

ENCLOSURE

EGG-HS-6350

CONTROL OF HEAVY LOADS AT NUCLEAR POWER PLANTS
WM. H. ZIMMER NUCLEAR POWER STATION
(PHASE I)
Docket No. [50-358]

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ABSTRACT

The Nuclear Regulatory Commission (NRC) has requested that all nuclear plants, either operating or under construction, submit a response of compliancy with NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants." EG&G Idaho, Inc., has contracted with the NRC to evaluate the responses of those plants presently under construction. This report contains EG&G's evaluation and recommendations for Wm. H. Zimmer Nuclear Power Station Unit 1.

EXECUTIVE SUMMARY

Wm. H. Zimmer Nuclear Power Station does not totally comply with the guidelines of NUREG-0612. In general, the actions taken and planned are consistent with NUREG 0612 requirements. Inconsistencies exist on:

- The justification for exemption of hoist Unit No. 108
- The adequacy of design or exemption justification for hoist Unit No. 301.

The main report Section 2.3.7 contains discussions and recommendations which will aid in the development of information more consistent with the NUREG 0612 guidelines.

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(PHASE I)

1. INTRODUCTION

1.1 Purpose of Review

This technical evaluation report documents the EG&G Idaho Inc., review of general load-handling policy and procedures at the Cincinnati Gas and Electric Company's Wm. H. Zimmer Nuclear Power Station. This evaluation was performed with the objective of assessing conformance to the general load-handling guidelines of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" [1], Section 5.1.1.

1.2 Generic Background

Generic Technical Activity Task A-36 was established by the U.S. Nuclear Regulatory Commission (NRC) staff to systematically examine staff licensing criteria and the adequacy of measures in effect at operating nuclear power plants to assure the safe handling of heavy loads and to recommend necessary changes to these measures. This activity was initiated by a letter issued by the NRC staff on May 17, 1978 [2], to all power reactor applicants, requesting information concerning the control of heavy loads near spent fuel.

The results of Task A-36 were reported in NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants." The staff's conclusion from this evaluation was that existing measures to control the handling of heavy loads at operating plants, although providing protection from certain potential problems, do not adequately cover the major causes of load-handling accidents and should be upgraded.

In order to upgrade measures for the control of heavy loads, the staff developed a series of guidelines designed to achieve a two-phase objective using an accepted approach or protection philosophy. The first portion of the objective, achieved through a set of general guidelines identified in NUREG-0612, Article 5.1.1, is to ensure that all load-handling systems at nuclear power plants are designed and operated such that their probability of failure is uniformly small and appropriate for the critical tasks in which they are employed. The second portion of the staff's objective, achieved through guidelines identified in NUREG-0612, Articles 5.1.2 through 5.1.5, is to ensure that, for load-handling systems in areas where their failure might result in significant consequences, either (a) features are provided, in addition to those required for all load-handling systems, to ensure that the potential for a load drop is extremely small (e.g., a single-failure-proof crane) or (b) conservative evaluations of load-handling accidents indicate that the potential consequences of any load drop are acceptably small. Acceptability of accident consequences is quantified in NUREG-0612 into four accident analysis evaluation criteria.

The approach used to develop the staff guidelines for minimizing the potential for a load drop was based on defense in depth and is summarized as follows:

- o Provide sufficient operator training, handling system design, load-handling instructions, and equipment inspection to assure reliable operation of the handling system
- o Define safe load travel paths through procedures and operator training so that, to the extent practical, heavy loads are not carried over or near irradiated fuel or safe shutdown equipment
- o Provide mechanical stops or electrical interlocks to prevent movement of heavy loads over irradiated fuel or in proximity to equipment associated with redundant shutdown paths.

Staff guidelines resulting from the foregoing are tabulated in Section 5 of NUREG-0612.

1.3 Plant-Specific Background

On December 22, 1980, the NRC issued a letter [3] to Cincinnati Gas and Electric Company, the applicant for Wm. H. Zimmer Nuclear Power Station, requesting that the applicant review provisions for handling and control of heavy loads at Wm. H. Zimmer Nuclear Power Station, evaluate these provisions with respect to the guidelines of NUREG-0612, and provide certain additional information to be used for an independent determination of conformance to these guidelines. On May 13, 1981, Cincinnati Gas and Electric Company provided a response [4] to this request. On June 24, 1981, a second response [5] was submitted with supplemental information. From these, a Technical Evaluation Report was drafted. The draft was discussed in a conference call and additional responses [6] submitted October 7, 1982, and [6a] on June 2, 1983. The present evaluation and recommendations herein considered information from all of the responses.

2. EVALUATION AND RECOMMENDATIONS

2.1 Overview

The following sections summarize Cincinnati Gas and Electric Company's review of heavy load handling at the Wm. H. Zimmer Nuclear Power Station accompanied by EG&G's evaluation, conclusions, and recommendations to the applicant for bringing the facilities more completely into compliance with the intent of NUREG-0612. The applicant indicated the weight of the power station's single spent-fuel assembly and its handling tool as 1000 pounds. This is the criteria listed in NUREG-0612 for classification as a heavy load and is considered to be a Wm. H. Zimmer Nuclear Power Station heavy load.

2.2 Heavy Load Overhead Handling Systems

This section reviews the applicant's list of overhead handling systems which are subject to the criteria of NUREG-0612 and a review of the justification for excluding overhead handling systems from the above mentioned list.

2.2.1 Scope

"Report the results of your review of plant arrangements to identify all overhead handling systems from which a load drop may result in damage to any system required for plant shutdown or decay heat removal (taking no credit for any interlocks, technical specifications, operating procedures, or detailed structural analysis) and justify the exclusion of any overhead handling system from your list by verifying that there is sufficient physical separation from any load-impact point and any safety-related component to permit a determination by inspection that no heavy load drop can result in damage to any system or component required for plant shutdown or decay heat removal."

A. Summary of Applicant's Statements

The applicant's June 2, 1983, submittal attached a table listing the item numbers of all overhead handling devices in, or planned for, the reactor. It listed 68 numbered items which was expanded to identify 95 hoists. Subsequent attachments presented justification for removal of many listed items and hoists which do not meet the criteria which NUREG 0612 specifics.

B. EG&G Evaluation

The original submittals and the updated one of June 2, 1983 indicate that a thorough evaluation and listing of overhead handling items has been made. Justification to remove hoists from the complete list was made with reason given for each.

C. EG&G Conclusions and Recommendations

Since there is no information to the contrary, EG&G concludes that the applicant has included all applicable hoists and cranes in their list of handling systems which must be consistent with the requirements of the general guidelines of NUREG-0612.

2.3 General Guidelines

This section addresses the extent to which the applicable handling systems comply with the general guidelines of NUREG-0612, Article 5.1.1. EG&G's conclusions and recommendations are provided in summaries for each guideline.

The NRC has established seven general guidelines which must be met in order to provide the defense-in-depth approach for the handling of heavy loads. These guidelines consist of the following criteria from Section 5.1.1 of NUREG-0612:

- Guideline 1--Safe Load Paths
- Guideline 2--Load Handling Procedures
- Guideline 3--Crane Operator Training
- Guideline 4--Special Lifting Devices
- Guideline 5--Lifting Devices (not specially designed)
- Guideline 6--Cranes (Inspection, Testing, and Maintenance)
- Guideline 7--Crane Design.

These seven guidelines should be satisfied for all overhead handling systems and programs in order to handle heavy loads in the vicinity of the reactor vessel, near spent fuel in the spent-fuel pool, or in other areas where a load drop may damage safe shutdown systems. The succeeding paragraphs address the guidelines individually.

2.3.1 Safe Load Paths [Guideline 1, NUREG-0612, Article 5.1.1(1)]

"Safe load paths should be defined for the movement of heavy loads to minimize the potential for heavy loads, if dropped, to impact irradiated fuel in the reactor vessel and in the spent-fuel pool, or to impact safe shutdown equipment. The path should follow, to the extent practical, structural floor members, beams, etc., such that if the load is dropped, the structure is more likely to withstand the impact. These load paths should be defined in procedures, shown on equipment layout drawings, and clearly marked on the floor in the area where the load is to be handled. Deviations from defined load paths should require written alternative procedures approved by the plant safety review committee."

A. Summary of Applicant's Statements

Safe load paths will be defined for each crane designed to carry heavy loads with the potential for impacting equipment required and/or for safe shutdown or decay heat removal. The safe load path will, "follow to the extent practicable structural floor members, beams, etc. . . ." These safe load paths will be included in procedures, and on equipment layout drawings. On the plant refueling floor, safe load paths will be clearly marked (via paint or safety roping) where the load shall be handled.

B. EG&G Evaluation

The safe load paths have been shown on drawings provided for the equipment removal plans. The proposed actions to meet the other details for "Safe Load Paths" are consistent with Guideline No. 1.

C. EG&G Conclusions and Recommendations

Completion of the actions described by the applicant will be consistent with the requirements of Guideline No. 1.

2.3.2 Load-Handling Procedures [Guideline 2, NUREG-0612, Article 5.1.1(2)]

"Procedures should be developed to cover load-handling operations for heavy loads that are or could be handled over or in proximity to irradiated fuel or safe shutdown equipment. At a minimum, procedures should cover handling of those loads listed in Table 3.1-1 of NUREG-0612. These procedures should include: identification of required equipment; inspections and acceptance criteria required before movement of load; the steps and proper sequence to be followed in handling the load; defining the safe path; and other special precautions."

A. Summary of Applicant's Statements

Per the requirements of Section 5.1.1(2) of NUREG-0612, procedures shall be developed to detail load-handling operations for hoists determined to be operating over or in proximity to irradiated fuel or safety equipment. Such procedures shall be written and approved prior to performing applicable load-handling operations following initial fuel loading. Procedures shall contain detailed rigging instructions including sling lengths, rope diameters, shackle diameters, and minimum ratings. The procedure shall contain an isometric pictorial diagram of the required rigging: Multi-use rope slings used at ZPS-1 are labeled with tags to indicate their rated

capacity. Some heavy loads located on the plant refueling floor are handled with dedicated sling arrangements. These slings will be labeled for their particular use(s). Before use, rigging inspections covering nine inspection parameters will be made. The procedures shall contain step-by-step load movement inspections and shall define the equipment removal path as previously discussed.

B. EG&G Evaluation

The commitment for procedure development, as stated, is consistent with the requirements for this guideline.

C. EG&G Conclusions and Recommendations

The procedure completion and implementation plans at the Wm. H. Zimmer Nuclear Power Station Unit 1 are consistent with Guideline 2.

2.3.3 Crane Operator Training [Guideline 3, NUREG-0612, Article 5.1.1(3)]

"Crane operators should be trained, qualified and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976, 'Overhead and Gantry Cranes' [7]."

A. Summary of Applicant's Statements

All personnel who operate cranes or hoists at the Wm. H. Zimmer Nuclear Power Station shall be trained, qualified, and conduct themselves per the guidelines of Chapter 2-3 of ANSI B30.2-1976. They have received documented classroom training in the areas of rigging, lifting, hand signals, and rigging inspection. In addition, personnel who operate cab-operated cranes have received hands-on training on such equipment during the preoperational testing programs at the plant.

B. EG&G Evaluation

The commitments and actions taken will, upon completion, satisfy the requirements of Guideline 3.

C. EG&G Conclusion and Recommendations

The implementation of planned actions will be consistent with Guideline 3.

2.3.4 Special Lifting Devices [Guideline 4, NUREG-0612, Article 5.1.1(4)]

"Special lifting devices should satisfy the guidelines of ANSI N14.6-1978, 'Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More for Nuclear Materials' [8]. This standard should apply to all special lifting devices which carry heavy loads in areas as defined above. For operating plants, certain inspections and load tests may be accepted in lieu of certain material requirements in the standard. In addition, the stress design factor stated in Section 3.2.1.1 of ANSI N14.6 should be based on the combined maximum static and dynamic loads that could be imparted on the handling device based on characteristics of the crane which will be used. This is in lieu of the guideline in Section 3.2.1.1 of ANSI N14.6 which bases the stress design factor on only the weight (static load) or the load and of the intervening components of the special handling device."

A. Summary of Applicant's Statements

The applicant's responses discuss two strongbacks that need to conform to ANSI N14.6 as special lifting devices. Separate evaluations of these two lifting devices are made.

First, the Reactor Head Strongback, according to information in the response, has been proof tested to 100 tons. It has a nameplate rating of 80 tons. The two major loads it handles are the Drywell Head and the Reactor Head, each listed at a load weight of 65 tons.

Secondly, the Dryer/Separator Strongback has been proof tested to 104 tons. It has a nameplate listing of 52 tons at 194.25 inches and 38 tons at 205.5 inches; also, a hook-block rating for 60 ton capacity. The listed loads to be handled are the Steam Dryer at 38 tons and the Steam Separator at 51 tons.

Detail design, fabrication, and acceptance testing requirements have been obtained from the designer, General Electric Company along with many related specifications, such as materials, heat treatment requirement, welding procedures, welder qualification, quality assurance documentation and controls. The N14.6 requirements have been addressed and statements relative to compliance with Section 3 on design and Section 4 on fabrication and acceptance testing are provided.

B. EG&G Evaluation

Information provided shows that the special lifting devices at Wm. H. Zimmer Nuclear Power Station Unit 1 are consistent with NUREG 0612 Guideline 4.

C. EG&G Conclusions and Recommendations.

The special lifting devices satisfy the requirements and are consistent with the Guideline 4.

2.3.5 Lifting Devices (Not Specially Designed) [Guideline 5, NUREG-0612, Article 5.1.1(5)]

"Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9-1971, 'Slings' [9]. However, in selecting the proper sling, the load used should be the sum of the static and maximum dynamic load. The rating identified on the sling should be in terms of the 'static load' which produces the maximum static and dynamic load. Where this restricts slings to use on only certain cranes, the slings should be clearly marked as to the cranes with which they may be used."

A. Summary of Applicant's Statements

The rigging used with all plant load-handling systems meets the requirements of ANSI B30.9. The following handling system hoists, in addition to meeting ANSI B30.9, provide an allowance for dynamic loading. (It is established as the static load plus 1/2% of the static load for each foot per minute of hoist hook speed.):

- Main Reactor Building Crane--Aux. Hook.
- Relief and Safety Valve Maintenance V. P. Cooler Units
- Recirculating Pump Motors V. P. Cooler Units
- Valve Maintenance
- Drywell Access Hatch Cover
- Low Pressure Core Spray
- R. H. R. Pumps

The combination of rigging devices, not covered above, and used on the Plant Refueling Floor are rated by the Manufacturer at 200% of the static load. This includes sling construction, sling leg angles, and other considerations. All other handling system items have been discussed in one of two attachments providing individual justification for exclusion from the requirements of NUREG 0612. Early submittals reported that a method is used, and is covered in procedures, by which certain slings for dedicated service will be labeled for that service.

B. EG&G Evaluation

The information provided shows that lifting devices not specially designed are consistent with Guideline 5 requirements.

C. EG&G Conclusions and Recommendations

Wm. H. Zimmer Nuclear Power Station Unit 1 has presented information on the requirements that show their actions are consistent with Guideline 5.

2.3.6 Cranes (Inspection, Testing, and Maintenance) [Guideline 6, NUREG-0612, Article 5.1.1(6)]

"The crane should be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976, 'Overhead and Gantry Cranes,' with the exception that tests and inspections should be performed prior to use where it is not practical to meet the frequencies of ANSI B30.2 for periodic inspection and test, or where frequency of crane use is less than the specified inspection and test frequency (e.g., the polar crane inside a PWR containment may only be used every 12 to 18 months during refueling operations, and is generally not accessible during power operation. ANSI B30.2, however, calls for certain inspections to be performed daily or monthly. For such cranes having limited usage, the inspections, test, and maintenance should be performed prior to their use)."

A. Summary of Applicant's Statements

All cranes and hoists at ZPS-1 shall be subjected to frequent and periodic inspections as described in Chapter 2-2 of ANSI B30.2-1976. All plant cranes are designated as either regular or standby service, based upon a twice/week-usage criterion.

All cranes undergo an undocumented before-use inspection encompassing those items listed under Section 2-2.1.2 of ANSI B30.2. All regular-use cranes, or standby-use cranes being operated regularly for more than a month, undergo a documented monthly inspection of these same characteristics. All cranes undergo a documented yearly inspection encompassing those items listed under Section 2-2.1.3 of ANSI B30.2.

Preventive maintenance, equipment safety tagging, adjustments, and lubrication will be performed as described in Section 2-2.3 of ANSI B30.3.0. Wire rope inspection, replacement, and maintenance will be conducted as described in Section 2-2.4 of ANSI B30.2.

All new, altered, extensively repaired, or modified cranes will be tested as required by Section 2-2.2.1 and rated load tests will be performed per Section 2-2.2.2 of ANSI B30.2 with an exception. The risk of an inadvertant drop of a test load could impact safe shutdown or decay heat removal equipment. Therefore, the requirements of Section 2-2.2.2.b. 2 and 3, requiring full length travel of the crane trolly and bridge while handling a 125% test load is believed inappropriate and places the plant in an unsafe situation.

B. EG&G Evaluation

The applicant has indicated that their actions are consistent with Guideline 6 for Inspection, Test, and Maintenance with one exception. Since the scope of the Heavy Load Program is aimed at preventing heavy load handling over vital equipment unnecessarily, and ANSI B30.2 Section 2-2.2.2b uses the qualifying phrase, "The rated load test, if made . . ." it seems that the exception is justified.

C. EG&G Conclusions and Recommendations

With the one exception discussed, the Wm H. Zimmer Nuclear Power Station Unit 1 actions are consistent with Guideline 6. The basis for the exception, in light of the code wording, is believed to be consistent also, because impracticalities are recognized.

2.3.7 Crane Design [Guideline 7, NUREG-0612, Article 5.1.1(7)]

"The crane should be designed to meet the applicable criteria and guidelines of Chapter 2-1 of ANSI B30.2-1976, 'Overhead and Gantry Cranes,' and of CMAA-70, 'Specifications for Electric Overhead Traveling Cranes' [10]. An alternative to a specification in ANSI B30.2 or CMAA-70 may be accepted in lieu of specific compliance if the intent of the specification is satisfied."

A. Summary of Applicant's Statements

As described in the Wm. H. Zimmer Nuclear Power Station Final Safety Analysis Report, the Reactor Building crane is designed per the requirements of ANSI B30.2.0 and CMAA-70. The miscellaneous hoists and trolleys located in the general areas of the plant are designed and constructed in accordance with ANSI B30.16-1973. They are described by the architect engineer and manufacturer as "electric overhead hoists." The refueling floor cranes include three jib cranes and the Reactor Building Crane. The three jib cranes on the refueling floor were designed and constructed in accordance with ANSI B30.11. The Turbine Building crane meets EOCI specifications. The Service Water Maintenance Bridge Crane complies with ANSI B30.2.

B. EG&G Evaluation

The submittals present data showing that the Reactor Building main crane is consistent with the guideline. Also, the various non-bridge crane hoists and jibs that are designed to the appropriate ANSI code such as B30.11 and B30.16 are consistent with the guideline. Details on a few cranes prompt questions that the submittals fail to answer the concerns of Guideline 7. These are discussed below.

1. The information given on the Turbine Building Crane, "meets EOCI specifications." It is listed as Item No. 301 and identified as two bridge cranes, each

with 110-ton and 25-ton hooks. Therefore, both ANSI B30.2 and CMAA 70 design requirements apply. Since EOCI 61 was superseded by CMAA 70, most of the requirements called for by CMAA 70 may be met. No information is given to determine if ANSI B30.2 was used in the design.

2. The information given on the Service Water Maintenance Building cranes, Item No. 406, indicates that it was designed to ANSI B30.2, but does not indicate that the added requirements of CMAA 70 criteria were used.
3. Items 113, 401, and 404 are listed as "Bridge Cranes", so the general statement relative to ANSI B30.11 or B30.16 do not apply. Reference to the design criteria of ANSI B30.2 and CMAA 70 are not given.

Each of the five item cranes above are listed among those in the submittal attachments used to justify exclusion from the requirements of NUREG 0612. The justifications for the latter four Item No. hoists are consistent with the general exclusion criteria of NUREG 0612. However, the Item 301 (2 cranes) justification is dependent partially on, isolation of the main steam lines, administrative control limits to 24 tons for specific travel areas, and single-failure-proof design for Reactor Protection Instrumentation. Guideline 7 requirements for design of cranes for Item 301 are not presented. Justification for exclusion of Item 301 from consideration is not consistent with the requirements of 2.2 above. Further evaluation and acceptable information is needed.

4. Hoist Item 108 apparently meets the ANSI code design requirements. However, the information concerning this hoist needs additional evaluation:

- General listings for Item 108 rate the hoist at 18 tons and at 20 tons. The data should be consistent.
- The submittals justify exclusion from the requirement of NUREG 0612 on assurances from "Application of Administrative controls" This is less than the "defense-in-depth" approach called for in NUREG 0612-5.1.

C. EG&G Conclusions and Recommendations

In general, the information submitted shows that cranes have been designed to criteria consistent with the intent of Guideline 7, or a justification was presented to show that they are excluded from the requirements of NUREG 0612.

The two hoists included in Item 301, "The Turbine Building Cranes," are not shown to be consistent with Guideline 7. Administrative controls are not acceptable; alternatives to design specifications and sufficient information to exclude the cranes from NUREG 0612 are not presented. More comprehensive alternative specification information is needed to show that the intent of Guideline Specifications is met.

Hoist Item 108. Provide better justification for removal from consideration from the requirement of NUREG 0612.

2.4 Interim Protection Measures

The NRC staff has established (NUREG-0612, Article 5.3) that six measures should be initiated to provide reasonable assurance that handling of heavy loads will be performed in a safe manner until final implementation of the general guidelines of NUREG-0612, Article 5.1 is complete. Four of these six interim measures consist of general

Guideline 1, Safe Load Paths; Guideline 2, Load-Handling Procedures; Guideline 3, Crane Operator Training; and Guideline 6, Cranes (Inspection, Testing, and Maintenance). The two remaining interim measures cover the following criteria:

- Heavy load technical specifications
- Special review for heavy loads handled over the core.

In the October 7, 1982, transmittal [6], specific implementation of interim actions were addressed by Cincinnati Gas and Electric Company. The interim protection measures were intended primarily for operational, licensed plants; however, the interim implementation actions reported are evaluated in the succeeding paragraphs of this section.

2.4.1 Interim Protection Measure 1 - Technical Specifications

"Licenses for all operating reactors not having a single-failure-proof overhead crane in the fuel storage pool area should be revised to include a specification comparable to Standard Technical Specification 3.9.7, 'Crane Travel - Spent Fuel Storage Pool Building,' for PWRs and Standard Technical Specification 3.9.6.2, 'Crane Travel,' for BWRs, to prohibit handling of heavy loads over fuel in the storage pool until implementation of measures which satisfy the guidelines of Section 5.1."

A. Summary of Applicant's Statements

The Main Reactor Building crane is used for handling heavy loads in the fuel storage pool area. The 110-ton hook of this crane is designed with four single-failure-proof features:

- A redundant idler gear train, which is a duplicate of the driving side gear reduction system (without drive motor). Each gear reduction train has a 150% of motor torque braking system.

- Structural steel support upon which the drum barrel will rest following gross failure of drum bearings, shaft, or bearing support.
- Redundant full capacity wire rope system.
- Redundant designed hook within a hook load-handling system.

In addition Technical Specifications contain:

- A limiting condition for operation for movement of equipment over fuel assemblies in the spent-fuel pool.
- Surveillance requirements to assure operability of crane interlocks which prevent travel over the spent-fuel pool.

B. EG&G Evaluation

The single-failure-proof components, combined with the crane interlocks, to prevent heavy load movements over the spent-fuel pool is consistent with the intent of Interim Protective Measure 1.

C. EG&G Conclusions and Recommendations

The conditions satisfy Interim Protection Measure 1--no recommendations are given.

2.4.2 Interim Protection Measures 2, 3, 4, and 5--Administrative Controls

"Procedural or administrative measures [including safe load paths, load-handling procedures, crane operator training, and crane inspection]... can be accomplished in a short time period and need not be delayed for completion of evaluations and modifications to satisfy the guidelines of Section 5.1 of [NUREG-0612]."

A. Summary of Applicant's Statements

Summaries of the applicant's statements are contained in discussions of the respective general guidelines in Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.6, respectively.

B. EG&G Evaluations, Conclusions, and Recommendations

EG&G evaluations, conclusions, and recommendations are contained in discussions of the respective general guidelines in Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.6.

2.4.3 Interim Protection Measure 6--Special Review for Heavy Loads Over the Core

"Special attention should be given to procedures, equipment, and personnel for the handling of heavy loads over the core, such as vessel internals or vessel inspection tools. This special review should include the following for these loads: (a) review of procedures for installation of rigging or lifting devices and movement of the load to assure that sufficient detail is provided and that instructions are clear and concise; (b) visual inspections of load-bearing components of cranes, slings, and special lifting devices to identify flaws or deficiencies that could lead to failure of the component; (c) appropriate repair and replacement of defective components; and (d) verify that the crane operators have been properly trained and are familiar with specific procedures used in handling these loads, e.g., hand signals, conduct of operations, and content of procedures."

A. Summary of Applicant's Statements

The special reviews called for in Interim Protection Measure 6 will be performed.

B. EG&G Evaluation

Performance of the reviews, as stated, meets the interim action requirements. In addition, many of the details provided in response to NUREG 0612, Section 5.1.1 guidelines indicate that the plant systems are established to accomplish the interim special reviews.

C. EG&G Conclusion

The reported action plans are consistent with the requirements for Interim Protection Measure 6.

3. CONCLUDING SUMMARY

3.1 Applicable Load-Handling Systems

The list of cranes and hoists supplied by the applicant as being subject to the provisions of NUREG-0612 is accepted as complete (see Section 2.2.1).

3.2 Guideline Recommendations

Compliance with the seven NRC guidelines for heavy load handling (Section 2.3) are partially satisfied at the Wm. H. Zimmer Nuclear Power Station. This conclusion is represented in tabular form as Table 3.1. Specific recommendations to aid in compliance with the intent of these guidelines are provided as follows:

<u>Guideline</u>	<u>Recommendation</u>
1. (Section 2.3.1) Safe Load Paths	a. Completion of the actions described by the applicant are consistent with the requirements of Guideline 1.
2. (Section 2.3.2) Load-Handling Procedures	a. Completion of the load-handling procedures, and their implementation will show that Wm. H. Zimmer Nuclear Power Station Unit 1 is consistent with Guideline 2.
3. (Section 2.3.3) Crane Operator Training	a. Completion of the actions committed to is consistent with the requirements of Guideline 3.

Guideline

Recommendation

- | | |
|---|---|
| 4. (Section 2.3.4)
Special Lifting
Devices | a. The special lifting devices satisfy the requirements and are consistent with Guideline 4. |
| 5. (Section 2.3.5)

Lifting Devices Not
Specially Designed | a. Wm. H. Zimmer Nuclear Power Station has presented information to show that their actions are consistent with Guideline 5. |
| 6. (Section 2.3.6)
Cranes (Inspection,
Testing, and Main-
tenance) | a. Generally the actions taken are consistent with Guideline 6. One exception listed is believed consistent with the intent of Guideline 6. |
| 7. (Section 2.3.7)
Crane Design | a. Information provided shows that Wm. H. Zimmer Nuclear Power Station Unit 1 is consistent with Guideline 7, with exceptions concerning the hoists in Item Nos. 108 and 301. |

3.3 Interim Protection

EG&G's evaluation of information provided by the applicant indicates that the following actions are necessary to ensure that the six NRC staff measures for interim protection at Wm. H. Zimmer Nuclear Power Station Unit 1 are met:

<u>Interim Measure</u>	<u>Recommendation</u>
1. (Section 2.4.1)	a. The indicated conditions and actions satisfy the Technical Specifications requirements for Interim Protection Measure 1.
2, 3, 4, and 5. (Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.6)	a. The actions taken and under way for Measures 2, 3, and 4, as indicated in the sections shown respectively, are consistent with the protection recommendation.
Administrative Controls	b. The required crane inspections program is adequate. The required programs for testing and maintenance have one exception taken, e.g., carrying test loads over vital equipment. The plant is consistent with the intent of the guideline.
6. (Section 2.4.3) Special Reviews for Heavy Loads Over the Core	a. The reported action plans are consistent with the requirements for Interim Protection Measure 6.

4. REFERENCES

1. NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, NRC.
2. V. Stello, Jr. (NRC), Letter to all applicants. Subject: Request for Additional Information on Control of Heavy Loads Near Spent Fuel, NRC, 17 May 1978.
3. USNRC, Letter to [Company]. Subject: NRC Request for Additional Information on Control of Heavy Loads Near Spent Fuel, NRC, 22 December 1980.
4. E. A. Borgman, Letter to Mr. Harold Denton, U.S. Nuclear Regulatory Commission, Washington, DC 20555, dated May 13, 1981, Referencing Wm. H. Zimmer Nuclear Power Station Unit 1 - Control of Heavy Loads.
5. E. A. Borgman, Letter to Mr. Harold Denton, U.S. Nuclear Regulatory Commission, Washington, DC 20555, dated June 24, 1981, referencing Wm. H. Zimmer Nuclear Power Station Unit 1--Supplemental Information in response to NRC Letter of December 22, 1980 regarding Control of Heavy Loads.
6. B. Ralph Sylvia, Letter to Mr. Harold Denton, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, dated October 7, 1982, referencing Wm. H. Zimmer Nuclear Power Station Unit 1--Control of Heavy Loads.
- 6a. J. Williams, Jr., Letter to Mr. Harold Denton, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, dated June 2, 1983, referencing Wm. H. Zimmer Nuclear Power Station Unit 1--Supplimentary Information, Heavy Loads.
7. ANSI B30.2-1976, "Overhead and Gantry Cranes."
8. ANSI N14.6-1978, "Standard for Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or more for Nuclear Materials."

9. ANSI B30.9-1971, "Slings."
10. CMAA-70, "Specifications for Electric Overhead Traveling Cranes."

TABLE 3.1. WM. H. ZIMMER NUCLEAR POWER STATION NUREG-0612 COMPLIANCE MATRIX

Equipment Designation	Heavy Loads	Weight or Capacity (tons)	Guideline 1 Safe Load Paths	Guideline 2 Procedures	Guideline 3 Crane Operator Training	Guideline 4 Special Lifting Devices	Guideline 5 Slings	Guideline 6 Crane Inspection, Test, and Maintenance	Guideline 7 Crane Design
101 main	14 Loads to 90 Ton Max.	110	C	C	C	C	C	C	C
101 aux	2 Loads to 4 Ton Max.	10	C	C	C		C	C	C
105	2900 lbs	2		C	C		C	C	C
108	18.5 Ton	18-20 ^a	C	C	C		C	C	C
109	23.8 Ton	24.45	C	C	C		C	C	C
114	1 Ton	2.5	C	C	C		C	C	C
116	5 Ton	6.	C	C	C		C	C	C
118	3.5 Ton	4	C	C	C		C	C	C
119	3 Ton	4	C	C	C		C	C	C
301	24 Ton	110 and 25	C	C	C		C	C	NC
204		5	Future						
412		8	C	C	C		C	C	C
417	3 Ton	3	C	C	C		C	C	C
418	2 Ton	3	C	C	C		C	C	C
102, 103, 104, 106, 107, 110, 111, 112, 113, 115, 117, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 201, 202, 203, 204, 205, 207, 208, 302, 303, 304, 305, 306, 307, 308, 309, 401, 402, 403, 404, 406, 407, 411, 412, 413, 414, 415, 416, 417, 418, and 419.			Are recognized in the submittals or drawings, but have justifications provided for exclusion that are consistent with NUREG 0612.						

C = Applicant action complies with NUREG-0612 Guideline.

NC = Applicant action does not comply with NUREG-0612 Guideline

R = Applicant has proposed revisions/modifications designed to comply with NUREG-0612 Guideline.

I = Insufficient information provided by the applicant.

a. Information submitted shows capacity of Hoist 108 at 18 tons one place and at 20 tons in another.

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BIBLIOGRAPHIC DATA SHEET

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Wm. H. Zimmer Nuclear Power Station (Phase I)

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7. AUTHOR(S)

C. R. Shaber, T. H. Stickley

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16. ABSTRACT (200 words or less)

The Nuclear Regulatory Commission (NRC) has requested that all nuclear plants either operating or under construction submit a response of compliancy with NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants." EG&G Idaho, Inc., has contracted with the NRC to evaluate the responses of those plants presently under construction. This report contains EG&G's evaluation and recommendations for Wm. H. Zimmer Nuclear Power Station, Unit 1.

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