it is stated that the path boundary includes the 345 KV, 115 kV and 13.8 kV system components from the plant 4.16 kV buses out to the first switchyard breaker, which disconnects the plant from the 345 kV or 115 kV ring bus or the 13.8 kV system fed from the #10 transformer in the switchyard. Please confirm that the path boundary also includes the associated control circuits within the scope of aging management review.

<u>NMC Response</u>

The control circuits for the Offsite Power / SBO Recovery Path components within the scope of license renewal are included within the scope of aging management review. The control circuits are considered part of the "system components" referenced on Page 2-340 of the License Renewal Application (LRA). Control and power cables for Offsite Power are addressed on Page 2-341. Although this paragraph does not explicitly state that the control cables are included within the scope of aging management review, the intent of addressing them in the paragraph was to confirm that they are included.

Page 2-340 states:

> The Off Site Power System/Recovery Path boundary includes the 345 kV, 115 kV and 13.8 kV system components from the plant 4.16 kV buses out to the first switchyard breaker, which disconnects the plant from the 345 kV or 115 kV ring bus or the 13.8 kV system fed from the #10 Transformer.

Page 2-341 states:

> Control and power requirements for the switchyard circuit breakers are supplied from battery sources located in the 345 kV / 115 kV control houses. Cable leads from distribution cabinets are carried below ground in trenches and then direct buried to the circuit breakers.

D. NRC RAI 3.5.2.1.15-1

Section 3.3.2.2.10 of the license renewal application (LRA) mentions a Boral Coupon Surveillance Program but does not provide details of that program. The staff requests the applicant confirm that the Boral coupon surveillance program will continue to monitor degradation into the period of extended operation and to discuss the schedule for coupon removal and testing during this period to demonstrate continued Boral performance.

NMC Response

Subsection 3.3.2.2.10 of the LRA identifies the potential aging effects for Boral and the aging management programs credited for managing these effects. The subsection notes the Plant Chemistry Program is used to manage the aging effects by proper monitoring and control of spent fuel pool water chemistry. This program will apply throughout the period of extended operation. In order to confirm the continuing effectiveness of the Plant Chemistry Program, the One Time Inspection Program will be used to verify the effectiveness of plant chemistry. Although no aging effects have been identified based on Boral sample coupon test results spanning the last 20 years, a one-time inspection will be performed before the period of extended operation.

The one-time inspection will be satisfied through use of the Boral coupon surveillance program. The surveillance program was established to monitor Boral performance in conjunction with its use in high-density fuel storage racks at the MNGP. The program placed seven sets of coupons in the fuel pool to be removed on a periodic basis and tested for degradation. To date, six of the seven coupon sets have been removed and tested and no degradation has been found (see response to RAI 3.5.2.1.15-3 for test results). Testing methods include physical observations; neutron attenuation tests; weight, specific gravity, dimensional checks; and analysis for boron content. The final (seventh) coupon set will be removed and tested before the period of extended operation to satisfy the requirement for a one-time inspection. No further testing is proposed during the period of extended operation pending acceptable results from the final inspection.

E. NRC RAI 3.5.2.1.15-2

Section 10.2.1.2 of the Monticello USAR identifies bulging and binding concerns in eight storage slots. The staff requests the applicant discuss the cause of the bulging and to describe the analysis that was performed to conclude that the bulging is not a degradation mechanism requiring management nor a concern in the remaining storage slots.

NMC Response

The bulging and binding concern identified in the Updated Safety Analysis Report (USAR) was the result of initial Boral contact with water that occurred when the high-density fuel storage racks were initially placed in the spent fuel pool or due to water that was not removed during rack fabrication. The concern is not the result of a long-term age degradation effect. The high-density fuel storage racks in the spent fuel pool contain sheets of Boral, a borated aluminum neutron absorber, encapsulated between stainless steel sheets. The initial design was for the sandwiched Boral to be completely sealed from water exposure.

The swelling that occurred in the newly installed storage racks was the result of hydrogen generation that is produced due to corrosion when the aluminum cladding of the Boral first undergoes oxidation from exposure to water. When the fresh metal surface is wetted, there is initially a high rate of corrosion, with a high rate of hydrogen generation, until a protective oxide film is formed on the surface. After a short period of time the surface becomes inert and further reaction between the metal surface and water, and thus further hydrogen generation, is greatly reduced.

Most likely, due to an incomplete seal at the bottom of the storage slot, water entered the sandwiched area when the fuel rack was initially placed in the spent fuel pool. A complete seal at the top of the storage slot prevented the hydrogen from escaping until the pressure at the top of the slot overcomes the water hydrostatic head pressure at the bottom where the water in-leakage occurred. This pressure buildup caused the swelling described in Section 10.2.1.2 of the USAR. Hydrogen produced in the aluminum cladding became trapped in the space between the inner and outer stainless steel shrouds and caused the swelling within the first two to three weeks of the rack being placed in the pool. Vents were added to these racks to relieve hydrogen pressure. Vents were included in all subsequent rack designs, thus eliminating the possibility for additional swelling.

Swollen storage slots were re-formed and accepted for use with the exception of the eight identified in the USAR. It was reported to the NRC that these eight slots were re-sized to accept fuel assemblies. However, due to an inability to "shrink" swollen areas back to their original configuration, they would not be used unless a safety evaluation is completed. This is controlled by explicitly noting in the USAR that these storage slots are not available for use.

In summary, the swelling was the result of initial exposure of Boral to water with no venting path for the subsequent hydrogen generation. Once an oxide level was formed, hydrogen generation dropped significantly. LRA Section 3.3.2.2.10, which does not list general corrosion as an aging mechanism, is consistent with this conclusion. Once the venting modification was completed, the swelling described in the USAR no longer constituted a degradation mechanism requiring management.

As noted in response to RAI 3.5.2.1.15-3, coupon sample test results demonstrate neutron absorption degradation due to aging is not occurring.

F. NRC RAI 3.5.2.1.15-3

By letter dated April 14, 1978, the staff approved the use of Boral for use at Monticello. This approval indicates that Boral has been in service at Monticello for over 20 years. The staff requests the applicant provide the installation date of the Boral currently in the spent fuel pool. In addition, to demonstrate that Boral integrity has been maintained, the staff requests the applicant to provide the test results for the coupons, including areal density measurements.

NMC Response

The high-density fuel storage racks in the spent fuel pool contain sheets of Boral, a borated aluminum neutron absorber, encapsulated between stainless steel sheets. The stainless steel generally covers the Boral, but is provided with vent openings that expose small areas of Boral to treated water. The remaining low-density storage racks are constructed only of stainless steel.

Work was completed and released on July 13 and 14, 1978 to initially install the first two high-density fuel storage racks into the spent fuel pool. Work on the second set of two racks was completed on August 8 and 11, 1978. All four racks were subsequently removed and modified to address swelling concerns identified in a few tube locations (see response to RAI 3.5.2.1.15-2 for details). The racks were re-installed with work completed on September 28, 1978 and have remained in the spent fuel pool since that time. The remaining nine storage racks, of a slightly modified venting design, had work completed and released on September 20, 1979. One rack was rejected during inspections and replaced on December 23, 1980. Twenty-one Boral coupon samples (seven sample sets) were installed in the spent fuel pool on June 13, 1979.

Each Boral coupon is approximately 6-inch square and has a ring welded to it to allow it to be suspended from a stainless steel chain attached to a top-mounting piece. The top-mounting piece is designed to fit over the peripheral edge of a high-density fuel storage rack. Each sample set consists of two samples encased in the stainless steel "sandwich" array of the high-density fuel storage rack tubes and a third, bare, sample that consists of Boral without a stainless steel encasement. Thus, the 21 Boral coupons are distributed among seven sample sets of three samples each, labeled 1A, 1B, 1C, 2A, 2B, 2C, etc. For the two samples of each set which are encased in stainless steel, one sample has two holes drilled in the corners to simulate the first four high-density fuel storage racks installed. This is the "A" sample of each set. The second sample, or "B" sample, of each set has four holes drilled in the corners to simulate the remaining nine storage racks installed. The "C" sample of each set is the bare Boral sample.

Sample sets have been removed and sent offsite for laboratory analysis on a periodic basis. Methods used to evaluate samples include physical observations; neutron attenuation tests; weight, specific gravity, dimensional checks; and, analysis for boron content. The sample removal timeframe from the spent fuel pool and test results for sample sets are summarized below. The seventh and final sample set (7A, 7B, and 7C) has not yet been removed from the pool. Consistent with the One-Time Inspection Program, as described in the LRA, this last set will be removed and tested before the period of extended operation to verify the absence of reduction of neutron absorption capacity of the Boral. The objective of the final one-time inspection is to verify the continued effectiveness of the Plant Chemistry Program for aging management during the period of extended operation.

Coupon Set 1A, 1B, and 1C:

- This coupon set was removed in November 1979, shortly after initial installation in the pool in June of 1979. Test results could not be located for this initial set. However, based on the 1980 results, no degradation would be expected.

Coupon Set 2A, 2B, and 2C (removed May 1980):

- Areal Density (minimum corner values for each sample, an average value was not reported) (grams B-10/cm^2): 0.0166 (2A), 0.0166 (2B), and 0.0173 (2C).

- Test Report Summary: "The test results indicate that the B10 loading for each sample is significantly above the minimum requirement of 0.0135 grams B-10/cm^2."

Coupon Set 4A, 4B, and 4C (removed July 1985, note coupon set 4 and 3 were schedule swapped):

- Areal Density (minimum corner values for each sample, an average value was not reported) (grams B-10/cm2): 0.0165 (4A), 0.0165 (4B), and 0.0185 (4C).

- Test Report Summary: "There was no discernible chemical or corrosion attack to the samples. No pitting was observed." Also: "The B10 measurements were uniform and showed no change from the original value; within statistical limits of test method. All B10 measurements were significantly above the minimum level specified for the rack storage cells of 0.0135 grams B-10/cm^2."

Coupon Set 3A, 3B, and 3C (removed September 1990):

- Average Areal Density (grams B-10/cm^2): 0.0164 (3A), 0.0170 (3B), and 0.0195 (3C).

- Test Report Summary: "All three Boral coupons were intact with no sign of swelling or other degradation. The surfaces appeared to have the expected coating of hydrated aluminum oxide which inhibits corrosion. Consequently, it is concluded that the surveillance coupon measurements confirm that the Boral absorber in the storage racks is capable of continuing to perform its intended function."

Coupon Set 5A, 5B, and 5C (removed June 1995):

- Average Areal Density (grams B-10/cm^2): 0.0165 (5A), 0.0167 (5B), and 0.0188 (5C).

- Test Report Summary: "All three coupons were intact, but there were significant differences in their physical appearances. Coupons 5A and 5B appeared much the same as coupons 3A and 3B had appeared five years earlier, in 1990. There was nothing in the appearance of the coupons to indicate that any basic change had occurred during their immersion in the pool. Coupon 5C was not so unchanged, however, in that it differed from its earlier counterpart, Coupon 3C, by displaying many small blisters on each face of the Boral. Despite the inconsistent appearance of the surfaces of Coupon 5C, tests revealed that its nuclear properties had not been degraded."

Coupon Set 6A, 6B, and 6C (removed August 2000):

- Average Areal Density (grams B-10/cm^2): 0.0161 (6A), 0.0161 (6B), and 0.0178 (6C)

- Test Report Summary: "All three coupons were intact, but there were significant differences in their physical appearances. Coupons 6A and 6B appeared much the same as coupons 5A and 5B had appeared five years earlier (1995) and as coupons 3A and 3B had appeared ten years earlier (1990). There was nothing in the appearance of any of these coupons, all of which had been enclosed in stainless steel, to indicate that any basic change had occurred during their immersion in the pool. The appearance of Coupon 6C was different, however, in that it was similar to that of Coupon 5C in 1995, which showed numerous small blisters on both sides. The appearance of coupons 5C and 6C, which had not been enclosed in stainless steel, differed from that of their bare counterpart, Coupon 3C, whose 1990 examination showed no blisters. Despite the appearance of the surfaces of Coupon 6C (and of 5C earlier), tests revealed that its nuclear properties had not been degraded."

In summary, the bare coupons have demonstrated some physical change (blistering) over time. However, all coupons have retained their required neutron absorption capability above the minimum required of 0.0135 grams B-10/cm^2 and no discernable degrading trends were noted. In particular, this includes those sandwiched in stainless steel as designed into the high-density fuel storage racks. A final test (coupon set number 7) will be performed before the period of extended operation as part of the One-Time Inspection Program. Although not expected, any evidence of age related degradation that could affect neutron absorption would be evaluated for impact on intended function.

G. NRC RAI 3.5.2.1.15-4

Section 3.3.2.2.10 of the LRA indicates that loss of material, cracking, and reduction of neutron absorbing capacity of Boral will be managed by the Plant Chemistry Program and the One Time Inspection (OTI). The staff requests the applicant discuss how plant specific and industry-wide operating experience support the management of Boral through an OTI. In addition, the staff requests additional information related to the OTI described in Section B2.1.23 of the LRA for managing Boral. Specifically, the staff requests the applicant discuss the properties of Boral to be detected and trended and the acceptance criteria applied to Boral by the OTI.

NMC Response

Both industry and plant operating experience were reviewed to identify applicable aging effects and aging management programs for the Boral used in high-density fuel storage racks. Results are summarized in Section 3.3.2.2.10 of the LRA and discussed further below.

A review of industry experience on Boral was performed. Typical examples of coupon edge sample corrosion and blistering were identified but no major degradation or defects were noted. One example of poor quality Boral manufacturing at another facility was identified, but this did not affect the ability of the Boral to perform its intended function. None of the industry experience reviewed identified a failure of the Boral used in high-density fuel racks to perform its intended function, i.e., meet neutron absorption test acceptance criteria. Similar fuel rack designs with Boral are used at a number of other facilities, such as Browns Ferry, where the Plant Chemistry and One-Time Inspection Programs are used to manage Boral aging effects (refer to NRC ADAMS Accession Number ML052210484). Further, the potential aging effects resulting from sustained irradiation of Boral were previously evaluated by the staff and determined to be insignificant (refer to NUREG-1787, page 3-406, NRC ADAMS Accession Number ML040300170).

At the MNGP, a number of Boral properties are observed, measured, and tested on each sample coupon removed from the spent fuel pool. Physical observation, i.e., general appearance, including photographs, of the Boral coupons are documented upon removal from the stainless steel jackets. A neutron attenuation test, to within desired statistical confidence limits, to determine areal density (i.e., boron content) is performed. Dimensional, weight, and specific-gravity measurements are taken. Of primary concern is the thickness measurement to check for the presence of bulging or swelling and the neutron attenuation tests to confirm the continued presence of Boron-10. The license renewal intended function of the Boral of neutron absorption is confirmed by requiring areal density measurements of greater than 0.0135 grams B-10/cm^2 of surface area. Areal density measurements of all coupon sample tests to date, spanning approximately 20 years, have been well above acceptance criteria and no discernable trends or degradation have been noted (see response to RAI 3.5.2.1.15-3). These same inspection methods and acceptance criteria will be applied in the One-Time Inspection Program.

Based on plant test results and industry experience, the use of the Plant Chemistry Program during the period of extended operation will continue to provide effective management of the loss of neutron absorption capacity aging effect. This will be confirmed by performing one additional inspection of Boral coupons as part of the One-Time Inspection Program before the period of extended operation.

ENCLOSURE 2

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION DATED AUGUST 18, 2005 (ADAMS ACCESSION NO. ML052310044)

NRC RAI B2.1.2-1

In lieu of the ASME Section XI examination requirements described in the GALL Report for the Reactor Vessel Stabilizer Bracket attachment welds (Examination Category B-K for welded attachments for vessels, piping pumps and valves), MNGP's current relief request allows visual examination of the accessible areas of those welds to provide adequate aging management during the extended period of operation. The NRC staff considers this an exception to the GALL Report for the ASME Section XI In-Service Inspection, Subsection IWB, IWC, and IWD Program. MNGP completed a VT-3 examination of the accessible areas of those welds during the 2005 refueling outage with no reportable indications recorded.

To support the NRC staff evaluation, the applicant is requested to describe details of the type of weld that is used for this attachment. Describe applicable examination requirements at the time of vessel manufacture (when the attachments were welded to the vessel) and, if readily available, provide applicable examination results. Describe inspections or examinations, if any, of the welds that have been performed since initial start-up of the plant, including the inspection or examination methodology and available results. Describe stressors (or absence thereof) that are experienced by the welds (e.g. mechanical or thermal forces, fatigue) during normal operation, and state, based on MNGP's operating history, whether the welds have experienced stressors different from the normal operating stressors. Provide a summary of industry operating experience, to the extent known by the applicant, that is related to failures or indicated defects in similar welds or to successful examination of similar welds. Provide any other additional information that MNGP considers appropriate for the NRC staff to consider in its evaluation of this proposed exception to the GALL Report's description for the ASME Section XI ISI, Subsection IWB, IWC, and IWD AMP.

NMC Response

NUREG 1801, XI.M1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD aging management program, credits the ASME Section XI, Table IWB-2500-1, Examination Category B-H, for aging management of integral attachments for vessels (Note that NUREG-1801, XI.M1 identifies this exam category as B-H, however, for the ASME Section XI, 1995 edition through the 1996 addenda, the Exam Category should be B-K). ASME Section XI, Table IWB-2500-1, Category B-K, Item B10.10, requires a surface examination of the reactor pressure vessel (RPV) stabilizer bracket welds each inspection interval. As an alternative, NMC would only perform a surface examination on the stabilizer brackets if jet reaction forces or seismic design loads were experienced. In addition, NMC performed a one-time visual examination on the accessible surfaces of each bracket attachment weld and adjacent areas during the current in-service inspection (ISI) interval. Consequently, this alternative is considered an exception to NUREG-1801.

The RPV stabilizer bracket welds are not part of the NUREG-1801, XI.S3 ASME Section XI, Subsection IWF Program and therefore this alternative is not considered an exception for the NUREG-1801, XI.S3 aging management program.

1. <u>Description of Stabilizer Bracket Welds</u>

   Four stabilizer brackets are attached to the RPV at 0°, 90°, 180°, and 270° RPV azimuth at an elevation of 994 feet, 2 inches. The 3 1/2-inch thick stabilizer bracket is welded to the vessel with a double-bevel groove weld (3/16-inch root opening, 1/8-inch root face, and 30° groove angle) and a concave reinforcing fillet (1 3/4-inch radius minimum, all around including corners).

2. <u>Examination at Time of Vessel Manufacture</u>

   The examination requirements at the time of vessel manufacture are summarized below:

   > Before welding the stabilizer bracket to the reactor pressure vessel, an ultrasonic examination (UT) was conducted of the vessel shell surface where the bracket was to be welded. UT of the vessel shell was to a depth at least equal to the thickness of the bracket, and over the entire area of the subsequent connection plus a band all around this area of a width equal to half the thickness of the bracket. Any defect, which produced a reflection signal equal to or in excess of the reference standard, was unacceptable. Any area which contained rejectable indications could be arc-gouged, chipped or ground, and repaired. After repairing, re-examination would be conducted by the original method over an area, which covers the repair and 3 inches all around.
   >
   > After the stabilizer bracket was welded to the vessel, a magnetic particle examination was conducted on the weld. The area to be examined was magnetized near saturation, and then dry magnetic particles were applied to the surface. At least two separate examinations would be carried out on the area. The second examination would be with the magnetic flux approximately at right angles to that used in the first examination. The following relevant indications were considered unacceptable:
   >
   > - Any cracks and indications
   > - Rounded indications with dimensions greater than 3/16 inch

- Four or more rounded indications in a line separated by 1/16 inch or less edge-to-edge

- Ten or more rounded indications in any six square inches of surface whose dimension is no less than one inch with these dimensions taken in the most unfavorable location relative to the indications being evaluated.

The examination results during vessel manufacture testing were not readily available.

3. Visual Examinations

Visual examinations are capable of determining the general mechanical and structural condition of the stabilizer bracket welds. Discontinuities and imperfections such as loss of integrity at bolted or welded connections, loose or missing parts, debris, corrosion, wear or erosion that could affect the operability or functional adequacy of the component can be detected. Visual examinations can be performed remotely with essentially the same capabilities as a direct examination when conditions exist that limit reasonable accessibility. The visual examination will still provide reasonable assurance that the general mechanical and structural condition has not been affected by degradation and that the components are able to perform their intended function. A VT-3 visual examination of the stabilizer brackets was conducted in March of 2005 utilizing a flashlight and mirror. The examination looked for cracks or linear indication, wear, corrosion, and contaminants. No reportable indications were found on any of the four stabilizer brackets. This was the only examination of the stabilizer bracket welds since initial manufacture.

4. Likelihood of Degradation

Degradation to the stabilizer bracket welds is unlikely because:

- The original MNGP reactor vessel stress analysis report and the report provided in support of the power uprate concluded that the cumulative fatigue usage factor for the stabilizer brackets was extremely low and did not need to be considered for analysis for cyclic operation. Therefore, it is reasonable to expect that cracking due to fatigue would not occur.

- For carbon steel, Stress Corrosion Cracking (SCC) was not identified as an applicable aging mechanism consistent with Electric Power Research Institute (EPRI) TR-1003056, "Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools," Revision 3 and based on plant operating experience. In addition, the drywell is maintained in an essentially inerted atmosphere during operation along with the high temperatures of the reactor pressure vessel, which reduces the possibility of loss of material due to general corrosion.

- The MNGP does not use boric acid or a borated solution as a moderator in the reactor coolant system. Therefore, loss of material due to boric acid corrosion of external surfaces does not occur.

- The RPV stabilizers are connected with flexible couplings to the brackets on the RPV and to the biological shield wall. The RPV stabilizers, brackets, and their attachment welds are designed to withstand and resist local loads (jet reaction forces) and seismic loads while allowing axial and radial movement due to normal thermal growth. The ability to allow for thermal growth suggests that thermal fatigue would not occur.

- The RPV stabilizer brackets do not provide structural support during normal operation. The MNGP RPV has never experienced jet reaction forces or seismic events; therefore, the stabilizers, brackets, and attachment welds have not experienced the loads for which they are designed.

5. Surface Examination at Duane Arnold Energy Center

Like many other plants, the MNGP was designed and erected before the examination access requirements of ASME Section XI. However, because of design differences, the Duane Arnold plant was able to conduct surface examinations on portions of their stabilizer bracket attachment welds. Surface examinations conducted in April of 2005 at Duane Arnold did not reveal any reportable indications. No failures or defects of these or similar welds are known of by the MNGP staff.

6. Summary

In summary, there is no loading on the stabilizer brackets during normal operation. The stabilizers, brackets, and attachment welds have never experienced the loads for which they were designed. Degradation of the component is unlikely. These determinations, along with the alternative proposal to visually examine the stabilizer bracket welds during the current ISI interval and then again with a surface examination if local or seismic loads are experienced, ensure the continued structural integrity of the component.

ENCLOSURE 3

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION DATED AUGUST 18, 2005 (ADAMS ACCESSION NO. ML052310055)

A. NRC RAI 2.3.3.9-1

The diesel fire pump, diesel fire pump day tank, and interconnecting piping are highlighted on LRA Drawing LR-36051 within the scope of license renewal. However, the diesel fire pump day tank fill line is not highlighted. Verify whether the diesel fire pump day tank fill line is within the scope of license renewal in accordance with 10 CFR 54.4(a) and subject to an Aging Management Review (AMR) in accordance with 10 CFR 54.21(a)(1). If they are excluded from the scope of license renewal and not subject to an AMR, provide justification for the exclusion.

NMC Response

The Diesel Fire Pump Day Tank fill line is not within the scope of license renewal and is not subject to AMR. The Diesel Fire Pump Day Tank (T-100) is a 120-gallon capacity tank. The tank conservatively provides about ten hours of operation of the diesel-driven fire pump before makeup is required. This satisfies the requirements of NFPA-20, "Standard for the Installation of Centrifugal Fire Pumps", which states that the day tank capacity "...shall be sufficient to operate the engine for at least eight hours". In accordance with the Operations Manual for the diesel oil subsystem, the nominal fuel oil consumption of the diesel-driven fire pump is eight (8) gallons per hour. An alternate method of transferring fuel oil from the Diesel Oil Storage Tank (T-44) to the Diesel Fire Pump Day Tank is provided during emergencies and is governed by abnormal procedures in accordance with the MNGP Operations Manual. Under these situations, the Portable Gasoline Engine Powered Fuel Oil Pump (P-229) that is normally stored in Warehouse 2 is utilized. This portable pump is within the scope of license renewal and is subject to AMR. P-229 is evaluated in AMR-DGN, Emergency Diesel Generators System, since the diesel oil subsystem including fuel oil to the diesel-driven fire pump, is evaluated within this AMR. Under these emergency situations, P-229 is connected to the Diesel Oil Storage Tank using portable hoses. T-100 is filled by removing the 8" manhole cover from this tank and inserting the discharge hose from P-229. Consequently, utilizing the Portable Gasoline Engine Powered Fuel Oil Pump provides an alternate method of filling the Diesel Fire Pump Day Tank and the Diesel Fire Pump Day Tank fill line is excluded from the scope of license renewal and is not subject to AMR.

B. NRC RAI 2.3.3.9-2

On LRA Drawing LR-36664 (coordinates C-7), the KB/GB boundary and the system boundary break (Fire Protection Emergency Service Water) are at opposite ends of Valve RHRSW-46. This is the only valve on the drawing where they are at opposite ends. Verify if this is correct.

NMC Response

This is correct due to the fact that valve RHRSW-46 is scoped in the Fire Protection (FIR) System. There is typically no correlation between License Renewal system boundary breaks and piping classifications.

C. NRC RAI 2.3.3.9-3

On LRA Drawing LR-36664, the piping on the KB side (outlet) of Valve RHRSW-46 (coordinates C-7) is highlighted as being within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). On the continuation LRA Drawing LR-36048, the same piping is shown highlighted as being within the scope of license renewal per 10 CFR 54.4(a)(1) and (a)(3). Verify which paragraph of 10 CFR 54.4 is applicable to this piping for the LRA.

NMC Response

The piping on the "KB" side of valve RHRSW-46 on LRA drawing LR-36664 is highlighted in "green" since it is in the scope of license renewal in accordance with 10 CFR 54.4(a)(2) for non-safety connected to safety (FIR to ESW) and, non-safety affecting safety (NSAS) with respect to potential leakage/spray. It is also in the scope of license renewal in accordance with 10 CFR 54.4(a)(3) for the fire protection regulated event. The continuation of this piping is highlighted on LRA drawing LR-36048 in "red" and is in the scope of license renewal per 10 CFR 54.4(a)(3) due to the Fire Protection regulated event. The color-coding was performed in this manner to indicate these two separate criteria yet provide differentiation between the two criteria due to this particular piping segment in the FIR System being identified on two separate LR drawings.

D. NRC RAI 2.3.3.9-4

NUREG-1801, GALL Report, Section XI.27, Fire Water System, describes the requirement for aging management of the Fire Protection (FP) Water System. It recommends that an Aging Management Program (AMP) be established to evaluate the aging effects of corrosion, microbiologically influenced corrosion (MIC), and biofouling of carbon steel and cast iron components in FP systems exposed to water.

The fire detection and protection system is within the scope of license renewal because, as stated in the LRA.

The description above results in some Structures and Components (SCs) for this system being in-scope. Since some SCs in the FIR System are non-safety related and their failure could affect the capability of SR components to perform their safety function, they are in-scope in accordance with 10 CFR 54.4(a)(2). In addition, components are in-scope due to supporting Fire Protection in accordance with 10 CFR 54.4(a)(3).

LRA Section 2.3.3.9 discusses requirements for the fire detection and protection program, but does not mention trash racks and traveling screens for the fire pump suction water supply. Trash racks and traveling screens are not mentioned in LRA Section 2.3.3.3, Circulating Water System, or Section 2.4.8, Intake Structure.

The USAR states in part, "River water is turned through an angle of 81° to approach the plant along a channel excavated to elevation 898 feet. It enters the Intake Structure through a trash rack before dividing into two separate streams to the circulating water pump chambers. Each stream passes through two parallel automatically operated traveling screens, the service water pump bay and two parallel motor-operated sluice gates before reaching a circulating water pump. The center dividing wall permits dewatering of either pump bay. A normally closed gate in the wall can be manually opened during normal operation if a traveling screen is out of service for maintenance. Taking suction from the service pump bay are two 14,000 gpm make-up pumps and pumps for the station cooling, screen wash, and fire protection."

Trash racks and traveling screens are necessary to remove debris and prevent clogging for the FP water supply system. Trash racks and traveling screens are typically considered passive, long-lived components. Trash racks are located in a freshwater environment. Traveling screens are located in a freshwater/air environment. Although not specifically discussed in the USAR or LRA, trash racks and traveling screens are typically constructed of carbon steel material. Carbon steel in a fresh water environment or a freshwater/air environment is subject to corrosion. Explain the apparent exclusion of the trash racks and traveling screens that are located upstream of the fire pump suctions from the scope of license renewal and from requiring an AMR.

<u>NMC Response</u>

The trash racks are installed to remove large debris from entering the Intake Structure. Since the trash racks are an integral part of the Intake Structure, they were included within the scope of license renewal and are subject to AMR as part of the Intake Structure, for conservatism. They are identified in Table 3.5.2-8 (Structures and Component Supports-Intake Structure) of the LRA as carbon steel (Component Type) in both an atmosphere/weather and raw water environment and are subject to AMR due to loss of material. The Structures Monitoring Program manages the aging effect of loss of material for this component. The traveling screens are part of the non-safety related Circulating

Water System that supports normal plant operation. The traveling screens are provided for trash, fish, and vegetation removal to minimize the fouling and clogging of the Circulating Water System water box tube sheets and piping. However, for both the trash racks and the traveling water screens, build-up of debris is considered event-driven and not age related. Both the trash racks and traveling screens are non-safety related, non-QA, and non-seismic components.

During normal plant operation, the Circulating Water pumps (two pumps in operation) draw a significant flow of cooling water (292,000 gpm) through the bays of the Intake Structure to support the main condenser cooling requirements. This high flow rate (not including the normal Service Water flow rate that equates to an additional 10,000 gpm with two pumps in operation) creates the potential for debris and sediment to enter the bays. During emergency operation, when the Circulating Water pumps are not in operation, the Fire Pumps draw a small flow (1500 gpm/pump) of water through the bays with a corresponding low velocity. The low flow velocity creates an insignificant amount of debris and sediment to accumulate and the traveling water screens are able to pass a sufficient amount of water to support operation of the Fire Pumps. Additionally, the Fire Pumps themselves are equipped with suction strainers. Basket strainers are provided in the main fire pump discharge headers. Any significant degradation or failure of the traveling screens during normal power operation would be evident and detected by plant operators far in advance of a complete failure. Even in the case of total failure, floating or heavy debris would not affect the operation of the Fire Pumps due to the low velocities at the suction of these pumps. The screens are subject to periodic maintenance and replacement and are continuously monitored through main control room annunciation. Additionally, the river and atmospheric environments for these components are relatively non-aggressive. The traveling screens and trash racks are not required to perform a function during or following a design basis event, and therefore do not meet the scoping criteria of 10 CFR 54.4 (a)(l)(i), (ii), or (iii). There is no credible failure mode of the traveling screens and trash racks that could prevent satisfactory accomplishment of any of the functions identified in paragraphs 10 CFR 54.4 (a)(l)(i), (ii), or (iii). Therefore, the traveling screens and trash racks do not meet the scoping criteria of 10 CFR 54.4 (a)(2). The traveling screens and trash racks are not required to perform a function in support of the regulated events of 10 CFR 54.4 (a)(3).

Based on the above, the traveling screens and trash racks are not considered to meet the scoping criteria of 10 CFR 54.4 (a) and do not perform a licensee renewal intended function per 10 CFR 54.4 (b). Consequently, although the trash racks are within the scope of license renewal and are subject to AMR since they are an integral part of the Intake Structure and were included for conservatism, the traveling screens are not within the scope of license renewal and are not subject to AMR.

E. NRC RAI 2.3.3.9-5

The NRC's "Fire Protection Safety Evaluation Report" (undated), Section 3.1.2(3) states that "a sprinkler system will be installed to provide a means to cool hot gases that enter the cable tray area in the water treatment and ESF motor control center area." This sprinkler system is not shown on the License Renewal Boundary Drawings. Verify that this sprinkler system is within the scope of license renewal per 10 CFR 54.4(a)(3).

NMC Response

The sprinkler system installed to provide a means to cool the hot gases that enter the cable tray area in the water treatment and ESF motor control center areas as addressed in the Fire Protection Safety Evaluation Report dated August 29, 1979, Section 3.1.2(3), is not shown in the Fire System LR boundary drawings (P&IDs). However, the isolation valves to this sprinkler system are shown on License Renewal Boundary Drawing LR-36048, Fire Protection System (coordinates C, 7). Valve FP-142 is located at the Turbine Building 951' elevation and valve FP-145 is located at the Turbine Building 911' elevation. These locked-open valves are noted on the drawing as "FIREWALL SPRINKLER ABOVE LUBE OIL STORAGE TANKS." These two valves and the remainder of this sprinkler system (water curtain) are in the scope of license renewal per 10 CFR 54.4(a)(3) and are subject to AMR. These components are addressed in Table 3.3.2-9, Auxiliary Systems-Fire System-Summary of Aging Management Evaluation, of the MNGP LRA. The aging effects associated with these components are managed by both the Fire Water System and System Condition Monitoring (external environment) AMPs. However, in addition to the installation of this sprinkler system and in compliance with Appendix R of 10CFR50, Section III.G.2(c), the cable, equipment and associated non-safety circuits of the redundant trains are separated by a fire barrier (wall) having a minimum one-hour rating (two-hour barrier actually installed). This fire barrier (Walls T324 and T331) is addressed in Table 3.5.2-17, Structures and Component Supports - Turbine Building - Summary of Aging Management Evaluation, of the MNGP LRA. Both the Fire Protection and Structures Monitoring AMPs manage the aging effects associated with this component.

F. NRC RAI 2.3.3.9-6

The NRC's "Fire Protection Safety Evaluation Report" (undated), Section 4.3.1(7) states that "The licensee will provide foam application equipment for use in fighting potential lube oil fires in the turbine building." This foam application equipment is not shown on the License Renewal Boundary Drawings. Verify that this foam application equipment is within the scope of license renewal per 10 CFR 54.4(a)(3).

NMC Response

The foam application equipment addressed in the Fire Protection Safety Evaluation Report dated August 29, 1979, Section 4.3.1(7) concerns the two (2) sets of portable foam applicators for use in fighting potential lube oil fires in the Turbine Building. This portable equipment is not shown in the Fire System LR boundary drawings (P&IDs) since it is portable equipment. This equipment is in the scope of license renewal per 10 CFR 54.4(a)(3) and is stored in the Fire Brigade Room in the Plant Administration Building basement at MNGP. This equipment is not subject to AMR since it is inspected periodically (quarterly) under the Fire Protection Program procedures for fire brigade equipment and replaced on condition.

This issue is also addressed in Section 2.1.4.2.4, Fire Protection, of the MNGP LRA that states:

> Items such as fire extinguishers, fire hoses, portable lighting, and air packs were subjected to the MNGP's scoping and screening process. This process is consistent with the NRC Staff's guidance on consumables provided in NUREG-1800, Table 2.1-3.

This issue is further defined in Section 2.1.5.3, Component Classification (Passive, long-lived), of the MNGP LRA that states:

> c. Fire Extinguishers, Fire Hoses, and Air Packs
>
> Components such as fire hoses, fire extinguishers, self-contained breathing apparatus (SCBA), and SCBA cylinders are consumables that are routinely tested or inspected. The Fire Protection Program complies with the applicable NFPA safety standards, which specify performance and condition monitoring programs for these specific components. They are replaced as necessary. Therefore, while these consumables are in the scope of license renewal, they do not require an AMR.
>
> A component (or component commodity group) that was determined to be active or short-lived is not subject to an AMR, and is screened out by the process.

Consequently, this foam application equipment is in the scope of license renewal per 10 CFR 54.4(a)(3) but is not subject to AMR.

G. NRC RAI 2.3.3.9-7

The NRC's "Fire Protection Safety Evaluation Report (undated), Section 5.2.6 states that the Cable Spreading Room "will be provided with an automatic gas suppression system." This automatic gas suppression system is not shown on the License Renewal Boundary Drawings. Verify that this automatic gas suppression system is within the scope of license renewal per 10 CFR 54.4(a)(3).

NMC Response

The Cable Spreading Room, addressed in the Fire Protection Safety Evaluation Report dated August 29, 1979, Section 5.2.6.3, is provided with a total flooding automatic gas suppression system consisting of cylinder storage units pressurized with Halon 1301. Halon is discharged into the room through wide-angle nozzles. As stated in Section 2.1.4.4 (Evaluation Boundaries - License Renewal Boundary Drawings) of the MNGP LRA, the in-scope boundaries are depicted in the License Renewal Boundary Drawings. "The drawings consist of simplified process and instrumentation drawings (for the mechanical systems)" or P&IDs. The Halon gas suppression system does not appear in any of the MNGP P&IDs for the Fire System but rather in individual vendor drawings which are not included as part of the license renewal boundary drawing submittal package. The Cable Spreading Room Halon automatic gas suppression system is in the scope of license renewal. This is confirmed by and discussed in Section 2.3.3.9 (Fire System), Table 3.0-1 Mechanical and Civil Service Environments, Table 3.3.2-9, (Auxiliary Systems- Fire System - Summary of Aging Management Evaluation), Appendix A2.1.17 (Fire Protection) and Appendix B2.1.17 (Fire Protection) of the MNGP LRA. Therefore, the Cable Spreading Room automatic gas suppression system is in the scope of license renewal per 10 CFR 54.4(a)(3) and is subject to AMR.

H. NRC RAI 3.3.2.1.9-1

LRA Table 3.3.2-9 FIR refers to Notes J and 319 which describe the AMRs for copper alloy in heat exchangers. Provide justification for the conclusion specified in Note 319 that "the aging management program referenced is appropriate for the aging effects/mechanisms identified and provides assurance that the aging effects/mechanisms are effectively managed through the period of extended operation."

NMC Response

The Fire Water System aging management program provides for aging management of water-based Fire Protection System piping and components in accordance with applicable NFPA recommendations. The Fire Protection aging management program provides for aging management of fire barriers, the diesel-driven fire pump, and the halon fire suppression system. This is consistent with

NUREG-1801 since the GALL states in XI.M26 for the Fire Protection AMP that, "For operating plants, the fire protection aging management program (AMP) includes a fire barrier inspection program and a diesel-driven fire pump inspection program." As a result, both the Fire Water System and Fire Protection AMPs are credited for line items such as filter/strainers, manifolds, pump casings and valve bodies since these line items are applicable to both the diesel-driven fire pump (Fire Protection AMP) as well as the remainder of the water-based components (Fire Water System AMP). In this specific case, the Fire Protection Program and not the Fire Water Program manages the copper alloy heat exchanger (radiator) for the diesel-driven fire pump that is addressed in the Fire Protection AMP. Consequently, Note J was applied to this line item that states, "Neither the component nor the material and environment combination is evaluated in NUREG-1801." This is applicable since the diesel-driven fire pump copper heat exchanger, in both a treated water and raw water environment, is not addressed in Section VII.G of the GALL. Additionally, Note 319 was applied to this line item that states "NUREG-1801, Volume 2, Chapter VII (Auxiliary Systems), Section G.6 (Fire Protection) does not address this environment for the mechanical portion of the "Fire Protection" AMP (XI.M26). The aging management program referenced is appropriate for the aging effects/mechanisms identified and provides assurance that the aging effects/mechanisms are effectively managed through the period of extended operation" to further define this issue. As a result, the Fire Protection AMP is appropriate to manage the aging effects of heat transfer degradation and loss of material for the copper alloy diesel-driven fire pump heat exchanger addressed in Table 3.3.2-9, Auxiliary Systems- Fire System - Summary of Aging Management Evaluation, as defined in Appendix B, Section B2.1.17 of the MNGP LRA and, provides assurance that the aging effects/mechanisms are effectively managed through the period of extended operation.

I. **NRC RAI 3.3.2.1.9-2**

LRA Table 3.3.2-9 FIR shows that there is no AMP for stainless steel fasteners/bolting. Please explain why these fasteners/bolting do not require an AMP, such as defined by NUREG-1801 Vol. 2, Section XI.M18, "Bolting Integrity."

NMC Response

Table 3.3.2-9, Auxiliary Systems-Fire System-Summary of Aging Management Evaluation, identifies stainless steel fasteners/bolting "exposed to weather" and "plant indoor air" external environments. The MNGP materials science position, which is in accordance with EPRI 1003056 (Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools, Revision 3), is that these components do not have a surface exposed to an aggressive chemical species, do not have the potential for concentrating contaminants and are not subject to wetting other than their normal environment. Therefore, loss of material is not a potential aging effect as identified by Note 327. Additionally, there are no bolts with a specified minimum yield strength >150 ksi in the FIR System.

Crevice corrosion is a potential aging mechanism for wetted stainless steel under certain conditions. Crevice corrosion is strongly dependent on the presence of dissolved oxygen. Although oxygen depletion in crevices may occur as a result of the corrosion process, oxygen is still required for the onset of corrosion, and bulk fluid oxygen content or the presence of contaminants such as chlorides is necessary for the continued dissolution of material in the crevice. For systems with extremely low oxygen content (<0.1 ppm), crevice corrosion is considered insignificant. This form of corrosion requires a crevice where contaminants and corrosion products can concentrate. In addition to oxygen, moisture is required for the mechanism to operate. Alternate wetting and drying is particularly harmful as this leads to a concentration of atmospheric pollutants and contaminants if they are present. These conditions do not exist for stainless steel fasteners/bolting at MNGP.

Pitting corrosion is a potential aging mechanism for wetted stainless steel under certain conditions. Unless cupric, ferric, or mercuric halides are present in the environment, oxygen is required for pitting initiation. Areas where aggressive species can concentrate are particularly susceptible to pitting. Most pitting is the result of halide contamination, with chlorides, bromides, and hypochlorites being prevalent. Pitting is a significant aging effect for stainless steels when exposed to a corrosive environment. Any continuously wetted or alternately wetted and dried surfaces tend to concentrate aggressive species if they are present and are prone to pitting corrosion. These conditions also do not exist for stainless steel fasteners/bolting at MNGP.

For conservatism during the IPA process, the stainless steel fastener/bolting component was added as a "global" asset in both an "exposed to weather" and "plant indoor air" external environment to assure no components, materials or environments were inadvertently omitted from the evaluations. However, recent walkdowns of the Fire System revealed that there were no stainless steel fasteners/bolting "exposed to weather."

Consequently, the Fire System's stainless steel fasteners/bolting "exposed to weather" asset will be removed from Table 3.3.2-9. For stainless steel fasteners/bolting in a "plant indoor air" environment, there are no aging effects for the same reasons as stated above.

J. **NRC RAI 3.5.2.1.5-1**

LRA Table 3.5.2-05 refers to the Fire Protection Program as the AMP for carbon steel in air/gas. Provide justification for this conclusion.

NMC Response

LRA Table 3.5.2-5 refers to the Fire Protection Program as the aging management program for carbon steel with a fire barrier intended function in an air/gas environment. The scope of the Fire Protection Program PBD/AMP-013, Table 7.1 includes fire barriers with specific reference to carbon steel with an aging effect loss of material in a plant indoor air environment (i.e. air/gas environment). This is consistent with LRA Table 3.5.2-5.

K. **NRC RAI 3.5.2.1.5-2**

LRA Tables 3.5.2-05, 3.5.2-15, and 3.5.2-17 refer to the Fire Protection Program as the aging management program for fibrous fire raps (thermal insulating wool/fiber), cementitious fireproofing (thermal insulating mastic), and rigid board (thermal insulating board) in air/gas. Provide justification for this conclusion.

NMC Response

LRA Tables 3.5.2-5, 3.5.2-15, and 3.5.2-17 refer to the Fire Protection Program as the AMP for managing aging effects for fibrous fire wraps, cementitious fireproofing, and rigid board with a fire barrier intended function in an air/gas environment. The scope of the Fire Protection Program PBD/AMP-013, Table 7.1 includes fire barriers with specific reference to fibrous fire wraps, cementitious fireproofing, and rigid board with the aging effects cracking, delamination, and loss of material in an air/gas environment. This is consistent with LRA Tables 3.5.2-5, 3.5.2-15, and 3.5.2-17.

L. **NRC RAI 3.5.2.1-3**

LRA Tables 3.5.2-15 and 3.5.2-17 refer to the Structures Monitoring Program as the AMP for rigid board (thermal insulating board) in air/gas. Provide justification for this conclusion.

NMC Response

LRA Tables 3.5.2-15 and 3.5.2-17 refer to the Structures Monitoring Program as the AMP for managing the aging effect for gypsum board walls (rigid board) with fire barrier and HELB barrier intended functions in an air/gas environment. The scope of the Structures Monitoring Program PBD/AMP-027, Table 7.1 includes rigid board with the aging effect loss of material in an air/gas environment. This is consistent with LRA Tables 3.5.2-15 and 3.5.2-17.

Since gypsum board walls perform fire barrier and HELB intended functions, both the Structures Monitoring Program and the Fire Protection Program will manage the aging effect ensuring the intended functions will be maintained consistent with the CLB for the period of extended operation.