ENCLOSURE 1

# CONTROL OF HEAVY LOADS AT NUCLEAR POWER PLANTS
# LIMERICK GENERATING STATION UNITS 1 AND 2

Docket No. 50/352 and 50/353

Author
N. Maringas

Principal Technical Investigator
T. H. Stickley

EG&G Idaho, Inc.

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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 Limerick Plant Units 1 and 2.

## EXECUTIVE SUMMARY

The Limerick Plant Units 1 and 2 does not totally comply with the guidelines of NUREG-0612. In general, additional evaluations are required in the following areas:

- Safe Load Paths
- Crane Operator Training
- Special Lifting Devices
- Slings
- Crane (Inspection, Testing and Maintenance)

The main report contains recommendations which will aid in bringing the above items into compliance with the appropriate guidelines.

CONTENTS


| Section | Title | Page |
|---|---|---|
| ABSTRACT | | i |
| EXECUTIVE SUMMARY | | ii |
| 1. | INTRODUCTION | 1 |
| 1.1 | Purpose of Review | 1 |
| 1.2 | Generic Background | 1 |
| 1.3 | Plant-Specific Background | 3 |
| 2. | EVALUATION AND RECOMMENDATIONS | 4 |
| 2.1 | Overview | 4 |
| 2.2 | Heavy Load Overhead Handling Systems | 4 |
| 2.2.1 | Scope | 4 |
| 2.2.1.1 | Summary of Applicant Evaluation on Overhead Handling Systems | 5 |
| 2.2.1.2 | EG&G Evaluation, Conclusions and Recommendations for Overhead Handling Systems | 7 |
| 2.2.1.3 | Summary on Heavy Load Overhead Handling Systems | 8 |
| 2.3 | General Guidelines | 8 |
| 2.3.1 | Safe Load Paths [Guideline 1, NUREG-0612, Article 5.1.1(1)] | 9 |
| 2.3.1.1 | Summary of Applicant's Evaluation of Safe Load Paths | 10 |
| 2.3.1.2 | EG&G Evaluations, Conclusions and Recommendations of Safe Load Paths | 10 |
| 2.3.1.3 | Summary on Safe Load Paths | 11 |
| 2.3.2 | Load Handling Procedures [Guideline 2, NUREG-0612, Article 5.1.1(2)] | 12 |

2.3.2.1 Summary of Applicant's Evaluation on Load Handling Procedures ..... 12
2.3.2.2 EG&G Evaluations, Conclusions and Recommendations on Load Handling Procedures ..... 12
2.3.2.3 Summary on Load Handling Procedures ..... 12

2.3.3 Crane Operator Training [Guideline 3, NUREG-0612, Article 5.1.1(3)] ..... 13

2.3.3.1 Summary of Applicant's Evaluation of Crane Operator Training ..... 13
2.3.3.2 EG&G Evaluations, Conclusions and Recommendations on Crane Operator Training ..... 13
2.3.3.3 Summary on Crane Operator Training ..... 13

2.3.4 Special Lifting Devices [Guideline 4, NUREG-0612, Article 5.1.1(4)] ..... 13

2.3.4.1 Summary of Applicant's Evaluation on Special Lifting Devices ..... 14
2.3.4.2 EG&G Evaluations, Conclusions and Recommendations on Special Lifting Devices ..... 15
2.3.4.3 Summary on Special Lifting Devices ..... 15

2.3.5 Lifting Devices (Not Specially Designed) [Guideline 5, NUREG-0612, Article 5.1.1(5)] ..... 15

2.3.5.1 Summary of Applicant's Evaluation on Lifting Devices (Not Specially Designed) ..... 16
2.3.5.2 EG&G Evaluations, Conclusions and Recommendations on Lifting Devices (Not Specially Designed) ..... 16
2.3.5.3 Summary on Lifting Devices (Not Specially Designed) ..... 16

2.3.6 Cranes (Inspection, Testing and Maintenance) [Guideline 6, NUREG-0612, Article 5.1.1(6)] ..... 17

2.3.6.1 Summary of Applicant's Evaluation on Cranes (Inspection, Testing and Maintenance) ..... 17
2.3.6.2 EG&G Evaluations, Conclusions and Recommendations on Cranes (Inspection, Testing and Maintenance) ..... 17
2.3.6.3 Summary on Cranes (Inspection, Testing and Maintenance) ..... 18

2.3.7 Crane Design [Guideline 7, NUREG-0612, Article 5.1.1(7)] ..... 18

2.3.7.1 Summary of Applicant's Evaluation of Crane Design ..... 18

2.3.7.2 EG&G Evaluations, Conclusions and Recommendations on Crane Design ..... 20

2.3.7.3 Summary on Crane Design ..... 20

3. CONCLUDING SUMMARY ..... 21

3.1 Applicable Load Handling Systems ..... 21

3.2 Guideline Recommendations ..... 21

3.3 Interim Protection ..... 21

4. REFERENCES ..... 24

TABLES

3.1 Limerick Plant Compliance Matrix ..... 22

3.2 Summary of Recommendations for Limerick Plant ..... 23

# TECHNICAL EVALUATION REPORT
# FOR
# LIMERICK PLANT UNITS 1 AND 2

## 1. INTRODUCTION

### 1.1 Purpose of Review

This technical evaluation report (TER) documents the EG&G Idaho Inc. review of general load handling policy and procedures at Philadelphia Electric Company's Limerick Plant Units 1 and 2. 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 ensure 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 licensees, 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 (1) 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 (2) 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:

- Provide sufficient operator training, handling system design, load handling instructions, and equipment inspection to ensure reliable operation of the handling system.

- 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

- 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

In December 22, 1980, the NRC issued a letter [3] to Philadelphia Electric Company, the licensee for Limerick Plant, requesting that the applicant review 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 June 18, 1981, Philadelphia Electric Company provided the initial response [4] to this request.

## 2. EVALUATION AND RECOMMENDATIONS

### 2.1 Overview

The following sections summarize Philadelphia Electric Company's review of heavy load handling at Limerick Plant 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 has indicated the weight of a heavy load for this facility (as defined in NUREG-0612, Article 1.2) as 700 pounds.

### 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 the applicant's 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.

2.2.1.1 Summary of Applicant Evaluation on Overhead Handling Systems

The applicant reviewed their plant and identified all overhead handling systems and provided an index in Table 1 of Reference 4.

The Reactor Enclosure Crane was the only overhead handling device identified by the applicant which could carry heavy loads over reactor fuel. Pertinent data for the crane is listed in Table 1 of Reference 4. The applicant identified the following cranes/hoists which could carry heavy loads over systems or components required for safe shutdown or decay heat removal:

a. Diesel Generator Building Bridge Cranes. (Diesel generators and auxiliaries are under the load path.)

b. Spray Pond Pump House Hoists. (Service water valves are under the load path.)

c. Spray Pond RHR and ESW Pump Yard Crane. (RHR and ESW pumps are under the load path.)

Other cranes/hoists which could carry heavy loads in the vicinity of safety-related electrical circuits or instrumentation are as follows:

a. Control Room HVAC Lift Beams
b. Recirculation Pump Motor Hoists
c. Core Spray Pump Hoist 10-H-215
d. Core Spray Pump Hoist 10-H-216
e. Containment Equipment Door Hoist

f. CRD Removal Platform Hoist
g. MSRV Service and Removal Hoists
h. Containment Hydrogen Recombiner Cover Hoists
i. Control Room HVAC Equipment Hoist

In Table 1 of Reference 4 the applicant identified cranes and hoists where safety-related equipment had been identified on the next elevation below the elevation of the load path. It was assumed that a load dropped from these overhead handling systems will not penetrate the floor, but may cause spalling of the concrete below, which could affect the safety-related equipment. There are 24 cranes/hoist listed that fall into this category.

All other cranes/hoists in Table 1 of Reference 4 not mentioned above, were excluded by the applicant based on the following criterion:

Criterion A: The crane or hoist is located in a structure which does not contain systems or equipment required for safe shutdown or decay heat removal. Structures included are the Turbine Enclosure, the Radwaste Enclosure, the Administration Building, the Auxiliary Boiler Building, the Circulating Water Pump House, and the Schuylkill River Pump House. This designation is based on the Limerick Fire Protection Evaluation Report which identifies safety-related equipment in each fire area and evaluates the effect of the loss of this equipment on plant safe shutdown capability (including decay heat removal).

Criterion B: The load carried by this crane or hoist is not greater than 700 pounds. Therefore, it is not a heavy load.

Criterion C: For these cranes and hoists there is no equipment required for safe shutdown or decay heat removal located in the load path. Absence of safe shutdown equipment was determined by review of the Fire Protection Evaluation Report and the results of the Separation Program. Load paths are defined on the drawings attached to this report. Except where limited by walls or other barriers load paths are at least twice as wide as the widest load or hatch opening. Thus, the load will still land in the load path if swinging occurs before it is dropped. For a load whose height is more than twice its width, it is assumed that the load can tip over in any direction from an impact point below the centerline of the normal or crane hoist. In these cases the load will also land within the load path. Therefore, dropped loads cannot damage safe-shutdown or decay heat removal systems or components.

2.2.1.2 EG&G Evaluation, Conclusions and Recommendations for Overhead Handling Systems

The applicant's response indicates that the overhead handling devices at the Limerick Plant are listed on Table 1, "Index of Overhead Handling Systems-Unit 1 and Common," of Reference 4. The drawings attached to Reference 4 identify equipment locations of all applicable overhead handling systems in the plant and their proximity

to safety-related components. These drawings identify each crane or hoist by equipment item number used in Table 1 of Reference 4. EG&G concludes that the applicant's list of cranes and hoists is complete and satisfies the requirements of NUREG-0612.

The applicant reviewed the Limerick Plant arrangement and indicated that exclusions were based on physical separation, i.e., no load drops could result in damage to any system or component required for safe shutdown or decay heat removal. Other exclusions were made based on the absence of safe shutdown or decay heat removal equipment in the area or loads would be less than the 700 pounds defined in Section 2.1, Overview. EG&G agrees with the applicant's evaluation of these devices and concludes that the applicant has met the requirements of NUREG-0612 concerning exclusion of overhead handling systems and justification for their exclusion.

#### 2.2.1.3 Summary on Heavy Load Overhead Handling Systems

Limerick Plant fully complies with the criteria of NUREG-0612 on heavy load overhead handling systems.

## 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.

2.3.1.1 Summary of Applicant's Evaluation of Safe Load Paths

The applicant provided equipment location drawings, Reference 4, which identified recommended safe load paths and locations of fuel and safety-related equipment. These drawings identified each crane or hoist by the equipment item number used in Table 1 of Reference 4.

With regard to load handling procedures, the applicant does not have information at this time, but will consider load paths and deviations when developing procedures.

The applicant has taken exception to marking of safe load paths on floors. The applicant felt that training, procedures, interlocks and other indications such as signs provide a sufficient level of safety.

2.3.1.2 EG&G Evaluation, Conclusions and Recommendations on Safe Load Paths

EG&G has reviewed the applicant's response to the criteria of Guideline 1, Safe Load Paths, and considers the marking of load paths on drawings as complete.

When the load paths and deviations from those paths are included in load handling procedures, then the applicant will have complied with that portion of Guideline 1.

If the applicant would provide the training program, procedures, interlocks used and defines other indications that would provide a sufficient level of safety, then EG&G could evaluate the validity of the applicant's exception to marking load paths on floors, etc.

In it's evaluation, the applicant has not addressed approvals to deviations from safe load paths as stated in Guideline 1 criteria.

2.3.1.3 Summary on Safe Load Paths

In order to fully comply with the criteria of Guideline 1, "Safe Load paths," the applicant should perform the following prior to fuel load:

a. Incorporation of safe load paths into procedures.

b. Provide substantiation that alternatives proposed to marking of safe load paths on floors, etc, are equivalent.

c. Incorporate approval by Plant Safety Review Committee to deviations from defined load paths using alternative procedures.

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 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 load path, and other special precautions.

2.3.2.1 Summary of Applicant's Evaluation on Load Handling Procedures

The applicant responded to this guideline by indicating that written procedures in accordance with Guideline 2 will be available prior to fuel load.

2.3.2.2 EG&G Evaluations, Conclusions and Recommendations on Load Handling Procedures

EG&G has reviewed the applicant's response and considers the criteria of Guideline 2 will be met when written procedures are completed.

2.3.2.3 Summary on Load Handling Procedures

The applicant will comply with the criteria of Guideline 2, "Load Handling Procedures," upon

issuance of written load handling procedures prior to fuel load. These procedures should be available for possible NRC review.

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."[5]

2.3.3.1 Summary of Applicant's Evaluation of Crane Operator Training

The applicant has not addressed Guideline 3 in this report or subsequent submittals. This should be completed prior to fuel load.

2.3.3.2 EG&G Evaluation, Conclusions and Recommendations on Crane Operator Training

An evaluation by EG&G cannot be performed pending further information from the applicant.

2.3.3.3 Summary on Crane Operator Training

The applicant has not complied with the criteria of Guideline 3 of NUREG-0612. This should be completed prior to fuel load.

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".[6] 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) of the load and of the intervening components of the special handling device.

2.3.4.1 Summary of Applicant's Evaluation on Special Lifting Devices

The applicant identified special lifting devices to be used at the Limerick Plant in Table 3 of Reference 4. These devices are not certified to ANSI N14.6-1978. The applicant also advised that shipping cask yokes are designed to be single failure proof, which is superior to meeting the ANSI specification directly.

The applicant is presently investigating the requirements that special lifting devices meet ANSI N14.6-1978. Based upon this investigation, the applicant may take exceptions to this requirement.

2.3.4.2 EG&G Evaluation, Conclusion and Recommendations on Special Lifting Devices

The applicant has not completed their review of the special lifting devices for the Limerick Plant. EG&G cannot perform a review until further information is received from the applicant.

EG&G recommends the applicant should perform a point by point review to ANSI N14.6-1978 with special attention to Sections 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2.1, 3.2.4, 3.2.5, 3.2.6, 3.3.1, 3.3.4, 3.3.5, 3.3.6, 4.1.3, 4.1.4, 4.1.5, 4.1.6, 4.1.7, 4.1.9, 5.1.3, 5.1.4, 5.1.5, 5.1.6, 5.1.7, 5.1.8, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.3.4, 5.3.6, and 5.3.7.

2.3.4.3 Summary on Special Lifting Devices

The applicant has not provided any information on compliance with Guideline 4, Special Lifting Devices. This should be completed prior to fuel load.

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".[7] 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.

2.3.5.1 Summary of Applicant's Evaluation on Lifting Devices (Not Specially Designed)

The applicant's response states that current requirements for slings utilized by Construction and Maintenance Division for Q-listed equipment will meet ANSI N45.2-1972. In addition, the applicant is presently investigating the requirements that slings meet ANSI B30.9-1971. Based upon that investigation, the applicant may take exception to the criteria of Guideline 5.

2.3.5.2 EG&G Evaluation, Conclusions and Recommendations on Lifting Devices (Not Specially Designed)

The applicant has not completed its review of slings for the Limerick Plant to the criteria of Guideline 5. EG&G cannot perform a review until that information is received. EG&G recommends the applicant should address not only ANSI B30.9-1971 but the additional requirements in Guideline 5 when conducting there review.

2.3.5.3 Summary on Lifting Devices (Not Specially Designed)

The applicant has not provided any information on compliance with the criteria of Guideline 5, Slings. This should be completed prior to fuel load.

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.

2.3.6.1 Summary of Applicant's Evaluation on Cranes (Inspection, Testing and Maintenance)

The applicant has stated that the Limerick Plant is still under construction, however, ANSI B30.2-1976 will be considered in the preparation of the crane inspection, testing and maintenance procedures at the time the cranes and hoists are turned over for plant use.

2.3.6.2 EG&G Evaluation, Conclusions and Recommendations on Cranes (Inspection, Testing and Maintenance)

EG&G cannot perform an evaluation until the applicant provides information that the crane

inspection, testing and maintenance will be in accordance with the criteria of Guideline 6 of NUREG-0612.

2.3.6.3 Summary on Cranes (Inspection, Testing and Maintenance)

The Limerick Plant will comply with Guideline 6 when the applicant submits information on their Crane inspection, testing and maintenance program prior to fuel load.

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."[8] 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.

2.3.7.1 Summary of Applicant's Evaluation of Crane Design

The applicant's response indicated that procurement specifications for cranes identified in Section 2.2.1.1 require compliance with all specifications and standards issued by the Crane Manufacturers Association of America (CMAA) and the American National Standards Institute (ANSI) which were in effect prior to the date of the purchase order. The reactor enclosure crane was purchased in 1973 and therefore was designed to CMAA Specification 70 and an earlier version

(1967) of ANSI B30.2. The diesel generator cranes were purchased in 1972 and designed to the same standards as the reactor enclosure crane.

The applicant states that the cranes were designed according to Chapter 2-1 of ANSI B30.2-1967. However NUREG-0612 requires verification of compliance with Chapter 2-1 of ANSI B30.2-1976. The applicant compared the two editions and concluded that the aforementioned cranes generally comply with the applicable requirements of Chapter 2-1 of ANSI B30.2-1976, with the following exceptions:

a. Welded construction (2-1.4.1)--The cranes welding procedures conform to AWS D2.0-66 rather than AWS D1.1.

b. Design of guard rails and toe boards (2-1.5.2 and 2-1.7.3) complies with OSAS A12-1932 rather than ANSI A12.1.

c. Trolley bumpers (2-1.8.3.a.1) designed with energy absorbing capacity for 40% of rated trolley speed rather than 50%.

d. Wiring and equipment (2-1.10.1) complies with USAS C1-1965 rather than Article 610 of National Electrical Code, ANSI C-1(NFPA 70).

The applicant does not consider the above differences to be significant with respect to safe operation of the cranes. Crane design should be considered to be in compliance with the guidelines of ANSI B30.2-1976.

2.3.7.2 EG&G Evaluation, Conclusions and Recommendations on Crane Design

EG&G has reviewed the applicants response on the specifications under which their cranes were purchased and concurs with the applicants determination. The applicant has demonstrated equivalency of actual design requirements where specific compliance with Guideline 7 standards were not provided. EG&G agrees with the applicants conclusion on the differences between the two specifications, ANSI B30.2-1967 and 1976.

2.3.7.3 Summary on Crane Design

The Limerick Plant is in full compliance with the criteria of Guideline 7, Crane Design of NUREG-0612. The applicant should have all pertinent information to substantiate the design of its cranes available for possible NRC audit.

# 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 complete (see Section 2.2).

## 3.2 Guideline Recommendations

Compliance with two of the NRC guidelines for heavy load handling (Section 2.3) are satisfied at the Limerick Plant; i.e., Load Handling Procedures and Crane Design. The conclusions are presented in tabular form on Table 3.1. Specific recommendations to aid in compliance with the intent of the safe load paths, crane operator training, special lifting devices, slings and crane inspection, testing and maintenance guidelines are presented in Table 3.2.

## 3.3 Interim Protection

The applicant should commit to compliance with the seven guidelines of NUREG-0612 before fueling. If this is not accomplished, it will be necessary to address interim measures.

TABLE 3.1 LIMERICK PLANT 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-Test and Inspection | Guideline Crane Do |
|---|---|---|---|---|---|---|---|---|---|
| Reactor Enclosure Crane | C | 125/15 | NC | C | NC | NC | NC | NC | C |
| Diesel Generator Building Bridge Cranes | C | 15 | NC | C | NC | NC | NC | NC | C |
| Spray Pond Pump House Hoists | C | 3 | NC | C | NC | NC | NC | NC | C |
| Spray Pond RHR and ESW Pump Yard Crane | C | * | NC | C | NC | NC | NC | NC | C |
| Control Room HVAC Lift Beams | C | 3 | NC | C | NC | NC | NC | NC | C |
| Recirculation Pump Motor Hoists | C | 24 | NC | C | NC | NC | NC | NC | C |
| Core Spray Pump Hoist (10-H215) | C | 5 | NC | C | NC | NC | NC | NC | C |
| Core Spray Pump Hoist (10-H216) | C | 5 | NC | C | NC | NC | NC | NC | C |
| Containment Equipment Door Hoist | C | 6 | NC | C | NC | NC | NC | NC | C |
| CRD Removal Platform Hoist | C | 1 | NC | C | NC | NC | NC | NC | C |
| MSRV Service and Removal Hoist | C | 1/2 | NC | C | NC | NC | NC | NC | C |
| Containment Hydrogen Recombiner Cover Hoist | C | 1 | NC | C | NC | NC | NC | NC | C |
| Control Room HVAC Equipment Hoist | C | 2/3 | NC | C | NC | NC | NC | NC | C |

* = Hoist/Crane to be borrowed from other locations when needed.
C = Applicant action complies with NUREG-0612 Guidelines.
NC = Applicant action does not comply with NUREG-0612 Guidelines.

TABLE 3.2 SUMMARY OF RECOMMENDATIONS FOR LIMERICK PLANT

| | | |
|---|---|---|
| 1. | Section 2.3.1 Safe Load Paths | a. Incorporation of safe load paths into procedures.<br>b. Provide substantiation that alternatives to marking of safe load paths on floors, etc., are equivalent.<br>c. Incorporate approval by Plant Safety Review committee to deviations from defined load paths using alternative procedures.<br>d. Complete compliance prior to fuel load. |
| 2. | Section 2.3.2 Load Handling Procedures | Complete development and issuance of load handling procedures prior to fuel load. The completed procedures should be available for possible NRC review. |
| 3. | Section 2.3.3 Crane Operator Training | Comply with criteria of Guideline 3 of NUREG-0612 prior to fuel load. |
| 4. | Section 2.3.4 Special Lifting Devices | Comply with criteria of Guideline 4 of NUREG-0612 prior to fuel load. |
| 5. | Section 2.3.5 Slings | Comply with criteria of Guideline 5 of NUREG-0612 prior to fuel load. |
| 6. | Section 2.3.6 Crane (Inspection, Testing and Maintenance) | Complete compliance with criteria of Guideline 6 of NUREG-0612 prior to fuel load. |
| 7. | Section 2.3.7 Crane Design | Documentation verifying compliance to Guideline 7 should be available for possible NRC audit. |

## 4. REFERENCES


1. U.S. Nuclear Regulatory Commission, Regulatory Guide, NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants."

2. V. Stello, Jr. (NRC), Letter to all Licensees, Subject: Request for Additional Information on Control of Heavy Loads Near Spent Fuel, dated May 17, 1978.

3. U.S. Nuclear Regulatory Commission, Letter to Philadelphia Electric Company, Subject: NRC Request for Additional Information on Control of Heavy Loads Near Spent Fuel, dated December 22, 1980.

4. John S. Kemper, Philadelphia Electric Company, Letter to D. G. Eisenhut (NRC), Subject: Response to Staff Position, Interim Actions for Control of Heavy Loads, dated June 18, 1981.

5. American National Standards Institute, ANSI B30.2-1976, "Overhead and Gantry Cranes."

6. American National Standards Institute, ANSI N14.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More for Nuclear Materials."

7. American National Standards Institute, ANSI B30.9-1971, "Slings."

8. Crane Manufacturers Association of America, Inc., CMAA-70, "Specifications for Electric Overhead Traveling Cranes."