Northern States Power Company

Monticello Nuclear Generating Plant
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Monticello, Minnesota 55362-9637

February 12, 1996

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Notification of a Deviation from Licensing Basis Information
Concerning Tornado Effects on the Reactor Building Superstructure

This submittal provides notification to the NRC of an identified condition which is a deviation in implementation of the Monticello licensing basis. Evaluations performed as part of the Monticello design basis reconstitution project have determined that information, incorporated into the plant licensing basis by reference, is inconsistent with design basis information for the Monticello plant. In addition, this submittal provides clarification of licensing basis information submitted in response to an NRC generic letter dated May 17, 1978, concerning the movement of heavy loads.

The Monticello staff has identified that information incorporated by reference into the Updated Safety Analysis Report (USAR), concerning the capability of the Reactor Building superstructure to withstand tornado wind loading conditions, is inconsistent with the design basis for the structure as well as specific licensing basis statements contained in the USAR. Attachment A of this submittal provides a discussion of the Monticello Reactor Building design basis pertaining to wind and tornado phenomena, the licensing basis pertaining to wind and tornado phenomena, identification of the deviation from the facility licensing basis, a safety significance evaluation, and our planned corrective actions to correct this deviation. The planned corrective actions restore compliance with the current licensing basis. We have confirmed that the intent of the licensing basis has been satisfied with the existence of the identified deviation in that the guidelines of 10 CFR Part 100 are not exceeded as a result of postulated events. The Monticello staff has evaluated this concern for reportability in accordance with regulatory requirements. We have determined that the issue does not meet the criteria for reportability as contained in 10 CFR 50.73, 10 CFR 50.72, 10 CFR Part 21, 10 CFR 50.9, or the plant technical specifications. We have evaluated the potential for an adverse impact on the public health and safety. We have determined that a substantial safety hazard does not result from the postulated event and that a reasonable assurance of safety is maintained.

Attachment B provides clarification of information provided to the staff in response to an NRC generic letter dated May 17, 1978. The generic letter requested information concerning the

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movement of heavy loads in the vicinity of spent fuel and the protection of stored spent fuel. This clarification is subject to resolution of the licensing basis deviation described in Attachment A of this submittal.

This submittal is provided to inform the NRC staff of deviations from the licensing basis as described herein. The issue identified in Attachment A is to be resolved in accordance with the provisions established by 10 CFR 50.59. Information concerning the licensing basis issue described in Attachment A has been provided tc the nuclear industry via the Institute of Nuclear Power Operations (INPO) Nuclear Network due to potential industry interest. This submittal provides the following new commitment to the NRC to correct the deviation described in Attachment A:

> Modifications are to be implemented to resolve the deviation from the current licensing basis. The modification design will ensure that a failure of the structural members of the Reactor Building superstructure will not occur when exposed to tornado winds.

This submittal clarifies licensing basis information as described in Attachment B. This notification is provided in accordance with established guidance concerning modification of docketed non-legally binding commitments. Specifically, the information supersedes the Monticello response to item 9 submitted by letter dated July 21, 1978, "Control of Heavy Loads Near Spent Fuel" in response to NRC Generic Letter, dated May 17, 1978, concerning movement of heavy loads in the vicinity of spent fuel.

Please contact Marv Engen, Sr Licensing Engineer, at (612) 295-1291 if you require further information.

William J Hill

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Plant Manager
Monticello Nuclear Generating Plant

c: Regional Administrator - III, NRC
NRR Project Manager, NRC
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State of Minnesota, Attn: Kris Sanda

Attachments: (A) Evaluation of Reactor Building Superstructure Licensing Basis Pertaining to Tornado Events
(B) Clarification of Commitments Related to Protection of Spent Fuel from Potential Missiles

Attachment A

Evaluation of Reactor Building Superstructure
Licensing Basis Pertaining to Tornado Events

Monticello Reactor Building Design Basis

Design basis is defined in 10 CFR 50.2. The definition states:

> *Design basis means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and specific values or ranges of values chosen for controlling parameters as reference bounds for design. The values may be (1) restraints derived from generally accepted "state of the art" practices for achieving functional goals, or (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals.*

The Monticello Reactor Building is a reinforced concrete structure from the foundation at elevation 888'-3" to the refueling floor at elevation 1027'-8". The Reactor Building superstructure consists of I-beam framing covered with an outer layer of aluminum siding and an inner layer of steel siding. The siding extends from the refueling floor level, 1027'-8", to the top of the building, 1074'-2". The inner layer of steel siding is screwed to horizontal wind girts (members spanning the vertical I-beams). The outer layer of aluminum siding is screwed to horizontal sub-girts which are clipped to the inner siding. See Figure 1, page 9, this attachment, "Typical Reactor Building Panel Cross Section." The seams of the outer and inner layers of siding are caulked to minimize building leakage. The reactor building superstructure above elevation 1027'-8" is a non-Class I structure, in accordance with original plant design and any modification thereto. The structure was designed to meet design basis loads pertaining to a Class II structure while ensuring that the structure will not collapse during a Class I seismic event. The structure is part of secondary containment; however, it is not required to perform any secondary containment function during a tornado event.

Class II structures are defined as those structures which are not essential for the safe shutdown of the plant or for the removal of decay heat, but are required for power generation. The steel superstructure above elevation 1027'-8" provides secondary containment during normal plant operations and during postulated accidents such as a Loss of Coolant Accident (LOCA) or refueling accident. These accidents are not postulated to occur as a result of tornado events nor are tornado events postulated to occur during accident mitigation [Reference Monticello Updated Safety Analysis Report (USAR), Sections 12.2.1.2 and 12.2.2.1.1; and license application amendment 4, dated January 10, 1967]. The reactor building superstructure below elevation 1027'-8" is a Class I structure, in accordance with original plant design and any modification thereto. Class I structures are defined as those structures whose failure could cause significant release of radioactivity or which are vital to safe shutdown of the plant under normal or accident conditions and the removal of decay and sensible heat from the reactor.

The Reactor Building, including the superstructure, was designed to withstand wind forces based on a maximum wind velocity of 100 mph, 30 feet above ground with a gust factor of 1.1. Increases in wind velocity due to elevation are to be considered in accordance with Table 1(a) of ASCE Paper 3269 [Reference Monticello USAR Section 12.2.1.6]. The Reactor Building, excluding the steel superstructure, was designed to withstand tornado loading conditions resulting from a rotational wind having a tangential velocity of 300 mph, a differential pressure between inside and outside enclosed areas of 2 psi, and a torsional moment resulting from applying the rotational wind on one-half of the structure [Reference Monticello USAR Sections 12.2.1.4 and 12.2.1.8]. Additional design requirements pertaining to seismic loads, dead and live loads, etc., are provided in section 12.0 of the Monticello USAR.

Reactor Building Tornado Event Licensing Basis History

The current licensing basis is defined in NRC Inspection Manual, Part 9900, Technical Guidance as:

> *Current licensing basis (CLB) is the set of NRC requirements applicable to a specific plant, and a licensee's written commitments for assuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modification and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR Part 2, 19, 20, 21, 30, 40, 50, 51, 55, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions, and Technical Specifications (TS). It also includes the plant-specific design basis information defined in 10 CFR 50.2 as documented in the most recent Final Safety Analysis Report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee response to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.*

Northern States Power Company (NSP) submitted an application dated August 1, 1966, with the Atomic Energy Commission (AEC), predecessor of the NRC, for all necessary licenses for construction and operation of the Monticello nuclear facility. The facility construction permit was issued on June 19, 1967. The information contained in the application, including the Preliminary Safety Analysis Report, and in Amendments 1 through 8 to the application, was evaluated by the AEC staff as well as the Advisory Committee on Reactor Safeguards (ACRS). During this phase of the licensing for the Monticello Nuclear Generating Plant, a question was raised by the AEC staff regarding the plant design basis pertaining to tornado events.

Amendment 4 to the Monticello application, submitted January 10, 1967, provided a response to an AEC question which stated:

> *Describe the design basis for the plant to withstand the wind and pressure effects of tornadoes* (AEC question 3.9 contained in Amendment 4).

The Monticello response to this question restated the tornado wind loading design criteria. Further, the response to this AEC question clearly established the criteria as applicable to structures necessary to protect equipment and systems to permit safe shutdown of the reactor during tornado conditions and established the criteria as applicable specifically to that portion of the reactor building below the refueling floor. This information was subsequently incorporated into the Monticello Final Safety Analysis Report (FSAR) for AEC provisional operating license review and has been incorporated into section 12.2.1.8 of the Monticello USAR.

By amendment 9, dated November 7, 1968, to the Monticello license application, NSP filed the Monticello Final Safety Analysis Report (FSAR) in connection with application for a provisional operating license. Amendment 15, dated July 2, 1969, to the Monticello license application submitted revised information for the Monticello FSAR. Information submitted with this revision of the FSAR specifically excluded the reactor building superstructure from the listing of Class I structures and from the consideration of tornado loads presented in section 12.0 of the FSAR. This information is consistent with the Reactor Building design basis and was subsequently incorporated into the Monticello USAR.

On October 15, 1969, NSP submitted amendment 21 to the Monticello license application. This amendment provided response to AEC staff concerns regarding structural and seismic matters and a revision to the Monticello FSAR. Section 4.5 of the submittal identified concerns raised in AEC staff safety evaluation reports for GE BWR construction and operating permit applications for other facilities under review during the time frame of Monticello's provisional operating license process. Section 4.5.6 of amendment 21, titled "Tornado and Missile Protection - GE-BWR - Spent Fuel Storage Pool" provided resolution for the Monticello plant to the AEC staff concern identified in the section title. The resolution provided reference to GE Topical Report APED-5696 (November 1968), "Tornado Protection for the Spent Fuel Storage Pool," which examined (a) whether sufficient water could be removed form the pool to prevent cooling of the fuel and (b) whether missiles could potentially enter the pool and damage the stored fuel. The conclusions from APED-5696 as restated in section 4.5.6 of amendment 21 found that:

> *The fuel pool in a General Electric BWR reactor building is designed with substantial capability for withstanding the effects of a tornado, as this document shows. The design of the fuel pool makes the removal of more than five feet of water due to tornado action highly improbable. With 25 feet of water covering the fuel racks, the removal of five feet of water is of no concern. Protection against a wide spectrum of tornado-generated missiles is provided by the water which covers the fuel racks. It is shown that protection is provided against all tornado-generated missiles having a probability of hitting the pool greater than one per 1.4 billion reactor lifetimes. Typical potential missiles in this category include a spectrum ranging up to a 3-inch-diameter steel cylinder 7 feet long or a 14-inch-diameter wooden pole 12 feet long.*

Prior to submittal of amendment 21 to the license application, reference to APED-5696 was incorporated into section 3.4.1 of the FSAR by amendment 14, dated May 15, 1969, to the Monticello facility license application (which has subsequently been incorporated into Monticello USAR section 2.3.4.1). The information incorporated into the licensing basis references GE Topical Report APED-5696, "Tornado Protection for the Spent Fuel Storage Pool," as demonstrating adequate protection of the fuel pool area from tornado phenomena including possible effects of missiles.

Deviation from Licensing Basis

Evaluations performed as part of the Monticello design basis reconstitution project have determined that licensing basis information, incorporated by reference, concerning the protection of stored spent fuel from the possible effects of missiles resulting from tornado phenomenon, is inconsistent with design basis information for the Monticello Reactor Building superstructure . Specifically, information contained in GE Topical Report APED-5696, which has been incorporated into the Monticello licensing basis via reference, states the reactor building superstructure is designed to withstand tornado winds. This statement is inconsistent with the design basis and specific licensing basis information contained in the license application, FSAR, and USAR; in that the Reactor Building superstructure was not designed to withstand tornado winds. A review of design specifications and design information for the Reactor Building superstructure has been performed to resolve this inconsistency in the Monticello licensing basis. This review has confirmed that the Reactor Building superstructure was designed and constructed using design basis loads consistent with a Class II structure and that the design did not include tornado loads.

Further analysis of the Reactor Building superstructure's response to tornado phenomena has determined that the structural members will remain intact up to wind velocities of approximately 189 mph. This capability is above the current design basis for wind loading (which is applicable to the superstructure), but does not satisfy the tornado loading resulting from a tornado with 300 mph tangential wind speeds (which is beyond the design basis of the superstructure). Evaluation of the current superstructure's response to tornado phenomena has determined that the exterior aluminum siding will be blown off, the inner liner on the windward side of the structure will bear against the wind girts and remain intact, and the effect of lateral wind loading on the windward side results in excessive deformation which is expected to result in structural failure for tornado winds in both the north-south and east-west wind directions. This evaluation conservatively assumed that the tornado winds impact directly perpendicular to the windward face of the structure. For any winds not impacting directly perpendicular to the structure, the siding affixed to the structural members would be damaged; however, the structural members would remain intact.

Topical report APED-5696 recognizes that damage to the Reactor Building superstructure does occur. This damage, as indicated by the report, would consist of removal of portions of the roof decking and metal siding such that tornado winds could act upon the spent fuel pool water volume as well as deliver potential missiles to the pool. The topical report concludes that

the roof decking and siding, as well as other potential low weight and large cross-section missiles, are not of concern for imparting damage to the stored spent fuel. However, the topical report does not recognize the potential for damage to the structural members of the Reactor Building superstructure as the analysis considered the structural members as being designed to withstand tornado winds.

The current licensing basis concerning the protection of the public health and safety is to prevent damage to the stored spent fuel due to the adverse consequences of tornado phenomena. Our review of this issue has concluded that contrary to the conclusion of GE topical report APED-5696, failure of the structural members of the Reactor Building superstructure could occur under extreme tornado conditions, such that damage to stored spent fuel could occur as a result of impact by these structural members.

Safety Significance of Licensing Basis Deviation

Although a structural analysis of the Reactor Building superstructure indicates that the structural integrity of the steel superstructure is questionable during the extreme conditions of a tornado, an evaluation of radiological consequences demonstrates that the intent of the licensing basis has been maintained and satisfied in that 10 CFR Part 100 limits are not exceeded. Further, we have determined that the postulated event is not credible during a portion of the year and that the event is still of low probability during the portion of the year when a tornado is credible.

The maximum activity for tornado phenomena varies with geographic location. The Monticello plant is located at 45° 20' north latitude and 93° 50' west longitude in Wright County, Minnesota. The latitude of the Monticello plant places it at the northern edge of the region of maximum tornado frequency in the United States. However, only a few tornadoes have occurred in this vicinity. An average of 18 tornadoes per year since 1953 have occurred in Minnesota. Of this annual average number of tornadoes, 14 have occurred during the months of May, June and July, with the peak month being June. No tornadoes have been observed in Minnesota during the months of November through February. A potential for the occurrence of a tornado does exists for the remaining months of the year. [R.A. Keen, Minnesota Weather, p. 57]. Eight tornadoes were reported in Wright County during the period from 1916 through 1967. Monticello USAR section 2.3.4.1 states that the probability of a tornado striking a given point in the area of a 1° square, lying between 45° and 46° north latitude, and 93° and 94° west longitude, can be calculated to be $5X10^{-4}$ per year, or one tornado every 2000 years.

More recent information concerning the effects of tornado phenomena can be found in ANSI/ANS-2.3-1983, " Standard for Estimating Tornado and Extreme Wind Characteristics at Nuclear Power Sites." According to Figure 3.2-1 of ANSI/ANS-2.3-1983, the Monticello plant site is in an area where the probability of experiencing tornado wind speeds of 320 mph or greater is 10^{-7} per year. Similarly, Figures 3.2-2 and 3.2-3 of ANSI/ANS-2.3-1983 show that the probabilities of experiencing maximum tornado wind speeds of 260 mph and 200 mph or greater are 10^{-6} and 10^{-5}, respectively.

An independent calculation of the tornado strike probability has been performed using the more recent methods and data provided in NUREG/CR-4661, "Tornado Climatology of the Contiguous United States." The tornado strike probability was calculated as $1.59X10^{-4}$ per year using the methods of NUREG/CR-4661. Per the methodology contained in NUREG/CR-4661, the probability of a tornado of wind speeds greater than 207 mph striking the Monticello site is $6.55x10^{-6}$ per year, and the probability of a tornado strike with wind speeds greater than 158 mph is $1.58X10^{-5}$ per year.

Based on the structure's straight-line wind capacity of approximately 189 mph, the probability of the 158 mph tornado strike would seem to be the appropriate measure of the chance of exceeding the structure's capacity; however, other considerations make the probability of a 207 mph or greater tornado the more correct measure. First, the wind speed given for the categories considered represents the vector sum of the radial, vertical, horizontal, and translational components of the tornado winds; the straight line winds which the structure would experience during a 207 mph tornado would be less than 207 mph. Second, tornadoes vary in severity as they progress, and they are categorized according to the most severe level they attain; a 207 mph or greater wind speed tornado on average is only at these wind speeds for 24% of its path, and is at lower wind speeds for the remainder. Therefore, even if a tornado is categorized with wind speeds of 207 mph or greater, there is a 76% chance that it would be of a lower wind speed category at the time of impact at the plant site. Finally, the determination of the ability of the structure to withstand wind speeds of up to approximately 189 mph is a conservative calculation. For these reasons, $6.55x10^{-6}$, as the probability of a tornado of wind speeds greater than 207 mph striking the Monticello site per year, is the appropriate comparison to assess the potential for exceeding the structure's capacity.

Despite the low probability of the postulated event, if a tornado resulting in failure of the Reactor Building superstructure is postulated to occur such that significant damage to spent fuel results, it has been determined that the limits for radiation dose to the public established in 10 CFR Part 100 are not exceeded and that the spent fuel storage pool can maintain water volume. An evaluation has shown that the spent fuel storage pool is able to withstand the worst reasonable tornado-generated missile impact into/onto the pool structure based upon the acceptance criteria as defined in USAR section 12.2.1.4 for Class I structures, NUREG-0800, section 3.5.3 and NRC Regulatory Guide 1.142. No adverse impact on the pool structural integrity will occur as a result of a bounding impact of the Reactor Building crane or a bounding impact of a section of the reactor building superstructure. The evaluation determined that no excessive spent fuel storage pool leakage is expected due to the postulated bounding missiles. Penetration of the steel liner may occur; however, water inventory can be maintained via the reinforced concrete structure. Should penetration of the pool liner occur, leakage would readily be detected by a Main Control Room system trouble alarm. Isolation of the liner leak detection system would be performed to isolate the leakage. Instrumentation monitoring fuel pool water inventory, as well as isolation valves for the liner leak detection system, are located in the Class I portion of the Reactor Building and would thus be protected from the

adverse impacts of the tornado phenomena. Multiple diverse means of restoring pool water volume are available if necessary.

With assumed damage to stored fuel in the spent fuel pool, a calculation was performed which addresses the radiological implications of ruptured stored spent fuel assemblies. The evaluation concludes "... that it would be impossible to exceed 10 CFR Part 100 limits due to gap radiation release from the fuel in the fuel pool following damage to the structure due to high winds." This analysis assumed:

1) High winds and unstable atmospheric conditions will exist when the fission products are released from the fuel pool.

2) The isotopic content of the released gap activity is proportional to the core isotopic concentrations 24 hours after shutdown.

3) The receptor (exposed person) is exposed to the entire cloud of radioactive material; no reduction is taken due to exposure time.

It can readily be determined that the potential radiation dose to an individual at the site exclusion area boundary as a result of damage to all fuel assemblies stored in a full storage pool is well below the limits contained in 10 CFR Part 100.

Corrective Actions

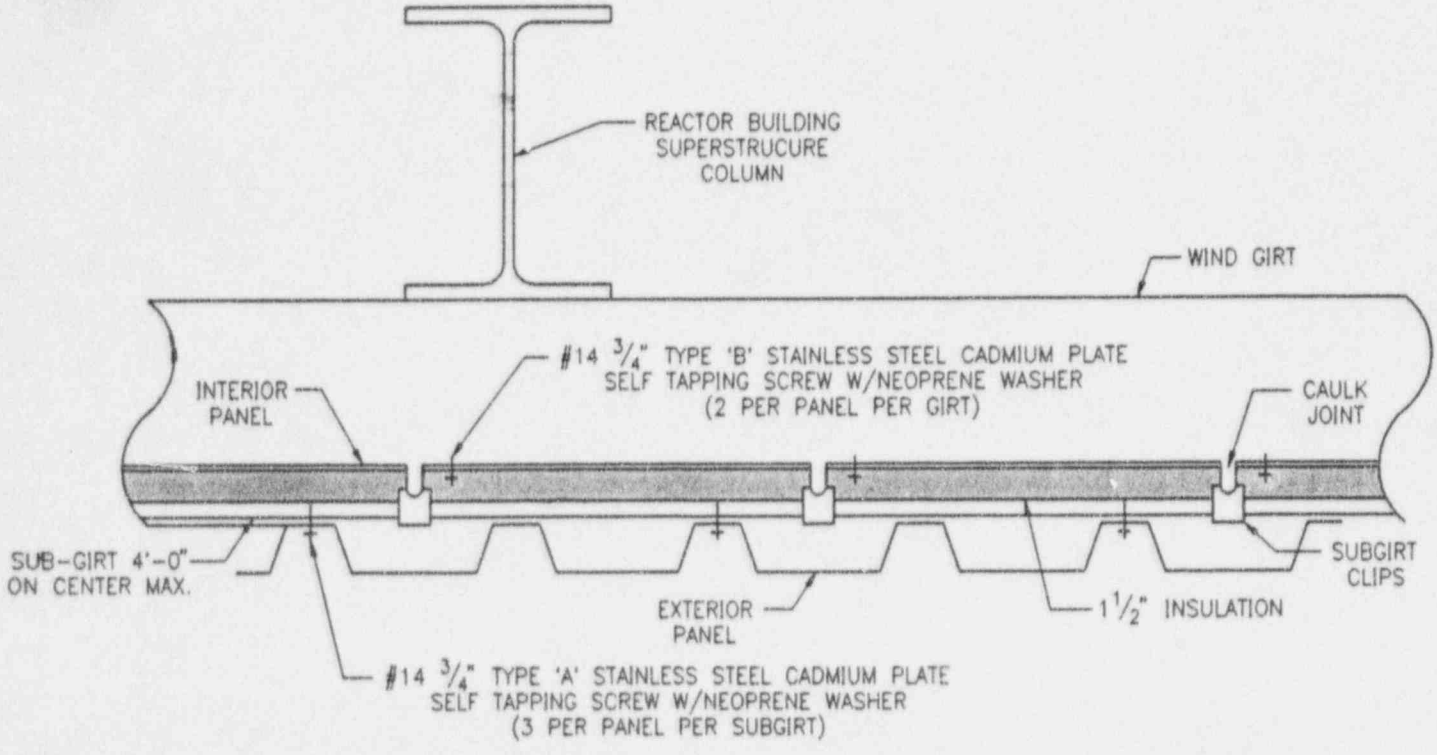
The Reactor Building superstructure consists of I-beam framing covered with an outer layer of aluminum siding and an inner layer of steel siding. Adjacent to the Reactor Building superstructure north and south wall vertical I-beam columns are located the Reactor Building overhead crane vertical support I-beam columns. To resolve the identified deviation from the current licensing basis, Monticello intends to perform modifications to the Reactor Building superstructure. These modifications will ensure that a failure of the structural members of the Reactor Building superstructure will not occur. Thus the potential for a failure of the superstructure resulting in missiles capable of damaging stored fuel will be eliminated. The modifications will consist of the following.

1) The north and south walls of the Reactor Building superstructure are to be strengthened by forming a composite beam from the existing vertical I-beam columns of the superstructure wall and the existing vertical I-beam columns which provide structural support to the Reactor Building overhead crane.

2) The east and west walls of the Reactor Building superstructure are to be modified to provide pressure relief during postulated wind conditions in excess of approximately 160 mph. Pressure relief is to be provided by establishing seams in the inner layer of steel siding along the wind girt such that the inner

layer will tear when exposed to the excessive forces of high winds, thus relieving the windward pressure force such that structural integrity is maintained.

These modifications are to be implemented following the Monticello 1996 refueling outage, which is currently scheduled to be completed in May of 1996. We have evaluated the risk of introducing foreign material into reactor systems by performing this modification concurrent with refueling outage activities against the risk of the postulated tornado phenomena. We have determined that a greater risk is posed to the facility if the proposed modification activities were to be performed concurrent with outage activities; therefore, we have elected to delay the structural modifications until after the 1996 refueling outage. We estimate that the proposed modification will be implemented within five (5) months of initiating construction activities.



TYPICAL REACTOR BUILDING PANEL CROSS SECTION

FIGURE 1

Attachment B
Clarification of Commitments
Related to Protection of Spent Fuel from Potential Missiles

By letter dated July 21, 1978, Monticello responded to an NRC generic letter, dated May 17, 1978, pertaining to movement of heavy loads in the vicinity of spent fuel. Question 9 of the information request enclosed with the generic letter stated:

> Discuss the degree to which your facility complies with the eight (8) regulatory positions delineated in Regulatory Guide 1.13 (Revision 1, December, 1975) regarding Spent Fuel Storage Facility Design Basis.

Our July 21, 1978, response stated:

> "The Monticello Plant conforms with the requirement of this guide with one exception. There are no interlocks provided to prevent cranes from passing over stored fuel when fuel handling is not in progress....Additional information on how the remaining seven regulatory positions of Regulatory Guide 1.13 are met can be found in Reference 1, 13, & 16."

References 1, 13 and 16 refer respectively to the Monticello Updated Safety Analysis Report; November 22, 1976 letter, "Design Report for Redundant Reactor Building Crane," L O Mayer to V Stello; and February 28, 1977 letter, "NRC Request for Additional Information on the Redundant Reactor Building Crane," L O Mayer to D L Ziemann.

A design basis review of the heavy loads issue has identified that the above statement is not accurate. Regulatory Guide 1.13, Regulatory Position C.2 states:

> "The facility should be designed (a) to keep tornadic winds and missiles generated by these winds from causing significant loss of watertight integrity of the fuel storage pool and (b) to keep missiles generated by tornadic winds from contacting fuel within the pool."

The Monticello licensing basis clearly states that the facility is designed to maintain the watertight integrity of the fuel storage pool; however, the licensing basis also states that the facility is not designed to keep tornado-generated missiles from *contacting* the fuel within the fuel storage pool. Amendment 21 to the Monticello Nuclear Generating Plant Final Safety Analysis Report (FSAR), section 4.5.6, responded to an AEC concern regarding spent fuel storage pool missile protection by stating the spent fuel storage pool is protected against a wide spectrum of tornado-generated missiles by the water which covers the fuel racks. The response to the AEC concern referenced GE topical report APED-5696, "Tornado Protection for the Spent Fuel Storage Pool", as providing the supporting technical analysis of this issue. Reference to APED-5696 was incorporated into section 3.4.1 of the FSAR by amendment 14, dated May 15, 1969, to the Monticello facility license application (which has subsequently been incorporated into Monticello USAR section 2.3.4.1), and states:

"Discussion of the expected effects of tornadoes on the fuel storage pool is included in a topical report, "Tornado Protection for the Spent Fuel Storage Pool" (November 1968) APED-5696."

The analysis provided in APED-5696 does not demonstrate that tornado-generated missiles will not contact the fuel. The analysis performed does demonstrate that:

1. Only large, slender objects, with the tornado winds acting on the maximum cross section and the object impacting the fuel pool with its minimum cross section, could potentially impart fuel damage.

2. Using conservative inputs, the probability of such missiles occurring was demonstrated to be low, 7×10^{-8}, and even in this highly unlikely case, a wide spectrum of these missiles can hit the pool without resulting in fuel damage or liner penetration.

3. A high degree of protection against tornado-generated missiles is provided for the spent fuel storage pool by the water which covers the fuel racks. Neither fuel damage or liner penetration is possible with any reasonable missiles.

The intent of Regulatory Guide 1.13, Regulatory Position C.2, the prevention of mechanical damage to stored fuel due to missiles generated by high winds, is demonstrated by the Monticello licensing documentation. We feel that this was the true intent of the statement made in our July 21, 1978, letter regarding Monticello's compliance with Regulatory Guide 1.13, Regulatory Position C.2. As such, we wish to clarify the record regarding compliance to Regulatory Guide 1.13. This clarification is subject to resolution of the issues discussed in Attachment A of this submittal. The commitment stated in our July 21, 1978, letter is modified to state the following (text revisions are indicated by bold text):

The Monticello Plant conforms with the **regulatory positions of Regulatory Guide 1.13** with **the following** exceptions:

Position C.2 - Discussion of the expected effects of tornadoes on the fuel storage pool is included in a topical report, "Tornado Protection for the Spent Fuel Storage Pool," (November 1968) APED-5696. Missile contact with the fuel is not precluded; however, the stored spent fuel is protected against a wide spectrum of tornado-generated missiles by the water which covers the fuel racks or the probability has been demonstrated to be below the regulatory threshold for those missiles with the potential to damage the fuel.

Position C.3 - There are no interlocks provided to prevent cranes from passing over stored fuel when fuel handling is not in progress. Such interlocks are considered unnecessary for three reasons. First, it is a good and commonly

known operating practice that heavy loads not be taken over critical areas; this practice is implemented administratively. Second, the travel path of heavy loads is such that they would not normally be carried over spent fuel; traveling over spent fuel would increase the travel path. Third, the redundant features of the modified crane as discussed in References 2 and 3 are such that the drop of any heavy load is highly improbable.

Additional information on how the remaining seven regulatory positions of Regulatory Guide 1.13 are met can be found in References 1, 2, & 3. **This information supersedes the Monticello response to item 9 submitted by letter dated July 21, 1978, "Control of Heavy Loads Near Spent Fuel," in response to NRC Generic Letter, dated May 17, 1978, concerning movement of heavy loads in the vicinity of spent fuel.**

References:

1 - Monticello Updated Safety Analysis Report

2 - November 22, 1976, Design Report for Redundant Reactor Building Crane, L O Mayer to V Stello

3 - February 28, 1977, NRC Request for Additional Information on the Redundant Reactor Building Crane, L O Mayer to D L Ziemann