CONTROL OF HEAVY LOADS AT NUCLEAR POWER PLANTS
COMANCHE PEAK STEAM ELECTRIC STATION UNITS 1 AND 2

Docket Nos. 50-445, 50-446

Author
B. W. Dixon

Principal Technical Investigator
T. H. Stickley

EG&G Idaho, Inc.

March 1982

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 the Comanche Peak Steam Electric Station Units 1 and 2.

EXECUTIVE SUMMARY

Comanche Peak Units 1 and 2 do not totally comply with the guidelines of NUREG-0612. In general, compliance is insufficient in the following areas:

- load paths have not been fully developed or properly implemented;
- lifting devices have not been rated and marked to account for dynamic effects;
- some cranes are not designed per all of the indicated regulations;
- The minimum weight for a "heavy load" per NUREG-0612 definition has not been established.

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

CONTENTS

TABLES

TECHNICAL EVALUATION REPORT
FOR
COMANCHE PEAK STEAM ELECTRIC STATION
UNITS 1 AND 2

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 Comanche Peak Steam Electric 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 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 assure 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

On December 22, 1980, the NRC issued a letter [3] to Texas Utilities Generating Company (TUGC), the licensee for Comanche Peak requesting that the licensee review provisions for handling and control of heavy loads at Comanche Peak Units 1 and 2, 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 August 7, 1981, TUGC provided the initial response [4] to this request. Additional information was provided on October 8, 1981 [5].

2. EVALUATION AND RECOMMENDATIONS

2.1 Overview

The following sections summarize Texas Utilities Generating Company's (TUGC) review of heavy load handling at Comanche Peak 1 and 2 accompanied by EG&G's evaluation, conclusions and recommendations to the licensee for bringing the facilities more completely into compliance with the intent of NUREG-0612. TUGC's review of the facilities does not differentiate between the two units so it is assumed that both units are of identical design. The licensee has not directly indicated the weight of a heavy load for this facility (as defined in NUREG-0612, Article 1.2), however, a value of 1,700 pounds has been inferred from the load data provided.

2.2 Heavy Load Overhead Handling Systems

This section reviews the licensee'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 Licensee Statements

The licensee's review of overhead handling systems identified the cranes and hoists shown in Table 2.1 as those which handle heavy loads in the vicinity of irradiated fuel or safe shutdown and decay heat removal equipment.

The licensee has also identified numerous other cranes that have been excluded from satisifying the criteria of the general guidelines of NUREG-0612, (Table 2.2). Exemption was based upon "sufficient physical separation from systems required for plant shutdown or decay heat removal to prevent damage to these systems, as determined by visual inspection." Also, the loads carried by the cranes do not travel "in or near" the spent fuel storage area.

B. EG&G Evaluation

The lack of detailed "separation criteria" and other information such as drawings showing the relationship between crane coverage and location of safety equipment makes evaluation of the licensee's statements difficult.

C. EG&G Conclusions and Recommendations

Since there is no information to the contrary EG&G concludes that the licensee has included all applicable hoists and cranes in their list of handling systems which must comply 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 guidlines 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:

A. Guideline 1--Safe Load Paths

B. Guideline 2--Load Handling Procedures

C. Guideline 3--Crane Operator Training

D. Guideline 4--Special Lifting Devices

E. Guideline 5--Lifting Devices (not specially designed)

F. Guideline 6--Cranes (Inspection, Testing, and Maintenance)

G. 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 paragrapns address the guidelines individually.

2.3.1 Safe Load Patns [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 Licensee Statements

"'Safe load areas' (areas serviced by a particular crane in which a load drop will not result in damage to shutdown or decay heat removal equipment or spent fuel) have been identified where applicable for the cranes listed in [Table 2.1]. Equipment handled by these cranes will be transported whenever possible within the identified safe load areas. The 'safe load areas' will be clearly identified for each crane by a combination of placards, procedures, and marked off areas near plant shutdown and decay heat removal equipment or where spent fuel is stored."

"'Safe load paths' will be established for equipment handled outside the safe load areas and will be incorporated in the particular load handling procedures. The 'safe load paths' will be established with the purpose of transporting equipment over safe shutdown or decay heat removal equipment or spent fuel via the safest and shortest route to the nearest 'safe load area'. The equipment will then be transported within the 'safe load area' to its final destination."

"Safe load paths will also be identified for those loads which will require a load drop analysis in order to satisfy the NUREG-0612 requirements. These safe load paths will be described and illustrated as part of any load drop analysis performed in response to the Part II requirements of the NRC December 22, 1980 letters."

B. EG&G Evaluation

The licensee's response states that "safe load areas" have been developed for each crane, where applicable. However, "safe load paths" for each heavy load have not yet been established.

EG&G feels that the idea of "safe load areas" is only partially sound. An extremely large load, if dropped, may have sufficient momentum to penetrate structural barriers that would contain a smaller "heavy load". Thus a marked "safe load area" may induce a false sense of security. The licensee should take steps to ensure that marked safety zones clearly indicate the maximum applicable safe load. For overly large heavy loads specific load paths should be marked across the safe zones.

The licensee has not indicated that safe load paths will be marked on equipment layout drawings, as specified in the guideline. The licensee has also failed to indicate that deviations from defined paths will require written alternatives approved by the plant safety review committee.

Since the development of safe load paths is not complete a more thorough evaluation is not possible at this time.

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 are not in compliance with the criteria of Guideline 1. The licensee should implement the following actions:

(1) complete the development and implementation of safe load paths for all heavy loads;

(2) insure that all safe load paths and areas are appropriately marked on equipment layout drawings;

(3) implement administrative controls requiring written alternatives for load path deviations.

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 critria 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 Licensee Statements

"For some heavy loads, it may be necessary to operate outside the 'safe load areas' and transport the heavy load over or near plant shutdown or decay heat removal equipment or spent fuel. In that event, special precautions or procedures will be utilized with the purpose of minimizing the risk of a heavy load drop in these areas. The procedures will consist of load drop prevention measures

such as a list of required equipment, inspection, acceptance criteria for the movement of the load, sequence of steps, etc."

B. EG&G Evaluation

The licensee has stated that procedures are being developed for loads carried outside of "safe load areas." The substance of these procedures are consistent with the requirements of NUREG-0612. These procedures should be extended to include overlarge loads carried in "safe load areas." The procedures should be available for possible NRC review prior to plant operaton.

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 are not presently in compliance with the criteria of Guideline 2. The licensee should implement the following actions:

(1) complete the procedures mentioned in Section A above and retain them for possible NRC review;

(2) insure that the procedures cover overlarge loads in "safe load areas" when these loads exceed the rated capacity of the structural components in these areas. Dynamic effects must be considered when developing capacity ratings.

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' [6]."

A. Summary of Licensee Statements

"No exceptions to ANSI B30.2-1976 with respect to operator training, qualification, and conduct are anticipated at this time, however, if it is later determined that exceptions are required, written notification will be made to the Nuclear Regulatory Commission."

B. EG&G Evaluation

The licensee's statement contains insufficient information to determine compliance. The statement infers that procedures governing operator training, etc., are not complete at this time. Sufficient information would be provided by verifying the implementation of such procedures.

C. EG&G Conclusion and Recommendations

Comanche Peak 1 and 2 may be in compliance with the criteria of Guideline 3, however, insufficient information has been provided to the reviewer. The licensee should verify implementation of the procedures governing operator training, qualifications and conduct.

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' [7]. 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 Licensee Statements

"Although a special lifting device for a spent fuel shipping container weighing 10,000 pounds or more has not as yet been procured, ANSI N14.6-1978 will be invoked when this special lifting device is obtained. Although it is anticipated at this time that the standards for the lifting devices will be met, it may later be determined that alternatives to the standard are required. In that event, written notification will be made to the Nuclear Regulatory Commission describing the alternatives and their equivalency in terms of load handling reliability.

Comanche Peak Steam Electric Station (CPSES) and Westinghouse Nuclear Division are currently reviewing the design and construction specifications of the Reactor Vessel Head and Reactor Internals lifting rigs. The results of this review will be submitted with the Part II response of CPSES compliance with NUREG-0612."

B. EG&G Evaluation

Guideline 4 states that all special lifting devices involved with heavy load lifts will comply with ANSI N14.6-1978, not just those devices used to handle spent fuel shipping containers. A review of the lifting device and heavy loads lists provided by the licensee indicates that the criteria of Guideline 4 should be met for at least the following devices:

(1) Spent Fuel Cask Lifting Device;

(2) Reactor Vessel Head Lifting Rig;

(3) Reactor Internals Lifting Rig;

(4) Failed Fuel Assembly Lifting Tool.

EG&G has included item (4) above as we feel that a failed assembly is a special case not exempted by the definition of a "heavy load" contained in NUREG-0612 Section 1.2

The criteria of Guideline 4 is more restrictive than that of ANSI N14.6 in that dynamic loads must be considered. Thus the licensee should ensure that ANSI N14.6 Section 3.2.1.1 is properly appended when applied to the special lifting devices covered by the guideline.

The licensee should take all reasonable steps to ensure that item (1) above, when procured, meets the appended requirements of ANSI N14.6 as NRC approval of exceptions to required criteria is not insured.

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 are not in compliance with the criteria of Guideline 4. The licensee should implement the following actions:

(1) append ANSI N14.6-1978 Secton 3.2.1.1 to include dynamic effects as specified in the guideline;

(2) demonstrate that all special lifting devices at the facility covered by NUREG-0612 meet the appended requirements of ANSI N14.6.

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' [8]. 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 Licensee Statements

"Lifting devices... will comply with ANSI B30.9-1971 where applicable."

B. EG&G Evaluation

The licensee has only addressed ANSI B30.9 in the reply. Guideline 5 is more restrictive than ANSI B30.9 as the marking procedure is appended and the rated working load must be factored to account for dynamic effects.

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 do not comply with the criteria of Guideline 5. EG&G recommends that the licensee implement the following actions:

(1) for all slings used on heavy load lifts verify compliance with ANSI B30.9 based on working loads that correspond to the sum of the static and maximum dynamic load;

(2) review sling markings and verify compliance with the marking procedures of ANSI B30.9 and NUREG-0612 Article 5.1.1(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 Licensee Statements

ANSI B30.2-1976, Chapter 2-2, will be invoked with respect to crane inspection, testing and maintenance.

With respect to Section 2-2.1.1.1 of ANSI B30.2-1976, cranes located within Containment will be inspected per the required visual inspection schedule only during the periods of crane operation (generally during refuelings and cold shutdowns). This is necessary because periodic inspections during power operations are impractical due to high radiation levels in Containment.

No other exceptions to the standard are anticipated at this time, however, if it is later determined that exceptions are required, written notification will be made to the Nuclear Regulatory Commission.

B. EG&G Evaluation

The licensee's statement indicates that measures consistent with the requirements of Guideline 6 will be invoked. EG&G assumes that these measures will be implemented prior to

fuel handling at the facility. Procedures, inspection records, and other documentation should be retained and available for possible NRC review.

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 will be in compliance with the criteria of Guideline 6 when the measures listed in Section A above are invoked. The licensee should retain documentation of these measures for audit purposes.

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' [9]. 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 Licensee Statements

The licensee has supplied a table consisting of all the cranes listed in Table 2.1 and the associated "applicable codes and standards" specified in the Equipment Purchase Specifications for the plant. The table indicates that all the cranes in Table 2.1 were designed to the criteria of CMAA 70 while cranes 1, 2, 3, 8 and 20 were also designed per ANSI B30.2-1976 Chapter 2-1. Exceptions were taken for cranes 22 and 23 as these cranes are designed to handle a fuel assembly and its associated handling tool, which, by the NUREG-0612 definition, is not a heavy load.

B. EG&G Evaluation

EG&G has performed a cursory review of both CMAA 70-1975 and ANSI B30.2-1976 Chapter 2-1. It is our belief that conformance to CMAA-70 does not give sufficient coverage of all topics contained in Chapter 2-1 of ANSI B30.2. The actual design of the cranes in question may meet the criteria of Chapter 2-1 as many of the criteria are based on sound engineering and safety practices; however, the licensee has supplied insufficient information to make this determination.

The licensee's exemption of crane 22, the Fuel Building Fuel Handling Bridge Crane, is questioned by EG&G. The licensee has supplied the weight of a "fuel assembly and lifting tool" for the containment Fuel Handling Bridge Crane as 1,700 lbs. We have adopted this value as the minimum weight of a heavy load at the plant (see Section 2.1). The largest load listed by the licensee for crane 22 is a "failed fuel assembly and lifting tool" at 3,000 lbs. We feel that this failed fuel assembly is not equivalent to the "spent fuel assembly" used in the definition of "heavy load" (NUREG-0612, Section 1.2), based on the information given. If the licensee wishes to continue to pursue an exemption for crane 22 we suggest that a more thorough argument be supplied.

Based on the load information provided, EG&G feels that the Containment Fuel Handling Bridge Crane (crane 8), the Main Steam Safety Valves Hoist (crane 19) and the Containment Dome Access Rotating Platform Hoist (crane 21) may qualify for exemption to this guideline based on the magnitude of loads carried and the "heavy load" definitions. The licensee may wish to address exemption for these cranes.

Review of the load weights and crane capacity ratings provided by the licensee reveals two cranes with listed loads heavier than the listed capacity. The RHR Pump Hoist (crane No. 10) has a capacity given as 3 tons while its heaviest load, the Pump Motor Assembly is 4.8 tons. The RCP Hoist (crane No. 14) has a capacity of 40 tons indicated with a maximum load (RCP Pump and Lifting Rig) of 43.7 tons. In addition, six other cranes (Nos. 9, 13, 15, 16, 17, and 24) have maximum loads equal to the rated capacity. The licensee needs to explain the apparent discrepancy concerning capacity ratings on cranes 10 and 14. EG&G feels that cranes 9, 13, 15, 16, 17, and 24 may also be underrated when dynamic load effects are considered although we presently have insufficient information to support (or disprove) this position.

C. EG&G Conclusion and Recommendation

Comanche Peak 1 and 2 are in partial compliance with the criteria of Guideline 7. The licensee should implement the following action:

(1) demonstrate compliance with ANSI B30.2-1976, Chapter 2-1 for all cranes listed in Table 2.1 with the exception of crane 23, the Containment Building Refueling Machine;

(2) explain the apparent discrepancy concerning rated capacity and maximum loads for some cranes.

The licensee may wish to pursue exemptions to the criteria for some of the other cranes in Table 2.1 as mentioned in Section B above.

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:

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

Licensee implementation and evaluation of these interim protection measures is contained 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 PWR's and Standard Technical Specification 3.9.6.2, 'Crane Travel,' for BWR's, 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 Licensee Statements

The licensee did not address this measure.

B. EG&G Evaluation

Due to a lack of information, a true evaluation is impossible at this time. The following points should be noted:

(1) Comanche Peak is not yet operating, so it will be some time before the facility produces spent fuel to be stored in the Spent Fuel Storage Pools;

(2) the only crane with access to the pools, the Fuel Building Fuel Handling Bridge Crane, may be exempt from NUREG-0612 guidelines due to the definition of "heavy loads."

C. EG&G Conclusions and Recommendations

Comanche Peak 1 and 2 may be exempt to Interim Protection measure 1 due to the plant completion schedule. EG&G feels that the licensee should not be required to address this measure unless compliance with Guidelines 4, 5 and 7 will not be completed before plant operation.

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 Licensee Statements

Summaries of licensee 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: (1) 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; (2) 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; (3) appropriate repair and replacement of defective components; and (4) 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 Licensee Statements

"The interim actions discussed above will be developed and implemented prior to fuel load of Comanche Peak Unit 1. The action discussed above will not be necessary until that time since no potential adverse effects to public health exist from a heavy load drop during the construction phase at Comanche Peak.

"The procedures described above will be reviewed to ensure sufficient detail and that they are clear and concise after those procedures are written. Visual inspections of components mentioned above will be performed to detect flaws or deficiencies that could lead to failure and that, if

defects are found, appropriate repairs will be made. Also crane operators will be properly trained and familiarized with procedures as discussed in Interim Action (3) above."

B. EG&G Evaluation

The licensee's response indicates that proper compliance with Interim Measure 6 will be completed and initiated before fuel is handled over the core at the facility.

C. EG&G Conclusion

Comanche Peak 1 and 2 are in compliance with the requirements of Interim Measure 6.

3. CONCLUDING SUMMARY

3.1 Applicable Load Handling Systems

The list of cranes and hoists supplied by the licensee as being subject to the provisions of NUREG-0612 is probably adequate (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 Comanche Peak 1 and 2. This conclusion is represented in tabular form as Table 3.1. Specific recommedations to aid in compliance with the intent of these guidelines are provided as follows:

Guideline	Recommendation
1. (Section 2.3.1)	
	a. Complete the development and implementation of safe load paths for all heavy loads, indicating the results of load drop analyses.
	b. Demonstrate that all safe load paths are marked on equipment layout drawings.
	c. Implement administrative controls requiring written alternatives for load path deviations.

Guideline	Recommendation
2. (Section 2.3.2)	
	a. Complete the procedures under development and retain them for possible NRC audit.
3. (Section 2.3.3)	
	a. Retain complete information on the procedures governing operator training, qualifications and conduct for possible NRC review.
	b. Verify implementation of said procedures.
4. (Section 2.3.4)	
	a. Submit verification that all special lifting devices used on heavy load lifts meet the requirements of ANSI N14.6-1978 as appended by NUREG-0612 Section 5.1.1(4) concerning dynamic effects.
5. (Section 2.3.5)	
	a. Submit verification that all slings used on heavy load lifts meet the requirements of ANSI 30.9-1971 as appended by NUREG-0612 Section 5.1.1(5) concerning dynamic effects and sling marking.

Guideline	Recommendation
6. (Section 2.3.6)	
	a. Retain and have readily available documentation demonstrating compliance with Section 5.1.1(6) of NUREG-0612.
7. (Section 2.3.7)	
	a. For cranes 4 through 7, 9 through 19, 21, 22 and 24 of Table 2.1 either submit verification of compliance with ANSI B30.2 Chapter 2-1 or provide an ample argument for exemption from the criteria of the guideline.
	b. Provide an explanation of the load rating for cranes 10 and 14 and any other cranes for which the rated capacity is less than the maximum load.

3.3 Interim Protection

If compliance with the seven guidelines of NUREG-0612 Section 5.1 cannot be ensured before the plant operation date interim protection must be implemented. EG&G's evaluation of information provided by the licensee indicates that the following actions are necessary to ensure that the six NRC staff measures for interim protection at Comanche Peak 1 and 2 are met:

Interim Measure	Recommendation
1. (Section 2.4.1)	Supply a response to this measure
6. (Section 2.4.3)	Retain verifying documentation of the implementation of procedures, inspections, training and repairs.

3.4 Summary

The Comanche Peak Steam Electric Station Units 1 and 2 are in partial compliance with the guidelines of Section 5.1 of NUREG-0612. The facilities are basically in non-compliance in the areas of safe load paths and lifting devices and in partial compliance in the area of crane design. The facilities are in full compliance concerning crane testing and inspection, load handling procedures and crane operator training, pending documentation. Insufficient information has been received to establish compliance in some areas.

4. REFERENCES

1. NUREG-0612
   Control of Heavy Loads at Nuclear Power Plants
   NRC

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

3. USNRC
   Letter to Texas Utilities Generating Company. Subject: NRC Request for Additional Information on Control of Heavy Loads Near Spent Fuel
   NRC, 22 December 1980

4. H. C. Schmidt Texas Utilities Services Inc. (TUSI)
   Letter to S. Burwell (NRC)
   Subject: "Comanche Peak Steam Electric Station Control of Heavy Loads: NUREG-0612" August 7, 1981.

5. H. C. Schmidt (TUSI)
   Letter to S. Burwell (NRC)
   Subject: "Comanche Peak Steam Electric Station Control of Heavy Loads: NUREG-0612" October 8, 1981.

6. ANSI B30.2-1976
   "Overhead and Gantry Cranes"

7. ANSI N14.6-1978
   "Standard for Lifting Devices for Shipping Containers Weigning 10,000 Pounds (4500 kg) or more for Nuclear Materials"

8. ANSI B30.9-1971
   "Slings"

9. CMAA-70
   "Specifications for Electric Overhead Traveling Cranes"

TABLE 2.1. OVERHEAD LOAD HANDLING SYSTEMS WITH POTENTIAL FOR LOAD DROP ON SPENT FUEL OR SYSTEMS REQUIRED FOR PLANT SHUTDOWN OR DECAY HEAT REMOVAL--COMANCHE PEAK 1 AND 2

	Crane/Hoist Name	Location	Capacity (Tons)	Equipment and/or Piping Along the Load Path
1.	Fuel building overhead crane	Fuel building	130-17-5	Spent fuel pool cooling piping, spent fuel transfer area.
2.	Containment auxiliary upper cranes	Containment building	5	Reactor vessel.
3.	Containment polar cranes	Containment building	175-20	Reactor vessel, steam generator, reactor coolants pumps, reactor coolant piping.
4.	Moderating HX and letdown chiller HX hoist.[a]	Safeguards building	2	Train "A" electrical tray (cabling for AUX[a] Feedwater System, Component Cooling Water System Motor operated valves) located near the monorail.
5.	Component cooling water pump hoist	Auxiliary building	4	Component cooling (CCW) water pump and associated piping.
6.	Safety related chiller hoist	Auxiliary building	1-1/2	CCW piping connected to the chiller, Chiller.
7.	Centrifugal charging pumps hoist	Auxiliary building	4	Centrifugal charging pump and associated piping and valves.
8.	Containment fuel handling bridge crane	Containment building	1-1/2	Containment fuel transfer area and fuel rack.
9.	Safety injection pumps hoists	Safeguards building	3	Service water piping.
10.	Residual heat removal pumps hoist	Safeguards building	3	RHR pump and associated piping and valves.

TABLE 2.1. (continued)

	Crane/Hoist Name	Location	Capacity (Tons)	Equipment and/or Piping Along the Load Path
11.	Auxiliary feedwater pump hoist, (electric motor driven pump)	Safeguards building	4	Motor driven auxiliary feedwater pumps, piping and valves.
12.	Auxiliary feedwater pump hoist, (turbine driven pump)	Safeguards building	3	Turbine driven auxiliary feedwater pump, piping and valves.
13.	Auxiliary building filters hoist	Auxiliary building	8	Various systems filters.
14.	Reactor coolant pumps hoist	Containment building	40	Same as polar crane. See Note 1.
15.	Diesel generator (piston) hoist.	Safeguards building	1	Diesel generator and its associated piping and instrumentation.
16.	Spent fuel pool HX hoist[a]	Fuel building	4	Spent fuel pool heat exchangers, piping and valves.
17.	Service water traveling screen hoist	Outside of service water structure	20	Traveling screen.
18.	Residual heat removal (RHR) HX and Containment Spray System (CSS) hoist	Safeguards building	10	RHR and CSS heat exchanger and its associated piping and valves.
19.	Main steam safety valves hoist	Safeguards building	1	Main steam safety valves.
20.	Service water intake structure crane	Service water structure	7-1/2	Service water pumps and its associated piping and valves.
21.	Containment dome access rotating platform hoist	Containment building	1	Reactor vessel, fuel storage rack, steam generator, reactor coolant pumps, reactor coolant piping.

TABLE 2.1. (continued)

	Crane/Hoist Name	Location	Capacity (Tons)	Equipment and/or Piping Along the Load Path
22.	Fuel building fuel handling bridge crane	Fuel building	2	Spent fuel pool, refueling canal, new fuel storage pit.
23.	Containment building refueling machine	Containment building	2	Reactor vessel, containment fuel transfer area.
24.	Service water intake stop gate hoist	Service water intake structure	8	Service water pumps.

NOTE: 1. Reactor Coolant Pumps Hoist is attached to the Polar Crane Hooks during the maintenance operation of the Reactor Coolant Pump.

a. HX = Heat Exchanger, AUX = Auxiliary

TABLE 2.2. OVERHEAD LOAD HANDLING SYSTEMS, CRANES, AND HOISTS WHICH DO NOT REQUIRE ADDITIONAL REVIEW AND EVALUATION--COMANCHE PEAK 1 AND 2

	Crane/Hoist Name	Capacity (Tons)	Location
1.	Drumming storage area crane.	15	Fuel building
2.	Maintenance building bridge crane.	25	Maintenance building
3.	Turbine building gantry crane.	Main hoist - 210 Aux. hoist - 50	Turbine building
4.	Circulating water intake structure gantry crane.	Main hoist: Inside span - 25 Outside span - 12 Aux. hoist: 5	Circulating water intake structure
5.	Equipment hatch door hoist.	10	Containment building
6.	Waste gas compressor hoist.	1	Auxiliary building
7.	Positive displacement charging pump hoist.	6	Auxiliary building
8.	H_2 recombiner hoist.	1	Auxiliary building
9.	Letdown chiller package hoist.	2	Auxiliary building
10.	H&V chiller hoist (near H-A line).	6	Auxiliary building
11.	H&V chiller hoist (near J-A line).	1	Auxiliary building
12.	Let down HX and seal water HX hoist.	1-1/2	Safeguard building
13.	Condenser vacuum pumps hoist.	4	Turbine building
14.	Turbine plant cooling water pump hoist.	6	Turbine building
15.	Heater drain pump hoist.	4	Turbine building

TABLE 2.2. (continued)

	Crane/Hoist Name	Capacity (Tons)	Location
16.	Control fluid tank pumps hoist.	3	Turbine building
17.	Personnel lock hoist.	2	Safeguard building
18.	Reactor vessel stud hoist.	1/2	Containment building See drawing A1-0505
19.	Steam generator feed water pump and turbine drivers hoist.	10	Turbine building
20.	Equipment hatch @ 790'-6" for miscellaneous equipment hoist.	4	Safeguard building
21.	Equipment hatch @ 810'-6" for miscellaneous equipment hoist.	4	Safeguard building
22.	Equipment hatch @ 873'-6" for miscellaneous ventilation equipment hoist.	1	Auxiliary building
23.	Equipment hatch @ 886'-6" for miscellaneous ventilation equipment hoist.	1	Auxiliary building
24.	Decontamination of miscellaneous equipment hoist.	2	Unit 2, turbine building
25.	Decontamination of miscellaneous equipment hoist.	1/4	Unit 2, turbine building
26.	Dry waste compactor hoist.	2	Fuel building
27.	Chlorine containers hoist.	2	Service water chlorination building
28.	Chlorine containers hoist.	2	Circulation water chlorination building

TABLE 2.2. (continued)

	Crane/Hoist Name	Capacity (Tons)	Location
29.	Auxiliary steam condensate cooler hoist.	1	Auxiliary building
30.	Containment equipment hatch hoist.	40	Outside containment
31.	Wall puller for let down seal water HX and let down chiller HX.	3/4	Safeguard building
32.	Demineralizers hoist.	8	Auxiliary building
33.	Radial arm stud tensioner hoists.	2	Containment building

TABLE 3.1. COMANCHE PEAK STEAM ELECTRIC STATION, UNITS 1 AND 2/NUREG-0612 COMPLIANCE MATRIX

	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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
(1)	Fuel building overhead crane	130-17-5	--	--	I	--	--	C	C	I	--
	Spent fuel cask	125	NC	R	--	NC	--	--	--	--	--
	New fuel asembly and handling tool	0.9	E	E	--	E	--	--	--	--	--
	New fuel shipping cask	3.4	NC	R	--	--	NC	--	--	--	--
	Fuel transfer canal stop gates	6	NC	R	--	--	NC	--	--	--	--
(2)	Containment auxiliary upper crane	5	--	--	I	--	--	C	C	--	--
	Reactor vessel tensioning device	2	NC	R	--	--	NC	--	--	--	C
	Reactor vessel stud transfer baskets	2.2	NC	R	--	--	NC	--	--	--	C
	Reactor vessel studs	0.4	E	E	--	--	E	--	--	--	E

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
(3) Containment polar crane	175-20	--	--	I	--	--	C	C	--	--
Reactor vessel head and lifting rig	130	NC	R	--	NC	--	--	--	--	C
Internals lifting rig	75	NC	R	--	NC	--	--	--	--	C
Reactor vessel upper internals	66	NC	R	--	NC	--	--	--	--	C
Reactor vessel lower internals	140	NC	R	--	NC	--	--	--	--	C
Reactor coolant pump internals	27.6	NC	R	--	--	NC	--	--	--	C
Reactor coolant pump	43.8	NC	R	--	--	NC	--	--	--	C
Reactor coolant pump motor stand	5.5	NC	R	--	--	NC	--	--	--	C
Fuel storage area stop gate	6	NC	R	--	--	NC	--	--	--	C
(4) Moderating heat exchanger hoist	2	--	--	I	--	--	C	NC	--	--
Moderating HX channel head	0.1	E	E	--	--	E	--	--	--	--

TABLE 3.1. (continued)

	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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
	Moderating HX tube bundle	0.8	E	E	--	--	E	--	--	--	--
	Moderating HX shell	1.3	NC	R	--	--	NC	--	--	--	--
(5)	Component cooling water pump hoist	4	--	--	I	--	--	C	NC	--	--
	Component cooling water pump	3.3	NC	R	--	--	NC	--	--	--	--
	CCW pump base	1.7	NC	R	--	--	NC	--	--	--	--
	CCW pump motor	3.8	NC	R	--	--	NC	--	--	--	--
	24 inch valves	0.5	E	E	--	--	E	--	--	--	--
	Emergency Fan/coil unit motor	0.1	E	E	--	--	E	--	--	--	--
(6)	Safety related chiller hoist	1.5	--	--	I	--	--	C	NC	--	--
	Processing tank	1.5	NC	R	--	--	NC	--	--	--	--
	Acid tank and pump	0.5	E	e	--	--	E	--	--	--	--
	Chiller	1.2	NC	r	--	--	NC	--	--	--	--

TABLE 3.1. (continued)

	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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
	Electrical cabinet	0.8	E	E	--	--	E	--	--	--	--
	Motor and compresor	0.2	E	E	--	--	E	--	--	--	--
	Precooler heat exchanger	1.2	NC	R	--	--	NC	--	--	--	--
(7)	Centrifugel charging pump hoist	4	--	--	I	--	--	C	NC	--	--
	Centrifugal charging pump	3.8	NC	R	--	--	NC	--	--	--	--
	CCP gear assembly	1.4	NC	R	--	--	NC	--	--	--	--
	CCP motor	2.9	NC	R	--	--	NC	--	--	--	--
	CCP motor rotor	0.9	NC	R	I	--	NC	--	--	--	--
	Lube oil cooler (shell)	0.1	E	e	--	--	E	--	--	--	--
	Emergency fan/coil unit motor	0.1	E	E	--	--	E	--	--	--	--
(8)	Containment fuel handling bridge crane	1.5	--	--	I	--	--	C	C,E	--	--
	Fuel assembly and lifting tool	0.9	E	E	--	E	--	--	--	--	E

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
(9) Safety injection pump hoist	3	--	--	I	--	--	C	NC	--	--
S.I. Pump	3	NC	R	--	--	NC	--	--	--	--
S.I. Pump motor	2.4	NC	R	--	--	NC	--	--	--	--
(10) RHR Pump Hoist	3	--	--	I	--	--	C	NC	--	--
RHR pump	2.2	NC	R	--	--	NC	--	--	--	--
RHR pump motor	2.6	NC	R	--	--	NC	--	--	--	--
RHR pump casing	0.9	NC	R	--	--	NC	--	--	--	--
RHR pump rotor	1.3	NC	R	--	--	NC	--	--	--	--
RHR pump motor assembly	4.8	NC	R	--	--	NC	--	--	--	--
(11) Auxiliary feedwater pump hoist (motor driven)	4	--	--	I	--	--	C	NC	--	--
A.F. Pump	2	NC	R	--	--	NC	--	--	--	--
A.F. Pump motor	3.6	NC	R	--	--	NC	--	--	--	--
A.F. Pump rotor	0.6	E	E	--	--	E	--	--	--	--

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
A.F. pump upper casing	0.6	E	E	--	--	E	--	--	--	--
(12) Auxiliary feedwater pump hoist (turbine driven)	3	--	--	I	--	--	C	NC	--	--
A.F. pump	2	NC	R	--	--	NC	--	--	--	--
Turbine driver	1.4	NC	R	--	--	NC	--	--	--	--
A.F. pump rotor	0.6	E	E	--	--	E	--	--	--	--
A.F. pump casing	0.7	E	E	--	--	E	--	--	--	--
(13) Auxiliary building filter area hoist	8	--	--	I	--	--	C	NC	--	--
Filter element transfer cask	3.4	NC	R	--	--	NC	--	--	--	--
Filter compartment concrete floor plugs (max)	8	NC	R	--	--	NC	--	--	--	--
(14) Reactor coolant pump hoist	40	--	--	I	--	--	C	NC	--	--

TABLE 3.1. (continued)

	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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
	Reactor coolant pump internals	27.6	NC	R	--	--	NC	--	--	--	C
	Reactor coolant pump motor and lifting rig	43.7	NC	R	--	--	NC	--	--	--	C
	Reactor coolant pump motor stand	5.5	NC	R	--	--	NC	--	--	--	C
(15)	Diesel generator hoist	1	--	--	I	--	--	C	NC	--	--
	Miscellaneous piping and structural components	1	NC	R	--	--	NC	--	--	--	--
(16)	Spent fuel rod heat exchanger hoist	4	--	--	I	--	--	C	NC	I	--
	S.F. cooling pump	1.3	NC	R	--	--	NC	--	--	--	--
	S.F.cooling motor	1.1	NC	R	--	--	NC	--	--	--	--
	S.F.H.E shell	3.8	NC	R	--	--	NC	--	--	--	--
	S.F.H.E tube bundle	3.7	NC	R	--	--	NC	--	--	--	--
	Concrete floor plugs	4	NC	R	--	--	NC	--	--	--	--

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
(17) Service water traveling screen hoist	20	--	--	I	--	--	C	NC	--	--
Miscellaneous Items (max)	1.8	NC	R	--	--	NC	--	--	--	--
(18) RHR and CSS heat exchanger hoist	10	--	--	I	--	--	C	NC	--	--
CSS H.E. shell body	3.7	NC	R	--	--	NC	--	--	--	--
CSS H.E. tube bundle	8.5	NC	R	--	--	NC	--	--	--	--
RHR H.E. shell body	3.9	NC	R	--	--	NC	--	--	--	--
RHR H.E. tube bundle	8.3	NC	R	--	--	NC	--	--	--	--
Compartment concrete floor plugs (max)	10	NC	R	--	--	NC	--	--	--	--
(19) Main steam safety valves hoist	1	--	--	I	--	--	C	I,E	--	--
MSS valves	0.8	E	E	--	--	E	--	--	--	--
(20) Service water intake structure bridge crane	7.5	--	--	I	--	--	C	C	--	--

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
S.W. pump motor	4.9	NC	R	--	--	NC	--	--	--	--
Fire pump jockey pump	0.3	E	E	--	--	E	--	--	--	--
F.P.J.P. motor	0.1	E	E	--	--	E	--	--	--	--
F.P. diesel driven pump	2.4	NC	R	--	--	NC	--	--	--	--
F.P.D.D.P. driver	1.7	NC	R	--	--	NC	--	--	--	--
F.P.D.D.P. gear	0.7	E	E	--	--	E	--	--	--	--
F.P. diesel coupling	0.1	E	E	--	--	E	--	--	--	--
F.P. electric driven pump	2.4	NC	R	--	--	NC	--	--	--	--
F.P.E.D.P motor	2.4	NC	R	--	--	NC	--	--	--	--
(21) Containment dome access rotating platform hoist	1	--	--	I	--	--	C	I,E	--	--
Miscellaneous tools	0.1	E	E	--	--	E	--	--	--	E
Welding equipment	0.2	E	E	--	--	E	--	--	--	E

TABLE 3.1. (continued)

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 7 Design	Interim Measure 1 Technical Specifications	Interim Measure 6 Special Attention
(22) Fuel building fuel handling bridge crane	2	--	--	I	--	--	C	I,NC	I	--
Failed fuel assembly and lifting tool	1.5	NC	R	--	NC	--	--	--	--	--
Fuel assembly and tool	1	NC	R	--	NC	--	--	--	--	--
(23) Containment building refueling machine	2	--	--	I	--	--	C	E	--	--
Fuel assembly	0.8	E	E	--	--	--	--	--	--	E
(24) Service water intake stop gate hoist	8	--	--	I	--	--	C	NC	--	--
S.W. pump compartment stop gates	8	NC	R	--	--	NC	--	--	--	--

C = Licensee action complies with NUREG-0612 Guideline.
NC = Licensee action does not comply with NUREG-0612 Guideline
R = Licensee has proposed revisions/modifications designed to comply with NUREG-0612 Guideline.
I = Insufficient information provided by the Licensee.
E = Exempt from NUREG-0612 guidelines per definition of 'heavy load'.