October 6, 2005

Mr. Paul A. Harden
Site Vice President
Nuclear Management Company, LLC
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT— EXEMPTION FROM 10 CFR 50.68, "CRITICALITY ACCIDENT REQUIREMENTS," FOR LOADING OF INDEPENDENT SPENT FUEL STORAGE INSTALLATION CASKS (TAC NO. MC7366)

Dear Mr. Harden:

Nuclear Management Company, LLC's (NMC's) letter of June 21, as supplemented August 25, 2005, requested a license exemption from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.68(b)(1) for handling and storing fuel assemblies during cask loading, unloading, and handling operations for Palisades Nuclear Plant (PNP).

The Nuclear Regulatory Commission (NRC) staff has completed its review of NMC's proposed exemption, and grants the exemption pursuant to 10 CFR 50.12, "Specific Exemptions." However, the NRC staff places the following limitations and conditions on this exemption:

- This exemption is limited to the loading, unloading, and handling of Dry Shielded Canisters (DSCs) for only the Transnuclear (TN) NUHOMS®-32PT cask systems at PNP.

- This exemption is limited to the loading, unloading, and handling in the DSCs at PNP of Combustion Engineering 15 x 15 fuel assemblies, without burnable poison rod assemblies, that had maximum initial, unirradiated U-235 enrichments less than 3.6 weight percent.

- This exemption is limited to the one-time, loading, unloading, and handling of the seven TN NUHOMS®-32PT cask systems (224 fuel assemblies, total) scheduled for the October 2005 cask loading campaign at PNP.

- NMC proposed that the exemption remain valid until July 31, 2006. This will provide enough time for NMC to perform the necessary analyses and submit a license amendment request (LAR) to comply with 10 CFR 50.68. If NMC submits an LAR by July 31, 2006, this exemption will remain in effect until such time as the NRC staff either approves or denies the LAR. In this case, the NRC staff finds it acceptable to leave the exemption in effect because it will allow NMC to unload any previously loaded cask should it become necessary. However, if NMC does not submit a license amendment by July 31, 2006, this exemption will expire, and NMC will not be able to load, unload, or handle DSCs in the spent fuel pool (SFP). In its exemption supplement, NMC committed to complete supporting

criticality analyses and submit a LAR to allow credit for burnup to meet the requirements of 10 CFR 50.68(b)(1) in July 2006 or earlier.

- During DSC loading, unloading, and handling at PNP, the SFP soluble boronconcentration must be greater than or equal to 2500 ppm at all times.

A copy of the exemption has been forwarded to the Office of the *Federal Register* for publication.

Sincerely,

/RA/

L. Mark Padovan, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure: Exemption

cc w/encl: See next page

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UNITED STATES NUCLEAR REGULATORY COMMISSION

NUCLEAR MANAGEMENT COMPANY, LLC

PALISADES PLANT

DOCKET NO. 50-255

EXEMPTION

1.0 BACKGROUND

Nuclear Management Company, LLC (NMC) is the holder of Facility Operating License No. DPR-20, which authorizes operation of the Palisades Nuclear Plant (PNP). The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the Nuclear Regulatory Commission (NRC or Commission) now or hereafter in effect.

The facility consists of a pressurized-water reactor located in VanBuren County in Michigan.

2.0 REQUEST/ACTION

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.68(b)(1) specifies requirements for handling and storing spent fuel assemblies during cask loading, unloading, and handling operations. Section 50.68(b)(1) sets forth the following requirement that must be met, in lieu of a monitoring system capable of detecting criticality events:

> Plant procedures shall prohibit the handling and storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water.

NMC is unable to satisfy the above requirement for handling the 10 CFR Part 72 licensed contents of the Transnuclear (TN) NUHOMS®-32PT storage system. Section 50.12(a) allows licensees to apply for an exemption from the requirements of 10 CFR Part 50, if special circumstances are demonstrated. NMC's letter of June 21, as supplemented August 25, 2005, requested a license exemption from the requirements of 10 CFR, Part 50, Section 50.68(b)(1)

for handling and storing spent fuel assemblies during cask loading, unloading, and handling operations for PNP. NMC stated in its letters that complying with 10 CFR 50.68(b)(1) is not necessary for handling the 10 CFR Part 72 licensed contents of the cask system to achieve the underlying purpose of the rule. Additionally, NMC contends that complying with the rule in this case will result in undue hardship.

3.0 DISCUSSION

Pursuant to 10 CFR 50.12, "Specific Exemption," the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. These circumstances include the special circumstance listed in 10 CFR 50.12(a)(2)(iii), where "Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated."

In its exemption supplement of August 25, 2005, NMC provided a justification for satisfying the hardship special circumstance. The staff agrees with NMC that due to the short duration between the March 23, 2005, issuance of Regulatory Issue Summary (RIS) 2005-05, “Regulatory Issues Regarding Criticality Analyses for Spent Fuel Pools and Independent Spent Fuel Storage Installations” (ADAMS ML#043500532), and the scheduled October 2005 cask loading campaign at PNP, insufficient time exists for NMC to perform the required analyses necessary to demonstrate compliance with 10 CFR 50.68. RIS 2005-05 identified an acceptable methodology for demonstrating compliance with the 10 CFR 50.68(b)(1) requirements during cask loading, unloading, and handling operations in pressurized water reactor SFPs. The staff has determined that a hardship claim may be acceptable for licensees

that have previously scheduled loading campaigns commencing before March 31, 2006 (1 year after the issuance of the RIS). Therefore, the staff concludes that pursuant to 10 CFR 50.12(a)(2)(iii), NMC has provided sufficient justification to support a conclusion that undue hardship would occur if NMC were required to postpone its scheduled cask-loading campaign until it could comply with 10 CFR 50.68.

However, since NMC's justification is based on the time needed to perform the necessary analyses, the staff has determined that NMC must comply with the regulations within an appropriate amount of time. In its exemption supplement, NMC proposed that the exemption remain valid until July 31, 2006. This will provide enough time for NMC to perform the necessary analyses and submit a license amendment request (LAR) to comply with 10 CFR 50.68. If NMC submits an LAR by July 31, 2006, this exemption will remain in effect until such time as the NRC staff either approves or denies the LAR. In this case, the NRC staff finds it acceptable to leave the exemption in effect because it will allow NMC to unload any previously loaded cask should it become necessary. However, if NMC does not submit a license amendment by July 31, 2006, this exemption will expire, and NMC will not be able to load, unload, or handle dry shielded canisters (DSCs) in the spent fuel pool (SFP). In its exemption supplement, NMC committed to complete supporting criticality analyses and submit a LAR to allow credit for burnup to meet the requirements of 10 CFR 50.68(b)(1) in July 2006 or earlier.

The NRC staff also evaluated NMC's request to determine if NMC has provided reasonable assurance that it can conduct the proposed cask loading, unloading, and handling activities in a safe and effective manner. PNP's Technical Specifications (TSs) currently permit NMC to store spent fuel assemblies in high-density storage racks in its SFP. In accordance with the provisions of 10 CFR 50.68(b)(4), NMC takes credit for soluble boron for criticality control, and ensures that the effective multiplication factor (k_{eff}) of the SFP does not exceed 0.95 if flooded with borated water. Section 50.68(b)(4) also requires that if credit is taken for soluble boron,

the k_{eff} must remain below 1.0 (subcritical) if flooded with unborated water. However, NMC is unable to satisfy the requirement to maintain the k_{eff} below 1.0 with unborated water at all times, which is also the requirement of 10 CFR 50.68(b)(1). Therefore, NMC's request for exemption from 10 CFR 50.68(b)(1) proposes to permit NMC to perform spent fuel loading, unloading, and handling operations related to dry cask storage without being subcritical under the most adverse moderation conditions feasible by unborated water.

Appendix A, "General Design Criteria (GDC) for Nuclear Power Plants," of 10 CFR, Part 50, lists the minimum design requirements for nuclear power plants. According to GDC 62, "Prevention of criticality in fuel storage and handling," PNP must have physical systems or processes to limit the potential for criticality in the fuel handling and storage system. Section 5.1.7.3 of PNP's Updated Final Safety Analysis Report (UFSAR) describes PNP's compliance with GDC 62. Section 5.1.7.3 specifically references the design of the spent fuel storage racks to maintain a geometrically safe configuration that provides spacing and neutron poisons sufficient to maintain a k_{eff} of less than 1.0 when flooded with unborated water.

Section 50.68 of 10 CFR Part 50, gives NRC requirements for maintaining subcritical conditions in SFPs. Section 50.68 specifies criticality-control requirements that, if satisfied, ensure that an inadvertent criticality in the SFP is an extremely unlikely event. These requirements include appropriate, conservative criticality margins during handling and storage of spent fuel. Section 50.68(b)(1) states, "Plant procedures shall prohibit the handling and storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water." Specifically, 10 CFR 50.68(b)(1) requires NMC to maintain the SFP in a subcritical condition during handling and storage operations without crediting the soluble boron in the SFP water.

NMC received a license to construct and operate an Independent Spent Fuel Storage Installation (ISFSI) at PNP. The ISFSI permits NMC to store spent fuel assemblies in large

concrete dry storage casks (Horizontal Storage Modules). As part of its ISFSI loading campaigns, NMC transfers spent fuel assemblies to a DSC in the cask pit area of the SFP. NMC performed criticality analyses of a fully-loaded DSC with fuel having the highest permissible reactivity. It determined that a soluble-boron credit was necessary to ensure that the DSC would remain subcritical in the SFP. NMC is thus unable to satisfy the requirement of 10 CFR 50.68(b)(1) to ensure subcritical conditions during handling and storage of spent fuel assemblies in the pool with unborated water. Accordingly, NMC identified the need for an exemption from the 10 CFR 50.68(b)(1) requirement to support DSC loading, unloading, and handling operations, without being subcritical under the most adverse moderation conditions feasible by unborated water.

The NRC staff evaluated the possibility of an inadvertent criticality of the spent nuclear fuel at PNP during DSC loading, unloading, and handling. The NRC staff has established a set of acceptance criteria that, if met, minimize the potential for an inadvertent criticality event. In lieu of complying with 10 CFR 50.68(b)(1), the NRC staff determined that an inadvertent criticality accident is unlikely to occur if NMC meets the following five criteria:

- Criterion 1 - The cask criticality analyses are based on the following conservative assumptions:
  - No credit is taken for fuel-related burnable absorbers.
  - All fuel assemblies in the cask are unirradiated and at the highest permissible enrichment.

- The cask is assumed to be flooded with moderator at the temperature and density corresponding to optimum moderation.
- Only 75 percent of the Boron-10 in the fixed poison panel inserts is credited.

- Criterion 2 - NMC's ISFSI TSs require the soluble boron concentration to be equal to, or greater than, the level assumed in the criticality analysis. TS surveillance requirements specify periodically verifying the concentration both prior to, and during, loading and unloading operations.
- Criterion 3 - Radiation monitors, as required by GDC 63, "Monitoring Fuel and Waste Storage," are provided in fuel storage and handling areas to detect excessive radiation levels and to initiate appropriate safety actions.
- Criterion 4 - The quantity of other forms of special nuclear material (e.g., sources, detectors, etc.) to be stored in the cask will not increase the effective multiplication factor above the limit calculated in the criticality analysis.
- Criterion 5 - Sufficient time exists for plant personnel to identify and terminate a boron dilution event prior to achieving a critical boron concentration in the DSC. NMC must provide the following to demonstrate that it can safely identify and terminate a boron dilution event:
  - A plant-specific criticality analysis to identify the critical boron concentration in the cask based on the highest reactivity loading pattern.
  - A plant-specific boron dilution analysis to identify all potential dilution pathways, their flowrates, and the time necessary to reach a critical boron concentration.
  - A description of all alarms and indications available to promptly alert operators of a boron dilution event.
  - A description of plant controls that NMC will implement to minimize the potential for a boron dilution event.
  - A summary of operator training, and procedures that will be used, to ensure that operators can quickly identify and terminate a boron dilution event.

  In RIS 2005-05, the NRC identified an acceptable methodology for demonstrating

compliance with the 10 CFR 50.68(b)(1) requirements during cask loading, unloading, and handling operations in pressurized water reactor SFPs. The NRC staff has determined that licensee implementation of this methodology will eliminate the need to grant future exemptions for cask storage and handling evolutions. NMC submitted its exemption request on June 21, 2005, 3 months after the issuance of the RIS. Since the exemption request was submitted after the issuance of the RIS, and an acceptable methodology for complying with the regulation exists, the staff has determined that it is not appropriate to approve the exemption based on the 50.12(a)(2)(ii) special circumstance related to the underlying purpose of the rule.

In its August 25, 2005, supplement, NMC contends that due to the short duration available between the March 2005 issuance of the RIS, and the October 2005 planned cask loading campaign, an undue hardship exists. Section 50.12 of 10 CFR provides for a special circumstance that allows the staff to review an exemption request based on undue hardship. Specifically, 10 CFR 50.12(a)(2)(iii) states the following:

> Compliance would result in undue hardship or other costs that are significantly in excess of those contemplated when the regulation was adopted, or that are significantly in excess of those incurred by others similarly situated.

Since the NRC staff has determined that it is not appropriate to grant the exemption based on satisfying the underlying intent of the rule, it reviewed the exemption request based on the undue hardship special circumstance in 10 CFR 50.12(a)(2)(iii). In determining the technical acceptability of NMC's exemption request, the NRC staff reviewed NMC's criticality analyses submitted to support the ISFSI license application and its exemption request, and NMC's boron dilution analysis. For each of the aspects, the NRC staff evaluated whether NMC's analyses and methodologies provide reasonable assurance that adequate safety margins are developed, and can be maintained, in the PNP SFP during loading of spent fuel into DSCs for dry cask storage.

3.1 Criticality Analyses

The NRC staff's review of NMC's criticality analyses, as described in the Standardized NUHOMS® Fuel Safety Analysis Report, dated 6/30/04 (ADAMS ML#042120462), consists of four parts. First, the NRC staff reviewed the methodology and assumptions NMC used in its criticality analysis to determine if Criterion 1 was satisfied. NMC stated the following:

- It took no credit in the criticality analyses for burnup or fuel-related burnable neutron absorbers.
- All assemblies were analyzed at the highest permissible enrichment.
- All criticality analyses for a flooded DSC were performed at temperatures and densities of water corresponding to optimum moderation conditions.

In its exemption request, NMC provided the results of its optimum moderation analysis that effectively demonstrated that the optimum moderation condition had been identified. NMC also said that it credited 90 percent of the Boron-10 content for the fixed neutron absorber in the DSC. NUREG-1536, "Standard Review Plan for Dry Cask Storage System," states that "[f] or a greater credit allowance [i.e., greater than 75 percent for fixed neutron absorbers] special, comprehensive fabrication tests capable of verifying the presence and uniformity of the neutron absorber are needed." The NRC staff accepted a 90-percent credit for the fixed neutron absorbers as described in Section 6 of Appendix M of the Standardized NUHOMS® Final Safety Analysis Report. Therefore, for the purposes of this exemption, the staff finds a 90-percent credit acceptable on the basis that it has previously been reviewed and approved by the NRC. Based on its review of the criticality analyses and the information submitted in its exemption request, the NRC staff finds that NMC has satisfied Criterion 1.

Second, the NRC staff reviewed the proposed PNP ISFSI TSs. NMC's criticality analyses credit soluble boron for reactivity control during DSC loading, unloading, and handling operations. Since the boron concentration is a key safety component necessary for ensuring subcritical conditions in the pool, NMC must have a conservative ISFSI TS capable of ensuring

that sufficient soluble boron is present to perform its safety function. The ISFSI TSs applicable to the NUHOMS®-32PT DSC, and attached to the Certificate of Compliance No. 1004, contain the requirements for the minimum soluble boron concentration as a function of fuel assembly class, DSC basket type, and corresponding assembly average initial enrichment values. In all cases, the boron concentration required by the ISFSI TS ensures that the k_{eff} will be below 0.95 for the analyzed loading configuration. Additionally, NMC's ISFSI TSs contain surveillance requirements that assure it will verify the boron concentration is above the required level both prior to, and during, DSC loading, unloading, and handling operations. Based on its review of the PNP ISFSI TSs, the NRC staff finds that NMC has satisfied Criterion 2.

Third, the NRC staff reviewed the PNP's UFSAR, and the information provided by NMC in its exemption request, to ensure that it complies with GDC 63. GDC 63 requires that licensees have radiation monitors in fuel storage and associated handling areas to detect conditions that may result in a loss of residual heat removal capability and excessive radiation levels and initiate appropriate safety actions. In its exemption request, NMC stated that its radiation monitoring system consists of gamma-sensitive detector assemblies in the SFP area, with audible alarm at the initiating detector and in the main control room. NMC stated in its exemption request that operations personnel will investigate the cause of high radiation levels and initiate appropriate safety actions. Furthermore, NMC's compliance with GDC 63 is described in its UFSAR, Sections 5.1.7.4 and 9.11.4.4. Based on its review of the exemption request and the PNP UFSAR, the NRC staff finds that NMC has satisfied Criterion 3.

Fourth, as part of the criticality analysis review, the NRC staff evaluated the storage of non-fuel related material in a DSC. The NRC staff evaluated the potential to increase the reactivity of a DSC by loading it with materials other than spent nuclear fuel and fuel debris. The approved contents for storage in the NUHOMS®-32PT cask design are listed in the PNP ISFSI TS Limiting Condition for Operation (LCO) 1.2.1 "Fuel Specifications." This ISFSI TS LCO

restricts the contents of the DSC to only fuels and non-fissile materials irradiated at PNP. As such, PNP is prohibited from loading other forms of special nuclear material (e.g., sources, detectors, etc.) in the DSC. Therefore, the NRC staff determined that the loading limitations described in PNP's ISFSI TSs will ensure that any authorized components loaded in the DSCs will not result in a reactivity increase. Based on its review of the loading restrictions, the NRC staff finds that NMC has satisfied Criterion 4.

3.2 Boron Dilution Analysis (Criterion 5)

Since NMC's ISFSI application relies on soluble boron to maintain subcritical conditions within the DSCs during loading, unloading, and handling operations, the NRC staff reviewed NMC's boron dilution analysis to determine whether appropriate controls, alarms, and procedures were available to identify and terminate a boron dilution accident prior to reaching a critical boron concentration.

The NRC's letter of October 25, 1996, "Topical Report Evaluation of WCAP-14416, Westinghouse Spent Fuel Rack Criticality Analysis Methodology" (ADAMS #9610300008), issued a safety evaluation on licensing topical report WCAP-14416, "Westinghouse Spent Fuel Rack Criticality Analysis Methodology." This safety evaluation specified that the following issues be evaluated for applications involving soluble boron credit:

- events that could cause boron dilution
- time available to detect and mitigate each dilution event
- potential for incomplete boron mixing
- adequacy of the boron concentration surveillance interval

The criticality analyses performed for the NUHOMS®-32PT DSC are described in the FSAR for the Standardized NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel. NMC used the same criticality analysis methods, models, and assumptions for its boron dilution evaluation. These PNP criticality calculations are based on the KENO V.a code. The

calculations determined the minimum soluble boron concentration required to maintain subcriticality (k_{eff} < 1.0) following a boron dilution event in a NUHOMS®-32PT DSC loaded with fuel assemblies that bound the PNP fuel designs (Combustion Engineering 15 x 15 fuel). To ensure that the calculated critical boron concentrations were bounding for all loading conditions, NMC employed conservative fuel enrichments in its analysis. NMC's criticality analyses were based on 3.6 weight-percent Uranium-235 enriched fuel, as opposed to the 3.4 weight percent limit in the NUHOMS®-32PT DSC TSs. The results of these calculations for the bounding case indicate that subcriticality is maintained if the soluble boron concentration remains greater than or equal to 1850 ppm. PNP's ISFSI TSs require NMC to maintain the soluble boron concentration greater than 2500 ppm in the DSC at all times. NMC indicated that proposed Amendment 9 to the NUHOMS® Certificate of Compliance 1004 provides analyses to support a variable, minimum-required, soluble-boron concentration as a function of the initial enrichment of the fuel to be stored. NMC committed in its exemption request to not implement this proposed change. Instead, NMC will continue to conduct DSC operations at a boron concentration of greater than or equal to 2500 ppm.

TS surveillance requirements for the NUHOMS®-32PR Cask System require the boron concentration in the SFP, and in the water to be introduced in the DSC, to be verified as follows:

- within 4 hours prior to flooding the DSC cavity
- within 4 hours prior to inserting the first spent fuel assembly into the DSC
- reconfirmed at intervals not to exceed 48 hours until such time as the DSC is removed from the SFP

NMC's analysis identified all credible potential sources that could dilute the SFP to critical conditions. NMC determined that the limiting boron dilution event occurs when water from the

fire protection system, with a maximum flow rate of 210 gpm from a 1.5-inch diameter hose, is added to the SFP. NMC's calculations show that at least 4 hours will be available to terminate the event before the DSC water boron concentration decreases from 2500 ppm to the critical concentration of 1850 ppm, assuming a straight dilution to the SFP overflow limit and a feed and bleed operation thereafter with instantaneous complete mixing.

The Palisades' SFP is a large rectangular structure filled with borated water which completely covers the spent fuel assemblies. During loading, unloading, and handling activities, the DSC is located in a 9 by 9 foot area in the north east corner of the SFP. This area is open to the SFP, thereby ensuring that thermal currents within the pool will mix the volume near the DSC with the remainder of the pool.

To demonstrate that sufficient time exists for plant personnel to identify and terminate a boron dilution event, NMC described all alarms available to alert operators, and plant controls that will be implemented. There is no automatic level control system for the SFP; therefore, the SFP will overflow on an uncontrolled water addition. However, a high-level alarm in the control room would alert personnel of a potential boron dilution event within 45 minutes for a 210 gpm dilution rate; 30 additional minutes will elapse before the pool begins to overflow. From this point, NMC calculated that at least 3 more hours are available to mitigate the dilution event before the boron concentration is reduced to the critical concentration of 1850 ppm.

In its exemption request of June 21, 2005, NMC stated that "to ensure defense-in-depth regarding the detection of a boron dilution event, NMC will revise procedures to include a requirement that whenever a 32PT DSC is in the SFP and fuel is in the DSC, the SFP level will be monitored on at least an hourly frequency (via television monitor or locally) to ensure that the SFP is not overflowing, and that SFP water level is not unintentionally rising." Therefore, should a boron dilution event occur, the most conservative time for the individual to detect the event would be when the SFP begins to overflow. Assuming the pool water level starts just

above the low-level alarm setpoint, then at most 73.3 minutes could elapse since the start of the dilution. With a limiting value of 210 gpm of unborated water being added to the pool, there would be 2.96 additional hours to mitigate and terminate the event. The staff finds that this is acceptable.

To ensure that operators are capable of identifying and terminating a boron dilution event during DSC loading, unloading, and handling operations, NMC stated that operator training will be conducted. NMC said that during training activities, operators will receive revised alarm manual procedures, which verify that the SFP boron concentration is in compliance with the new ISFSI TS limit prior to the loading of a NUHOMS®-32PR DSC.

Based on the staff's review of NMC's exemption request dated June 21, 2005, and its boron dilution analysis, the staff finds that NMC has provided sufficient information to demonstrate that an undetected and uncorrected dilution from the TS required boron concentration to the calculated critical boron concentration is very unlikely. Based on its review of the boron analysis and enhancements to the operating procedures and operator training program, the staff finds NMC has satisfied Criterion 5.

Therefore, in conjunction with the conservative assumptions used to establish the TS-required boron concentration and critical boron concentration, the boron dilution evaluation demonstrates that the SFP and DSC will remain subcritical during spent fuel loading, unloading and handling operations.

Accordingly, the NRC staff concludes that since NMC has satisfied the five criteria, as described in Section 3.0 of this exemption, NMC has provided reasonable assurance that it can conduct the proposed cask loading, unloading, and handling activities in a safe and effective manner.

Section 50.68(b)(1) of 10 CFR was promulgated to require that adequate controls are in place so that the handling and storage of fuel assemblies is conducted in a manner that

provides reasonable assurance that the fuel assemblies will remain safely subcritical. Based on the NRC staff's review of NMC's exemption request, the staff has determined the following:

- NMC has demonstrated that sufficient controls are in place to provide reasonable assurance that there is no undue risk to public health and safety given conservative assumptions in the criticality analysis (Criterion 1).
- Surveillances periodically verify the boron concentration before, and during, loading and unloading (Criterion 2).
- Radiation monitoring equipment is used to detect excessive radiation and initiate appropriate protective actions (Criterion 3).
- Only fuel authorized by the ISFSI TSs will be loaded and stored in the ISFSI (Criterion 4).
- Boron dilution events have been analyzed, and there are sufficient monitoring capabilities and time for NMC to identify and terminate a dilution event prior to achieving a critical boron concentration in the cask (Criterion 5).

Therefore, the NRC staff concludes that NMC has established sufficient controls to ensure the fuel assemblies remain subcritical during loading, unloading, and handling within the SFP and DSC so that there is no undue risk to public health and safety.

This exemption results in changes to the operation of the plant by allowing the operation of the new dry fuel storage facility and loading of the NUHOMS®-32PT DSC

4.0 CONCLUSION

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security. Also, special circumstances are present. Therefore, the Commission hereby grants NMC, an exemption from the requirements of 10 CFR 50.68(b)(1) for the loading, unloading, and handling of the components of the TN NUHOMS®-32PT dry cask storage system at PNP. However, since NMC does not have an

NRC-approved methodology for evaluating changes to the analyses or systems supporting this exemption request, the NRC staff's approval of the exemption is restricted to those specific design and operating conditions described in NMC's June 21, 2005, exemption request. NMC may not apply the 10 CFR 50.59 process for evaluating changes to specific exemptions. Any changes to the design or operation of 1) the dry cask storage system; 2) the SFP; 3) the fuel assemblies to be stored; 4) the boron dilution analyses; or 5) supporting procedures and controls, regardless of whether they are approved under the general Part 72 license or perceived to be conservative, will invalidate this exemption. Upon invalidation of the exemption, NMC will be required to comply with NRC regulations prior to future cask loadings.

Based upon the review of NMC's exemption request to credit soluble boron during DSC loading, unloading, and handling in PNP's SFP, the NRC staff concludes that pursuant to 10 CFR 50.12(a)(2)(iii), NMC's exemption request is acceptable. However, the NRC staff places the following limitations/conditions on the approval of this exemption:

1. This exemption is limited to the loading, unloading, and handling of the DSC for only the TN NUHOMS®-32PT at the PNP.
2. This exemption is limited to the loading, unloading, and handling in the DSC at PNP of Combustion Engineering 15 x 15 fuel assemblies, without burnable poison rod assemblies, that had maximum initial, unirradiated U-235 enrichments less than 3.6 weight percent.
3. This exemption is limited to the one-time only loading, unloading, and handling of the 7 TN NUHOMS®-32PT cask systems (224 assemblies total) scheduled for the October 2005 cask loading campaign at PNP.
4. If NMC submits a LAR by July 31, 2006, this exemption will remain in effect until such time as the NRC staff either approves or denies the LAR. In this case, the NRC staff finds it acceptable to leave the exemption in effect because it will allow NMC to unload any previously loaded cask should it become necessary. However, if NMC does not submit a

license amendment by July 31, 2006, this exemption will expire, and NMC will not be able to load, unload, or handle DSCs in the SFP. In its exemption supplement, NMC committed to complete supporting criticality analyses and submit a LAR to allow credit for burnup to meet the requirements of 10 CFR 50.68(b)(1) in July 2006 or earlier.

5. During DSC loading, unloading, and handling at PNP, the SFP soluble boron concentration must be greater than or equal to 2500 ppm at all times.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (70 FR 57899).

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 6th day of October 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Ledyard B. Marsh, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation