September 3, 2004

Mr. Daniel Malone
Site Vice President
Palisades Generating Plant
Nuclear Management Company, LLC
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR GENERATING PLANT
NRC INSPECTION REPORT 07200007/2004-002 (DNMS)

Dear Mr. Malone:

On August 5, 2004, the NRC completed its routine spent fuel inspection activities at the Palisades Nuclear Generating Plant. The purpose of the inspections was to determine whether the pre-operational testing program and the subsequent Independent Spent Fuel Storage Installation (ISFSI) operations were conducted safely and in accordance with NRC requirements. At the conclusion of the onsite inspections, on June 24, July 9, July 16, and July 23, 2004, the NRC inspectors discussed the preliminary inspection findings with members of your staff. On August 5, 2004, at the conclusion of your initial dry fuel storage loading effort, a final exit meeting between members of your staff and the inspectors was conducted to discuss the inspection results.

The inspections consisted of examination of dry fuel storage activities at the Palisades Nuclear Generating Plant as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Areas examined during the inspections are identified in the enclosed report. Within these areas, the inspections consisted of a selective examination of procedures and representative records, observations of activities in progress, and interviews with personnel.

Based on the results of these inspections, the NRC did not identify any violations. The pre-operational testing program and the subsequent ISFSI operations were conducted in accordance with applicable regulations and license conditions. The NRC did identify two unresolved items regarding your staff's translation of the safe shutdown earthquake from the reactor site to the ISFSI pad and your staff's determination of the subsurface bearing stability beneath the ISFSI pad. The unresolved items are described in detail in Sections 1.1 and 1.3 of the enclosed report.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). The NRC's document system is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

We will gladly discuss any questions you may have regarding this inspection.

Sincerely,
/RA/
Kenneth O'Brien, Chief
Decommissioning Branch

Docket No. 072-00007
License No. DRP-0020

Enclosure: Inspection Report 07200007/2004-002

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REGION III

Docket No.	072-00007
Report No.	07200007/2004-002
Licensee:	Nuclear Management Company, LLC
Facility:	Palisades Nuclear Generating Plant
Location:	27780 Blue Star Memorial Highway Covert, MI 49043-9530
Dates:	June 21-24, July 6-9, July 12-16, July 19-23, and August 2-5, 2004
Inspectors:	Ross B. Landsman, Project Engineer Magdalena R. Dziedzic, Reactor Inspector Christopher R. Martin, Decommissioning Inspector Robert Temps, Senior Transportation and Storage Safety Inspector
Approved by:	Kenneth G. O'Brien, Chief Decommissioning Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Palisades Nuclear Generating Plant
NRC Inspection Report 07200007/2004-002(DNMS)

The purpose of the inspections was to review the licensee's pre-operational testing program and initial loading activities associated with the Independent Spent Fuel Storage Installation; including, the loading of four NUHOMS® dry shielded canisters, transfer of the canisters to the Independent Spent Fuel Storage Installation, and placement of the canisters in the horizontal storage modules.

On-Site Fabrication of Components and Construction of an Independent Spent Fuel Storage Installation

- The inspectors concluded that the licensee's written evaluation to verify that the ISFSI pad was designed to support the dynamic load of the NUHOMS® casks required further evaluation (URI 0720007/2004-002-1). (Section 1.1)

- The inspectors concluded that the licensee adequately evaluated the transfer of the NUHOMS® cask along the haul road. (Section 1.2)

- The inspectors reviewed that the licensee's slope stability analyses for the sand dunes surrounding the ISFSI pad and did not identify any issues. However, the inspectors determined that additional review will be needed of the licensee's subsurface bearing stability evaluation (URI 0720007/2004-002-2). (Section 1.3)

Pre-operational Testing of an Independent Spent Fuel Storage installation

- The inspectors concluded that the licensee's method for selecting spent for loading into the NUHOMS casks was consistent with the applicable CoC criteria. (Section 2.1)

- The inspectors concluded that the licensee's radiation protection practices and controls associated with loading of the NUHOMS casks were commensurate with the radiological hazards present. In addition, the inspector's radiation protection technicians closely coordinated their activities with the dry cask loading personnel to ensure safe operations. (Section 2.2)

- The inspectors determined that the licensee's training program was adequate and that the staff demonstrated an appropriate level of knowledge during loading of four NUHOMS® DSCs and during transfer of the loaded DSCs to the Independent Spent Fuel Storage Installation pad. (Section 2.3)

- The inspectors determined that the L-3 fuel building crane and associated building structures were adequate to lift and sustain loads up to 110 tons. The licensee appropriately incorporated into its heavy load procedure limitations on the crane's use under certain conditions. (Section 2.4)

- The inspectors concluded that the licensee met the applicable requirements specified in the CoC to perform welding and inspection activities associated with the DSC lids of the NUHOMS® cask. (Section 2.5)

- The inspectors concluded that the licensee's DSC lid cutting and removal methods met the CoC requirements. (Section 2.6)

- The inspectors concluded that the licensee's helium leak method met the CoC requirements. (Section 2.7)

- The inspectors concluded that the licensee's NUHOMS® cask loading procedure was adequate for dry storage cask loading activities. (Section 2.8)

- The inspectors determined that the licensee had conducted an adequate readiness review of the dry fuel storage process. However, the licensee initially did not document its resolution of or fully address each review finding. (Section 2.9)

- The inspectors concluded that the licensee implemented its program adequately and was ready to load spent fuel from the spent fuel pool into the dry shielded canister, transport the dry shielded canister to the Independent Spent Fuel Storage Installation pad, and then transfer the loaded dry shielded canister into the horizontal storage module. (Section 2.10)

Review of 10 CFR 72.212(b) Evaluations

- The inspectors concluded that the licensee's written evaluations of the cask system were adequate to demonstrate compliance with the requirements of 10 CFR 72.212(b). (Section 3.0)

Review of 10 CFR 72.48 Evaluation

- The inspectors concluded that the licensee's program for conducting design change reviews and its recent implementation were adequate. (Section 4.0)

Operation of Independent Spent Fuel Storage Installation

- The inspectors determined that the licensee's loading and transfer of four NUHOMS® dry shielded canisters to the Independent Spent Fuel Storage Installation pad was adequate and met the requirements in the CoC and associated Technical Specifications. (Section 5.0)

Report Details[1]

1.0 On-Site Fabrication of Components and Construction of an Independent Spent Fuel Storage Installation (IP 60853, IP 60856, IP 60856.1)

1.1 Storage Pad

a. Inspection Scope

The inspectors reviewed the licensee's written evaluations to verify that the Independent Spent Fuel Storage Installation (ISFSI) was designed to support the static and dynamic loads of the NUHOMS® dry fuel storage casks.

b. Observations and Findings

The Palisades Nuclear Generating Station is located in an area of active sand dunes, underlain by approximately 150 feet of compacted glacial deposits consisting of compacted dense till. Bedrock is located directly underneath the glacial deposits at an elevation of approximately 450 feet. The reactor site is located atop compacted glacial deposits at an elevation of 590 feet and the ISFSI pad is located at the top of a sand dune deposit, at an elevation of 625 feet.

The inspectors noted that the Final Safety Analysis Report (FSAR), Revision 21 and the Safety Evaluation Report (SER) both document that the upper sand dune deposits were removed for construction of the reactor site down to an elevation of 590 feet. The compacted glacial material underlying the sand dunes was not expected to amplify the earthquake input value which was transferred to it from the underlying bedrock. Therefore, the design basis site earthquake was not applied at bedrock, but at the top of the till deposits, at an elevation of 590 feet, where the reactor site foundation is located.

Title 10 Code of Federal Regulations (CFR) 72.212(b)(2)(i)(B) requires the licensee to account for potential amplification of earthquakes through soil structure interaction and subsequent potential soil liquefaction in the design of the ISFSI pad. The inspectors identified that the design ISFSI pad horizontal earthquake acceleration value was identical to the reactor site safe shutdown earthquake (SSE) value. However the inspectors could not determine how the licensee accounted for the differing soil structures at the reactor site (compacted glacial deposits) or the ISFSI pad (sand dunes) in its translation calculations to demonstrate compliance with 10 CFR 72.212(b)(2)(i)(B). The licensee's earthquake translation calculations and analyses, including any affect based on the differing soil structures, will be the subject of further review by the inspectors and is considered an Unresolved Item (URI) 0720007/2004-002-1.

c. Conclusions

The inspectors concluded that the licensee's written evaluation to verify that the ISFSI pad was designed to support the dynamic load of the NUHOMS® casks required further evaluation (URI 0720007/2004-002-1).

1.2 Haul Road

[1]A list of acronyms used in the report is included at the end of the Report Details.

a. Inspection Scope

The inspectors evaluated the licensee's engineering analysis for the haul road to verify that the road would sustain the NUHOMS® cask loads during transport from the reactor building to the ISFSI pad.

b. Observations and Findings

The licensee collected and analyzed soil borings along the anticipated haul route. The haul road was approximately one-half mile long and a part of the haul road was situated atop an abandoned railroad embankment. The licensee determined, based upon its analysis of the soil borings, that the haul road was structurally adequate to support the static load of a fully loaded NUHOMS® cask and its associated transport trailer. However, the inspectors determined that the licensee initially did not analyze the dynamic loads on the haul road resulting from a postulated seismic event. Subsequent to the inspectors finding the licensee evaluated the effects of a seismic event during transport along the haul road. The evaluation resulted in the licensee's determination that the cask could be recovered following a postulated railroad embankment failure. The inspectors determined that the licensee's analyses were appropriate.

The licensee also evaluated the consequences of a fully loaded NUHOMS® cask and its related transport trailer impacting the utilities buried underneath the haul road. The inspectors noted that the licensee determined that the buried utilities could withstand the loads associated with NUHOMS® cask transport activities.

c. Conclusions

The inspectors concluded that the licensee adequately evaluated the transfer of the NUHOMS® cask along the haul road.

1.3 Slope Stability

a. Inspection Scope

The inspectors evaluated the licensee's analyses of earthen slopes at the ISFSI pad to verify that an adequate safety margin existed to preclude the failure of the earthen slopes under static and dynamic loads.

b. Observations and Findings

The licensee used the methodology found in NUREG-1567, entitled "Standard Review Plan for Spent Fuel Dry Storage Facilities," Section 2.4.6.5, and NUREG-0800, entitled "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 2.5.5, to evaluate the subsurface bearing stability beneath the ISFSI pad. Included as a reference document in NUREG-0800 was NAVFAC DM-7, dated March 1971, entitled "Soil Mechanics, Foundations and Earthen Structures." The NAVFAC DM-7 document recommended a slope stability safety factor of no less than 1.5 for permanent or sustained loading conditions and a minimum safety factor of 1.15 for transient loads (e.g., seismic event loads). The licensee's initial analyses of the dynamic loads did not result in a safety factor of 1.15 for all cases. However, the inspector had not completed reviewing the soil parameters used by the licensee in the slope stability calculations (i.e., soil boundary uncertainties and soil properties). The

licensee's subsurface stability calculations will be the subject of further review by the inspectors and is considered an Unresolved Item (URI) 0720007/2004-002-2.

The inspectors reviewed the licensee's calculation of slope stability safety factors for all sand dune slopes surrounding the ISFSI pad whose failure could adversely impact the safety of the pad and the NUHOMS® cask(s) and did not identify any issues with the calculations.

c. Conclusions

The inspectors reviewed that the licensee's slope stability analyses for the sand dunes surrounding the ISFSI pad and did not identify any issues. However, the inspectors determined that additional review will be needed of the licensee's subsurface bearing stability evaluation (URI 0720007/2004-002-2).

2.0 Pre-operational Testing of an Independent Spent Fuel Storage installation (Licensee Dry Run) (IP 60854, IP 60854.1)

2.1 Licensee Fuel Characterization

a. Inspection Scope

The inspectors evaluated the licensee's selection of fuel for loading into the dry casks to verify that the licensee selected fuel that met the Certificate of Compliance (CoC) criteria.

b. Observations and Findings

The inspectors noted that the licensee's characterization of spent fuel included a review of the historical records for each of the fuel assemblies stored in the spent fuel pool. The licensee's initial step in the spent fuel selection process was to determine which assemblies had an enrichment of greater than 2.0 percent and less than 3.4 percent uranium-235 in accordance with the CoC. The licensee determined that 356 fuel assemblies met the criteria. The licensee then identified those assemblies that were ultrasonically inspected for fuel cladding integrity or monitored to identify spent fuel off-gassing following their removal from the reactor core. The licensee identified 140 intact assemblies that were acceptable candidates for placement in the NUHOMS® cask. The licensee conducted additional visual inspections of the assemblies in an effort to identify any structural damage (i.e., grid damage). The licensee determined that all 140 pre-selected assemblies were acceptable for placement in the NUHOMS casks.

The inspectors noted that the licensee's highest calculated heat load for a load dry shielded canister (DSC) was 17 kilowatts (Kw) which is less than the maximum value of 24 Kw specified in the CoC for each NUHOMS® cask. The inspectors also noted that the licensee increased the decay heat value for each spent fuel assembly by 5 percent, for added conservation, when it calculated the DSC heat load.

c. Conclusions

The inspectors concluded that the licensee's method for selecting spent for loading into the NUHOMS casks was consistent with the applicable CoC criteria.

2.2 Radiation Protection Program

a. Inspection Scope

The inspectors evaluated the licensee's radiation protection program as it related to the operation of the ISFSI; including the loading of four NUHOMS® casks and the subsequent transfer of the loaded casks to the ISFSI pad.

b. Observations and Findings

The inspectors noted that the licensee's radiation protection (RP) staff pre-planned for the NUHOMS® cask loadings and the plan was commensurate with the expected radiological hazards. The licensee's RP staff considered lessons learned from other utility and previous onsite spent fuel loading campaigns during development of the radiological controls for the loading efforts. The radiation protection plan for the loading efforts included As-Low-As-Reasonably-Achievable (ALARA) provisions, RP instructions, and radiological hold points in loading the spent fuel and storage of NUHOMS® casks at the ISFSI pad.

The licensee's staff established appropriate acceptance criteria to ensure that radiological limits as set forth in administrative plant procedures and the CoC, were met. The licensee's RP staff developed a comprehensive radiation protection work instruction which contained the aforementioned limits. The work instruction provided the radiation protection technicians (RPTs) with the guidance necessary to conduct appropriate radiation and contamination monitoring during the spent fuel operations. The inspectors noted that the dry fuel storage procedures contained sufficient RP hold points to allow the RPTs to perform the required radiological surveys.

The inspectors reviewed the radiological surveys and determined that the survey documentation contained the appropriate information, were legible, and readily available to cask loading personnel. The inspectors noted that the RPTs and the cask loading personnel exhibited good communication skills which would enable the staff to conduct the loading campaign safely.

The licensee estimated that the occupational dose for loading the NUHOMS® casks and subsequent transport of the casks to the ISFSI pad would be approximately 0.6 person-rem per cask. The licensee estimated that the total occupational dose would be 2.8 person-rem for the loading campaign. The inspectors noted that the occupational dose estimates were consistent with doses received at other utilities, after taking into account the age of the spent fuel.

c. Conclusions

The inspectors concluded that the licensee's radiation protection practices and controls associated with loading of the NUHOMS casks were commensurate with the radiological hazards present.

2.3 Training Program

a. Inspection Scope

The inspectors reviewed the licensee's training program and verified the staff's ability to perform their assigned tasks during the loading of four NUHOMS® casks and transfer of the loaded casks to the ISFSI pad.

b. Observations and Findings

The licensee provided dry fuel storage overview training to all of the personnel involved in the process regarding the: (1) regulatory requirements; (2) design objectives; (3) major equipment and components; and (4) process for loading, transporting, and retrieving the fuel. In addition, the licensee provided more detailed training to those individuals directly involved with the NUHOMS® casks, as well as on-the-job training which was very specific to the particular tasks being performed.

The licensee prepared a dry fuel storage qualification matrix which documented each team and its associated training requirements. The inspectors verified that selected personnel received the required training and successfully passed the examinations. The inspectors also discussed specific aspects of the operation with the appropriate staff and determined that the staff had a clear understanding of their duties and responsibilities.

c. Conclusions

The inspectors determined that the licensee's training program was adequate and that the staff demonstrated an appropriate level of knowledge during loading of four NUHOMS® DSCs and during transfer of the loaded DSCs to the Independent Spent Fuel Storage Installation pad.

2.4 Heavy Loads (L-3 Fuel Building Crane and Fuel Building Structure)

a. Inspection Scope

The inspectors evaluated the L-3 fuel building crane and associated building structure to verify that it was able to sustain the loads associated with a fully loaded NUHOMS® DSC and transfer cask.

b. Observations and Findings

The Office of Nuclear Reactor Regulations (NRR) performed an independent assessment of the new L-3 fuel building crane trolley upgrade to determine if the crane was qualified to meet single failure proof design requirements. Based upon its review, NRR issued a license amendment which approved the licensee's use of the L-3 fuel building crane as a single failure proof crane for below-the-hook loads up to 110 tons. The crane met the guidelines of NUREG-0612, entitled "Control of Heavy Loads at Nuclear Power Plants," and NUREG-0554, entitled "Single-Failure-Proof Cranes for Nuclear Power Plants."

The inspectors noted that the licensee assessed the building structure in the Fuel Handling Area of the Auxiliary Building for the increased crane loads. The licensee determined that the concrete portion of the structure was acceptable below an elevation of 646 feet 6 inches, and the steel framing, above an elevation of 646 feet 6 inches, was also found acceptable, except for the single members of the vertical bracing in the north-south direction of the Column Rows, F 0.1 to F 0.9. The licensee determined that the building bracing system required the addition of angles to the system. The licensee also

determined that wind speeds in excess of 90 mph could cause some columns to be over-stressed. As a result, the licensee modified Procedure FHS-M-23, entitled "Site Heavy Loads," to specify that the crane will not be used when ground level wind speeds were in excess of 90 miles per hour (mph). The inspector did not identify any concerns with the licensee's analyses.

c. Conclusions

The inspectors determined that the L-3 fuel building crane and associated building structures were adequate to lift and sustain loads up to 110 tons. The licensee appropriately incorporated into its heavy load procedure limitations on the crane's use under certain conditions.

2.5 Welding of the NUHOMS® Cask Dry Shielded Canister Lid

a. Inspection Scope

The inspectors evaluated the licensee's ability to weld the NUHOMS DSC lids in accordance with the requirements specified in the CoC.

b. Observations and Findings

The inspectors reviewed Work Order: 24420171, "NRC Dry Run," which provided the procedures and steps necessary for the licensee to weld and inspect the DSC lids. The work order package included: 1) Procedure FHS-M-32B, entitled "Fuel Loading and DSC Sealing Operations for NUHOMS® 32 PT Dry Fuel Loading Operations;" 2) the welding specifications; 3) NMC Fleet Procedure FP-PE-III-P8P8-GTM-063, entitled "Transnuclear Dry Cask Welding," Rev 0; 4) NMC Fleet Procedure FP-PE-111-P8P8-GTM-062, entitled "Grove Welds and Fillet Welds, P8-P8, GTAW/SMAW, Without PWHT," Rev 0; 5) weld rod control procedures; 6) Administrative Procedure 10.01, entitled "Material Storage and Control;" and 7) Administrative Procedure 5.13, entitled "Material Control During Maintenance."

The inspectors also reviewed Consumers Energy Technical Services Procedures: 1) NDT-VT-08, entitled "Visual Examination;" 2) NDT-TP-09, entitled "Liquid Penetrant - Standard Temperature;" 3) NDT-PT-10, entitled "Liquid Penetrant - Nonstandard Temperature;" and 4) NDT-A-02, entitled "NDT Personnel Training, Qualification and Certification."

The inspectors also examined the procedure qualification record for the welding procedure, the welding checklists to document the welding and quality control, the liquid penetrant material certifications, and the qualification records of the welding and quality control personnel.

The inspectors observed the welding and non-destructive examination (NDE) dry runs of DSC mock-ups in the welding shop and determine that the licensee staff properly completed the required welds and conducted. A Nuclear Management Company (NMC) fleet crew performed the welding. The weld team consisted of six qualified welders from the Duane Arnold, Palisades, and Point Beach Plants. The same team performed the welding at Duane Arnold during its loading campaign. The licensee's quality control

(QC) personnel performed the NDE examinations. The inspectors did not identify any concerns with the licensee's procedures, records, or actual welding activities.

c. Conclusions

The inspectors concluded that the licensee met the applicable requirements specified in the CoC to perform welding and inspection activities associated with the DSC lids of the NUHOMS® cask.

2.6 NUHOMS® Cask Dry Shielded Canister Lid Removal

a. Inspection Scope

The inspectors evaluated the licensee's procedures and practices associated with removal of the DSC lids.

b. Observations and Findings

The inspectors reviewed Procedure FHS-M-40B, entitled "NUHOMS-32PT DSC Unloading." The inspectors previously observed a demonstration DSC lid removal performed by the NMC fleet welding crew at the Duane Arnold Energy Center in 2003. The welding crew use an Automated Welding System (AWS) to remove the lid by replacing the welding head with a plasma cutting torch. The licensee successfully removed the DSC lid. The inspectors noted that the licensee planned to use the same method and the same welding crew at the Palisades Nuclear Generating Plant.

c. Conclusions

The inspectors concluded that the licensee's DSC lid cutting and removal methods met the CoC requirements.

2.7 Helium Leak Detection

a. Inspection Scope

The inspectors evaluated the licensee's helium leak detection method to verify that the licensee could appropriately perform helium leak detection at the DSC lid welds.

b. Observations and Findings

The inspectors reviewed Procedure FHS-M-39B, entitled "Fuel Loading and DSC Sealing Operations for NUHOMS-32PT Dry Fuel Loading Operations." The inspectors noted that the procedure contained sufficient guidance to licensee staff for the staff to perform helium leak detection at the DSC lid welds.

The licensee' contractor, Leak Testing Specialists, Inc. (LTS), performed all leakage testing in accordance with LTS Procedure MSLT-DSC NMC, Revision 2. The inspectors noted that certified personnel performed testing in accordance with LTS qualification and certification requirements. The inspectors compared these requirements to the guidelines contained in the CoC and the American Society for Non-Destructive Testing Recommended Practice No. SNT-TC-1A (1996 Edition), and determined that the requirements were consistent with the guidelines.

c. Conclusions

The inspectors concluded that the licensee's helium leak method met the CoC requirements.

2.8 Administrative Procedures

a. Inspection Scope

The inspectors evaluated the licensee's procedures to verify that they were adequate to support the proposed NUHOMS® cask loadings.

b. Observations and Findings

The inspectors determined that the licensee completed development and approval of the dry cask storage procedures prior to its conducting dry run demonstrations. While observing the licensee insert the DSC into the Horizontal Storage Module (HSM), the inspectors noted that the licensee used the loading procedure as a reference use only procedure. The inspectors noted that the loading procedure and the sequence of activities: (1) were complex and difficult; (2) the consequences of improper actions had direct impact on the nuclear safety and reliability; and (3) the activities were infrequently performed. Therefore, the inspectors concluded that the loading procedure met the licensee's definition of a continuous use procedure. The licensee conducted an independent review of the inspectors' findings and revised the procedure classification to a continuous use procedure.

c. Conclusions

The inspectors concluded that the licensee's NUHOMS® cask loading procedure was adequate for dry storage cask loading activities.

2.9 Readiness Review

a. Inspection Scope

The inspectors reviewed the licensee's internal readiness review report to determine if the licensee addressed the identified recommendations and suggestions.

b. Observations and Findings

In March 2004, a licensee-sponsored review team completed an assessment of the Palisades Dry Fuel Storage Project's readiness to begin loading in July 2004. The team determined that the project was at a critical junction due to the considerable amount of work remaining to be completed prior to July 2004. The team observed that many of the needed procedures had not been finalized. In addition, the team noted that the procedures provided only minimal guidance regarding the handling of off-normal or contingency situations.

The review team identified that in some cases contingency actions were described in procedure notes; however, the procedure notes did not include the detailed steps necessary for the staff to perform the specified actions. The review team also determined that in other cases contingency plans existed for a given situation; however,

the plans were not referenced in the procedures. Consequently, if an off-normal or contingency situation occurred, the procedures may not provide adequate response or mitigation guidance. In particular, with respect to a suspended heavy load (i.e., NUHOMS® cask), the team identified that the existing procedures did not address this situation.

The inspectors identified two examples of recommendations not incorporated into the procedures, that caused delays during the licensee's conduct of dry run activities, as follows:

(1) during the transfer of a NUHOMS® cask to the transport trailer, a crane protection circuit tripped resulting in the cask remaining suspended for some time while the licensee determined the appropriate recovery actions (see Section 2.10 of this report for additional detail); and

(2) the licensee experienced difficulties aligning the transfer trailer with the horizontal storage module due to a lack of calibrated instruments.

In both cases, the licensee's review team previously identified the issues; however, the licensee did not modify the loading procedures to address the issues. The inspectors noted that the licensee entered some of the readiness review team recommendations into its corrective action program, but many were resolved informally or not at all. In addition, the inspectors noted that the licensee did not formally document and track to closure the lessons learned during its dry run effects. The licensee reviewed the inspectors' findings and independently determined that the outstanding review findings should be addressed prior to loading the first NUHOMS@ cask.

c. Conclusions

The inspectors determined that the licensee had conducted an adequate readiness review of the dry fuel storage process. However, the licensee initially did not document its resolution of or fully address each review finding.

2.10 Dry Run

a. Inspection Scope

The inspectors evaluated the licensee's ability to safely load, transfer, store, and retrieve the spent fuel.

b. Observations and Findings

The inspectors observed the various evolutions performed during a typical dry cask loading campaign. Specifically, the inspectors observed the licensee: (1) move all the necessary equipment, including the transfer cask and the DSC, into the wash down pit; (2) lower the transfer cask and the DSC into the spent fuel pool; (3) load and unload fuel assemblies using a dummy fuel bundle; (4) install the shield plug; (5) lift the transfer cask and the DSC from the spent fuel pool and place them in the cask wash down pit; and 5) lower and place the transfer cask and DSC onto the transfer trailer after decontamination of the cask in the wash down pit.

On July 6, 2004, while moving the transfer cask and DSC onto the transfer trailer, the L-3 fuel building crane stopped operating. The licensee placed the load in a safe condition and contacted electrical maintenance who subsequently went up on the crane trolley and to troubleshooting the crane using Work Order No. 24421839. The electrical maintenance staff completed troubleshooting and determined that a trolley speed limit relay had tripped. The inspectors noted that the shift manager approved the work order declaring the crane operable and directing the dry fuel storage crew to lower the transfer cask into a safe condition. Subsequently, the licensee investigated the potential causes for the relay tripping and made recommendations regarding crane operations prior to the staff lifting another heavy load.

The inspectors engaged the licensee on its decision to move the suspended load without prior assessment of the root cause of the crane's inoperability. Based upon its independent review of the inspectors' findings, the licensee revised the loading procedures to include guidance on resolving significant conditions adverse to quality through the corrective actions program. In addition, the licensee identified that manual operation of the L-3 fuel building crane may be considered in order to permit the staff to place a heavy load in a safe condition.

The inspectors observed the licensee transport the NUHOMS® cask to the ISFSI pad. Subsequently, the licensee attempted to position the transport trailer against the horizontal storage module (HSM) in order to permit insertion of the DSC into the NUHOMS® cask. While backing up the transfer trailer to the HSM, the licensee experienced difficulties steering the transfer trailer. After numerous attempts to back up the trailer, the licensee stopped all the work. The transfer trailer was designed for use with the NUHOMS® casks. One of its principle functions was to ensure proper alignment between the transfer cask and the HSM in order to allow the licensee to insert the DSC into the HSM. In order to perform this evolution, the licensee needed to easily steer the trailer. The trailer had eight fully independent hydraulic suspensions with four pneumatic tires on each suspension. Coupled steering of all axles around a common point allowed compensation for road surface irregularities as well as full, independent steering of all four axles. The inspectors identified that the cambers on the tires of the four axles were all pointing in different directions. In fact, one set of tires was riding on one half of the tire sidewall. This misalignment of the tires limited the staff's ability to steer the trailer. When the licensee inspected the undercarriage linkage and determined that the main linkage locking nuts were backed off (up to 1 foot 6 inches). After tightening the loose suspension, the transfer trailer operated as expected. The inspectors determined that this condition resulted from a lack of preventive maintenance being performed on the transfer trailer by the vendor and/or the licensee.

During its efforts to align the transfer trailer and the HSM, the licensee contacted a registered land surveyor to ascertain if the cause of the misalignment was the use of incorrect surveying techniques by the licensee staff. The surveyor determined that one of the leveling instruments, used to align the transfer trailer and the HSM, was out of calibration. The licensee did not check the instrument's calibration prior to performing the surveys. The licensee revised its procedure to add a requirement for the staff to perform an accuracy check of the level instruments prior to use. After resolution of the alignment issues, the licensee successfully inserted the DSC into the HSM, retrieved it, and brought the transfer cask and DSC back to the reactor building.

c. Conclusions

The inspectors concluded that the licensee implemented its program adequately and was ready to load spent fuel from the spent fuel pool into the dry shielded canister, transport the dry shielded canister to the Independent Spent Fuel Storage Installation pad, and then transfer the loaded dry shielded canister into the horizontal storage module.

3.0 Review of 10 CFR 72.212(b) Evaluations (IP 60856, IP 60856.1)

a. Inspections Scope

The inspectors evaluated whether the licensee had reviewed, assessed, and documented the cask system to demonstrate compliance with the requirements of 10 CFR 72.212(b).

b. Observations and Findings

The inspectors verified the licensee prepared cask system evaluations in accordance with the requirements of 10 CFR 72.212(b). The licensee performed a review to determine if the conditions set forth in Part 72-1004 of the CoC had been met. The inspectors determined that the licensee assessed in its evaluations of the CoC conditions; the cask storage pad area; effluents and direct radiation; 10 CFR 72.48 evaluations; the quality assurance program; the radiation protection program; the training program; the security plan; and the emergency plan.

During review of the evaluations, the inspectors identified an inconsistency regarding the required vehicle standoff distances to be used during cask transportation along the transfer route. The 10 CFR 72.212 report listed distances referenced to the transfer road center while several supporting ISFSI operational procedures listed distances referenced from the transport cask or from the side of the travel path. This issue was discussed with the licensee who stated the procedures would be revised to ensure consistency and to prevent confusion.

c. Conclusions

The inspectors concluded that the licensee's written evaluations of the cask system were adequate to demonstrate compliance with the requirements of 10 CFR 72.212(b).

4.0 Review of 10 CFR 72.48 Evaluations (IP 60857)

a. Inspection Scope

The inspectors reviewed the licensee's program for conducting safety evaluations of changes to the dry fuel storage process.

b. Observations and Findings

The inspectors reviewed the licensee's administrative procedures controlling the design change (10 CFR 72.48 review process, completed 10 CFR 72.48 screenings, and the qualification documentation for the personnel engaged in the 10 CFR 72.48 process. The inspectors determined that the licensee's 10 CFR 72.48 review process was

implemented such that completed screenings met the licensee's criteria. The inspectors noted that all currently qualified reviewers were appropriately trained.

The inspectors identified that on July 1, 2004, the licensee revised its training and certification requirements for individuals approved to perform design change reviews. As a result, the new Nuclear Management Corporation Fleet Mentoring Guide differed from the licensee's existing training and certification requirements. The inspectors discussed this issue with the licensee. The licensee stated that the differences between the two qualification programs would be resolved by either additional training, mentoring, or through an approved evaluation by January 31, 2005. In the interim, the licensee considered that all of the previously qualified reviewers qualified to perform the design change reviews.

c. Conclusions

The inspectors concluded that the licensee's program for conducting design change reviews and its recent implementation were adequate.

5.0 Operation of Independent Spent Fuel Storage Installation (IP 60855, IP60855.1)

a. Inspection Scope

The inspectors evaluated the licensee's loading of four DSCs and transfer of the DSCs to HSMs to verify compliance with the applicable CoC conditions and associated Technical Specifications.

b. Observations and Findings

The inspectors observed the licensee perform activities associated with the loading of four NUHOMS® DSCs. The activities included loading of the DSC and the transfer cask with spent fuel, decontamination of the cask, movement of the transfer cask to the ISFSI pad, and placement of the DSC inside the HSM. The inspectors noted that a number of minor issues occurred during the loading campaign which were resolved in a timely manner. These issues are discussed in the following paragraphs.

During the loading activities, the licensee performed helium leak testing of the circumferential weld in accordance with the applicable CoC requirement. However, the licensee did not plan to conduct a helium leakage test on the vent and siphon port valves. The inspectors noted that performance of this test would verify that the helium pressure inside the DSC remained within the Technical Specifications criteria before the vent and siphon port valve covers were welded. The inspectors discussed the issue with the licensee and the licensee independently determined that the helium leak testing of the valves, prior to welding covers over the valves, was appropriate to verify that the pressure inside the DSC remained within its Technical Specifications criteria.

The inspectors noted that the licensee performed daily operational checks of the L-3 fuel building crane. During one of these checks, the licensee identified an unusual noise originating from the trolley as the crane was in motion. In addition, the licensee noted that an interlock bypass, which allowed the trolley to go over the spent fuel pool, was not working. The licensee performed troubleshooting activities and determined that a shroud, which covered a belt and the overspeed limit switch, was loose and causing an interference with proper crane movement. The licensee subsequently tightened the nuts

to eliminate the interference. The licensee also determined that the interlock bypass switch was inoperable. The licensee replaced the remote control box in which the overspeed limit switch was located.

The licensee identified that the transfer trailer rear three axles were not performing as expected during the fourth cask loading evolution. The licensee inspected the transfer trailer, after removing it from the Auxiliary Building Load Distribution System, and determined that the front steering linkage threaded rod, between the front axle and front-middle axle, was bent approximately 45 degrees. The licensee contacted the vendor to provide troubleshooting and repair directions. The licensee subsequently repaired the trailer and completed the evolution.

The inspectors also noted that the licensee experienced a number of human errors during the loading campaign, such as, a pump, designed to measure water removed from the storage canister annulus, was set to measure the volume of water pumped in liters instead of gallons, as required. The licensee promptly identified this and other human errors and corrected each one before the errors had a safety impact.

c. Conclusions

The inspectors determined that the licensee's loading and transfer of four NUHOMS® dry shielded canisters to the Independent Spent Fuel Storage Installation pad was adequate and met the requirements in the CoC and associated Technical Specifications.

6.0 Exit Meeting

The inspectors presented the preliminary results of the inspections to the licensee on June 24, July 9, July 16, and July 23, 2004. On August 5, 2004, the inspectors presented the final inspection results to the licensee. The licensee acknowledged the findings presented and did not identify any documents or processes reviewed by the inspectors as proprietary.

Partial List of Persons Contacted

D. J. Malone, Site Vice-President
P. Harden, Director of Site Operations
* G. Hettel, Plant Manager
M. Carlson, Engineering Director
* S. Leblang, NMC High Level Waste Manager
* L. Thornsberry, Manager of Projects
* B. Rice, Dry Fuel Project Manager
L. Lathi, Regulatory Affairs Manager
D. G. Malone, Regulatory Compliance Supervisor

* Indicates those individuals present at the exit meetings.

Inspection Procedures Used

IP 60853	On-Site Fabrication of Components and Construction of an ISFSI
IP 60854	Pre-operational Testing of an Independent Spent Fuel Storage installation (Licensee Dry Run)
IP 60854.1	Pre-operational Testing of an Independent Spent Fuel Storage installation (Licensee Dry Run) at Operating Plants
IP 60855	Operation of Independent Spent Fuel Storage Installation
IP 60855.1	Operation of Independent Spent Fuel Storage Installation at Operating Plants
IP 60856	Review of 10 CFR 72.212(b) Evaluations
IP 60856.1	Review of 10 CFR 72.212(b) Evaluations at Operating Plants
IP 60857	Review of 10 CFR 72.48 Evaluations

Items Opened, Closed, and Discussed

URI	0720007/2004-002-01	Translation of Site SSE Earthquake to ISFSI Pad
URI	0720007/2004/002-02	Subsurface Bearing Stability Beneath the ISFSI Pad

List of Acronyms Used

ALARA	As-Low-As-Reasonably-Achievable
AWS	Automated Welding System
CoC	Certificate of Compliance
DSC	Dry Shielded Canister
EM	Electrical Maintenance
HSM	Horizontal Storage Module
ISFSI	Independent Spent Fuel Storage Installation
LDS	Load Distribution System
LTS	Leak Testing Specialists, Inc.
NDE	Non-destructive examination
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulations
PNP	Palisades Nuclear Plant
QC	Quality Control
RPT	Radiation Protection Technician
SER	Safety Evaluation Report
SFP	Spent Fuel Pool
SSE	Safe Shutdown Earthquake
UFSAR	Updated Final Safety Analysis Report

Licensee Documents Reviewed

Procedure FHS-M-39A, “Equipment Preparation for NUHOMS-32PT Dry Fuel Loading Operations.”

Procedure FHS-M-39B, “Fuel Loading and DSC Sealing Operations for NUHOMS-32PT Dry Fuel Loading Operations.”

Procedure FHS-M-39C, “Dry Fuel Loading Operations Loaded NUHOMS DSC/Transfer Cask Transfer to ISFSI.”

Procedure FHS-M-40A, “NUHOMS-32PT DSC Retrieval from HSM.”

Procedure FHS-M-40B, “NUHOMS-32PT DSC Unloading.”

Condition Report 007576, “Procedure Change Request,” dated 7/13/04.

NMC Fleet Mentoring Guide, “Engineering Personnel Training Program,” dated 12/8/03.

Procedure, EM-04-56, “Fuel Selection for Dry Fuel Storage,” dated 7/2/04.

Work Instruction, WI-RSDH-002, “Radiation Protection Monitoring Requirements for Dry Fuel Storage,” Revision 2.

2004 Dry Fuel Storage NUHOMS 32-PT Dose Estimate, dated 5/20/04.

2004 Palisades Dry Fuel Storage ALARA Plan.

Procedure 5.26, “Independent Spent Fuel Storage Installation Training and Certification Program,” Revision 8, dated 4/22/04.

NMC Letter, dated 6/2/04, “Responses to NRC Questions fromTelecons on 5/25/04 & 5/27/04.”

NRC letter, dated 6/16/04, “Palisades Plant-Issuance of Amendment Re: Palisades Spent Fuel Pool Crane Upgrade (TAC NO. MC1862).”

Work Order 24420171, “NRC Dry Run.”

NMC Fleet Procedure, FP-PE-III-P8P8-GTM-063, “Transnuclear Dry Cask Welding,” Revision 0.

NMC Fleet Procedure, FP-PE-III-P8P8-GTM-062, “Groove welds and Filler welds, P8-P8, GTAW/SMAW, Without PWHT.”

Procedure 10.01, “Material Storage and Control.”

Procedure 5.13, “Material Control During Maintenance.”

Consumers Energy Technical Services NDT Procedure, NDT-VT-08, “Visual Examination.”

Consumers Energy Technical Services NDT Procedure, NDT-PT-09, “Liquid Penetrant-Standard Temperature.”

Consumers Energy Technical Services NDT Procedure, NDT-PT-09, “Liquid Penetrant-Non-Standard Temperature.”

Procedure NDT-A-02, “ NDT Personnel Training, Qualification and Certification.”

LTS Procedure, MSLT-DSC NMC, “Helium Mass Spectrometer Leak Test Procedure,” dated 4/14/04.

Procedure 10.51, “Writer’s Guideline for Procedures,” dated 6/30/04.

CAP042412, “Transfer Trailer steering linkage requires tightening,” dated 7/8/04.

CAP042363, “L-3 SFP Crane Trolley stopped operating while downending Transfer cask,” dated 7/6/04.

Work Order 24421839, “L-3 Spent Fuel Pool Crane,” dated 7/6/04.

Procedure FP-PA-ARP-01, “Action Request Process,” Revision 3, dated 12/8/03.

CAP042413, “Horizontal Transfer Alignment Issues result in Dry Run Delays,” dated 7/8/04.

SA006218, “Dry Fuel Storage Readiness Review Opportunities,” dated 4/20/04.

Palisades Nuclear Plant Dry Spent Fuel Storage Program Readiness Review Report.

Procedure QF-1030-20, “Perform or Review a 10CFR 72.48 Evaluation,” Revision 1.

Procedure QF-1030-20, “Perform or Review a 10CFR 72.48 Screening,” Revision 1.

Procedure 3.07, “10 CFR 50.59 and 72.48 reviews,” Revision 15, dated 7/1/04.

Calc No. EA-EAR-2000-0309-2, Revision 3 (Slope Stabilities).

Final Safety Analysis Report, “Site and Environment,” Revision 21.

Final Safety Analysis Report, “Design of Structures, Systems and Components,” Revision 21.

CAP041649, “NRC Questions on CAP Responses from previous visits.”

Palisades 10CFR72.212 and Certificate of Compliance Evaluation Report for NUHOMS 32PT System, Revision 0.