

September 28, 2007

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Victor M. McCree, Acting Regional Administrator, Region II
James L. Caldwell, Regional Administrator, Region III
Elmo E. Collins, Regional Administrator, Region IV
James E. Dyer, Director, Office of Nuclear Reactor Regulation
R. William Borchardt, Director, Office of New Reactors
Charles L. Miller, Director, Office of Federal and State Materials and
Environmental Management Programs
Michael F. Weber, Director, Office of Nuclear Material Safety and
Safeguards
Roy P. Zimmerman, Director, Office of Nuclear Security and Incident
Response

FROM: Cynthia A. Carpenter, Director/RA/
Office of Enforcement

SUBJECT: ENFORCEMENT GUIDANCE MEMORANDUM 07-006
ENFORCEMENT DISCRETION FOR HEAVY LOAD HANDLING
ACTIVITIES

Purpose:

The purpose of this Enforcement Guidance Memorandum (EGM) is to provide guidance for exercising enforcement discretion in dispositioning current unresolved and future potential performance deficiencies related to handling of reactor vessel heads at nuclear power plants. The NRC has found industry uncertainty regarding the licensing bases for handling of reactor vessel heads. This uncertainty stems in part from the wording of Generic Letter (GL) 85-11, "Completion of Phase II of Control of Heavy Loads at Nuclear Power Plants, NUREG-0612," dated June 28, 1985, which may have created some confusion regarding what was required or expected of licensees. By letter dated September 14, 2007 (ML072670127), the Nuclear Energy Institute (NEI) informed the NRC of industry approval of a formal initiative that specifies actions each plant will take to ensure that heavy load lifts continue to be conducted safely and that plant licensing bases accurately reflect plant practices. The NRC staff believes implementation of the initiative will resolve uncertainty in the licensing bases for heavy load handling, and enforcement discretion related to the uncertain aspects of the licensing basis is appropriate during the implementation of the initiative. To be eligible for discretion, licensees must complete applicable commitments specified by the industry initiative on heavy load lifts consistent with the timeframe described in the action section of this EGM.

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This EGM pertains to the disposition of issues related to the following requirements: the Title 10 of the Code of Federal Regulations (10 CFR) 50.71(e) requirement to revise the safety analysis report to include the effects of analyses performed at Commission request of postulated heavy load drops and, when the analysis does not bound planned head lifts with respect to load weight, load height, or medium present, the requirement to translate information from an existing reactor vessel head drop analysis (generic or plant-specific) to procedures for the movement of the head.

Background:

In NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," dated July 1980, the NRC staff provided regulatory guidelines for the control of heavy loads to assure the safe handling of heavy loads in areas where a load drop could impact stored spent fuel, fuel in the reactor core, or equipment that may be required to achieve safe shutdown or permit continued decay heat removal. In a letter dated December 22, 1980, later identified as Generic Letter (GL) 80-113, as supplemented by GL 81-07, "Control of Heavy Loads," dated February 3, 1981, the NRC staff requested that all licensees describe how they satisfied the guidelines of NUREG-0612 at their facility and what additional modifications would be necessary to fully satisfy these guidelines. The NRC staff divided this request into two phases (Phase I and Phase II) for implementation by licensees. Phase I guidelines addressed measures for reducing the likelihood of dropping heavy loads and provided criteria for establishing safe load paths; procedures for load handling operations; training of crane operators; design, testing, inspection, and maintenance of cranes and lifting devices; and selection and use of slings. Phase II guidelines addressed alternatives to reduce further the probability of a load handling accident or mitigate the potential consequences of heavy load drops. These alternatives include using a single-failure-proof crane for increased handling system reliability, restricting crane travel to safe areas by design, or performing load drop consequence analyses for assessing the effect of dropped loads on plant safety and operations.

The responses to GL 80-113 and GL 81-07 generally were part of the licensing bases for heavy load handling programs at nuclear power plants. During the review of the responses, the NRC staff requested additional information about issues such as safe load paths, special lifting devices, crane design, and special compensatory measures during certain load handling evolutions. The staff issued safety evaluation reports addressing the Phase I issues for every plant.

In GL 85-11, the NRC staff concluded that a detailed review of the Phase II responses received from licensees was not necessary. The NRC staff based its conclusion on the improvements resulting from the review of the Phase I responses and the findings identified through a high-level sample of Phase II responses, including some detailed pilot reviews. As documented in Enclosure 1 to GL 85-11, the NRC staff found no remaining heavy load handling concerns of sufficient significance existed to justify further generic action. Plants that had installed single-failure-proof cranes (or showed their crane to be equivalent to a single-failure-proof crane) or completed load drop analyses conforming to the physical limits of the handling system provided an assurance of safety inherent in the facility design. However, other load drop analyses limited potential consequences of drops through administrative controls on load handling parameters, such as load height, load weight, and media present below the load. The staff considered these administrative controls an amplification of the Phase I guidelines regarding procedures for the safe handling of heavy loads.

Discussion

Through recent inspections, the NRC has identified that reactor vessel head handling issues were not clearly resolved through the issuance of GL 85-11. The wording of GL 85-11 may have created some confusion regarding what was required or expected of licensees. The NRC staff has attempted to clarify expectations through further generic communications. On April 11, 1996, the NRC staff issued Bulletin 96-02, "Movement of Heavy Loads over Spent Fuel, over Fuel in the Reactor Core, or over Safety-Related Equipment," in part to alert addressees to the importance of meeting existing regulatory guidelines associated with the control and handling of heavy loads at nuclear power plants while the plant is operating. The NRC staff also issued Regulatory Issue Summary (RIS) 2005-25, "Clarification of NRC Guidelines for Control of Heavy Loads," dated October 31, 2005, as a means to assist with licensees' understanding of the regulatory requirements for compliance with 10 CFR 50.71(e) and 10 CFR 50.59 as these requirements relate to the heavy load handling program implementation. The staff followed up with RIS 2005-25, Supplement 1, "Clarification of NRC Guidelines for Control of Heavy Loads," on May 29, 2007, to communicate regulatory expectations associated with the safe handling of heavy loads and load drop analyses. Continued identification of inspection issues, particularly issues associated with reactor vessel head lifts, suggest the generic communications have not been fully effective in clarifying regulatory expectations.

By letter dated September 14, 2007, NEI proposed an industry initiative to enhance the description of heavy load handling programs in the safety analysis report, and, where appropriate, develop realistic load drop consequence analyses to define bounds for the safe handling of reactor vessel heads over the reactor vessel and spent fuel casks over the spent fuel pool structure. The NRC staff considers these areas of the nuclear power plant safety significant with regard to maintaining irradiated fuel covered with water for adequate cooling. Where appropriate, licensees will complete realistic load drop consequence analyses to support plant outages beginning after July 1, 2008.

For plants with outages beginning before July 1, 2008 that have neither a single-failure-proof crane (or equivalent) nor an existing reactor vessel head drop analysis (generic or plant-specific) that bounds planned head lifts with respect to load weight, load height, and medium present, NEI has proposed interim administrative controls. These controls are detailed in the next section. Based on existing reactor vessel head drop evaluations, the NRC staff concluded that these interim measures will establish safe bounds for reactor vessel head movement by limiting the energy that could be transferred to the reactor vessel in the event of a load drop to levels that have been found acceptable for a variety of reactor configurations. These interim measures are also consistent with GL 85-11, which concluded that a backfit requiring installation of a single-failure-proof crane for pressurized-water reactors would not be justified by the averted risk. For spent fuel cask lifts over the spent fuel pool structure, the licensee must use a single-failure-proof crane (or equivalent) or provide a load drop analysis that bounds the planned lifts with respect to load weight, load height, and medium present under the load, and implement procedures for moving the load that reflect the applicable safety basis.

To allow sufficient time for full implementation of the industry initiative, the NRC is providing guidance for exercising enforcement discretion for those licensees who perform all the interim actions. This enforcement discretion is intended to give licensees sufficient time to evaluate and update their administrative controls for reactor vessel head and spent fuel cask handling.

Action:

The NRC staff considers exercise of enforcement discretion prudent because there may have been confusion on the part of licensees regarding the implementation of regulatory guidelines for reactor vessel head and spent fuel cask handling. Based on the NRC's recognition of the need to clarify the implementation of these guidelines, which will be accomplished through completion of the industry initiative, NRC will exercise enforcement discretion for current unresolved and future potential performance deficiencies related to a licensee's failure to update the FSAR to reflect aspects of handling heavy loads. In addition, when the analysis does not bound planned head lifts with respect to load weight, load height, or medium present, the NRC will consider exercising enforcement discretion related to the failure to translate information from an existing reactor vessel head drop analysis (generic or plant-specific) to procedures for the movement of the head. This enforcement discretion is limited to these areas. Other performance deficiencies associated with crane operation are not covered by this EGM and should be characterized and processed in accordance with Reactor Oversight Process (ROP) guidance.

To be eligible for enforcement discretion, licensees must meet the following conditions:

- 1) Licensees with plants that have outages beginning before July 1, 2008, must complete all the following interim actions prior to the specified lifts in accordance with the industry initiative:
 - A) For all heavy load lifts, adequately implement safe load paths, load handling procedures, and standards for training of crane operators, use of special lifting devices, use of slings, and design, inspection, testing, and maintenance of the crane.
 - B) For reactor vessel head lifts:
 - Perform the lift consistent with an accepted safety basis (i.e., a single-failure-proof crane (or equivalent) or an existing load drop analysis (generic or plant-specific) that bounds the planned lifts with respect to load weight, load height, and medium present under the load, and implement procedures for moving the head that reflect that safety basis. Load drop analyses can be based on realistic (i.e., best estimate) calculations.
- OR
- For facilities that have neither a single-failure-proof crane nor a load drop analysis (generic or plant-specific) that bounds the planned lifts with respect to load weight, load height, and medium present, conduct the head lift at the minimum practicable height and flood the refueling cavity with water during head movement to limit the maximum potential impact velocity of the head. By maintaining the bottom of the head less than 15 feet above the refueling cavity water surface when the head has been lifted above the guide studs, the energy that could be transferred to the reactor vessel in the event of a load drop would be limited to levels that have been found acceptable for a variety of configurations. Once the cavity is fully flooded (i.e., >23 feet above the reactor vessel flange), the reactor vessel head may be lifted more than 15 feet above the water surface as necessary to lift the head above immovable

- structures around the refueling cavity. With the refueling cavity fully flooded, the water depth is sufficient to limit the potential energy to acceptable values for any credible lift height.
- C) For spent fuel cask lifts over the spent fuel pool, ensure that a single-failure-proof crane (or equivalent) is used or a load drop analysis is provided that bounds the planned lifts with respect to load weight, load height, and medium present under the load, and implement procedures for moving the load that reflect the applicable safety basis. Load drop analyses can be based on realistic (i.e., best estimate) calculations.
 - D) Include the movement of heavy loads as a configuration management activity in administrative controls established to implement 10 CFR50.65(a)(4).
- 2) All licensees must complete the following actions before each facility's first refueling outage after July 1, 2008, in accordance with the industry initiative:
- A) For all heavy load lifts, adequately implement safe load paths, load handling procedures, and standards for training of crane operators, use of special lifting devices, use of slings, and design, inspection, testing, and maintenance of the crane.
 - B) For reactor vessel head lifts and spent fuel cask lifts over the spent fuel pool, ensure that a single-failure-proof crane (or equivalent) is used or a load drop analysis (generic or plant-specific) is provided that bounds the planned lifts with respect to load weight, load height, and medium present under the load, and implement procedures for moving the load that reflect the applicable safety basis. Load drop analyses can be based on realistic (i.e., best estimate) calculations.
 - C) Include the movement of heavy loads as a configuration management activity in administrative controls established to implement 10 CFR50.65(a)(4).
 - D) If load drop analyses are used, ensure that restrictions on load height, load weight, and medium present under the load are reflected in plant procedures.
- 3) If not already included in the safety analysis report, all licensees must include a summary description of the basis for conducting safe heavy load movements by the next safety analysis report update after July 1, 2008, including definition of safe load paths, establishment of load handling procedures, and implementation of standards with respect to training of crane operators, use of special lifting devices, use of slings, and design, inspection, testing, and maintenance of cranes. If the safety basis includes reliance on a load drop analysis, then that fact should be included in the summary description within the safety analysis report. NRC RIS 2005-25, Supplement 1, "Clarification of NRC Guidelines for Control of Heavy Loads," May 29, 2007, provides guidance on the content of the safety analysis report with respect to heavy load handling activities.

When exercising enforcement discretion in accordance with this EGM for failures to update the FSAR as required by 10 CFR 50.71(e), the Regional Office should obtain an Enforcement Action (EA) number from the Office of Enforcement (OE), which would allow such cases to be

identified and tracked as needed, but a formal enforcement panel does not need to be held. When considering exercising discretion for violations of any requirements other than 10 CFR 50.71(e), the Regional Office should obtain an EA number from OE, and a formal enforcement panel should be held to make the discretion determination.

The following language is to be included in the text of an inspection report discussing the inspection finding when exercising enforcement discretion:

A potential violation of [insert the applicable regulation or license requirement] was identified. Consistent with EGM 07-006, we are exercising enforcement discretion in accordance with Section VII.B.6 of the NRC Enforcement Policy, and are therefore not issuing any enforcement action for this potential violation.

If the licensee does not complete all the actions in the timeframes as described, then potential performance deficiencies will not be eligible for enforcement discretion under this EGM and will be processed in accordance with the normal NRC enforcement process.

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