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AUTH.NAME AUTHOR AFFILIATION
UHRIG,R.E. Florida Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
EISENHUT,D.G. Division of Licensing

SUBJECT: Forwards updated rept on interim action for control of heavy loads in response to Sections 2.2,2.3 & 2.4 of Encl 3 to NRC 801222 review request.

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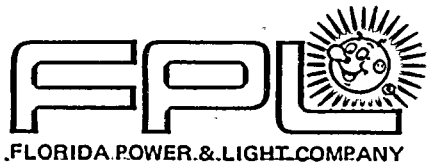


FLORIDA POWER & LIGHT COMPANY

November 12, 1981
L-81-473

Office of Nuclear Reactor Regulation
Attention: Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Eisenhut:

Re: Turkey Point Units 3 & 4
Docket No. 50-250, 50-251
Control of Heavy Loads

As requested by an NRC letter, dated December 22, 1980, Florida Power & Light has conducted a review of controls for the handling of heavy loads at Turkey Point Units 3 & 4. This review was conducted in accordance with NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants - Resolution of TAP A-36."

An update to our report of interim action taken on this subject and a report in response to Sections 2.2, 2.3, and 2.4 of Enclosure 3 to the December 22, 1980 letter are attached.

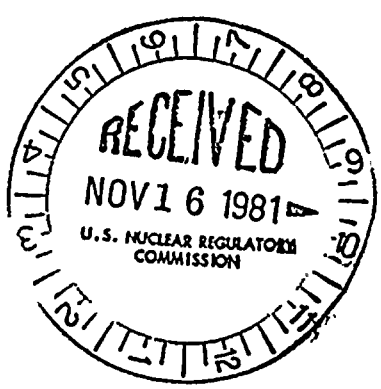
Very truly yours,

J a Ple Mosty
for

Robert E. Uhrig
Vice President
Advanced Systems and Technology

REU/PLP/mbd

cc: Mr. J.P. O'Reilly, Region II
Harold F. Reis, Esquire



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ATTACHMENT

Re: Turkey Point Units No. 3 and No. 4
Interim Actions for Control of Heavy Loads

The NRC letter dated December 22, 1980 (subject: Control of Heavy Loads) requested implementation of interim actions for the training, qualification, and conduct of crane operators. Florida Power & Light will implement, at Turkey Point Unit No. 3 and 4, Section 2-3.1 (Qualifications for and conduct of Operators) of Chapter 2-3 of ANSI Standard B 30.2-1976 with the following exceptions to the referenced paragraphs:

Paragraph 2-3.1.2. We will require an eye test of 20/40 in both eyes for new employees.

Paragraph 2-3.1.7.f, g and h. Because of the power requirements of the crane motor heaters, we will meet the intent of these requirements by using the crane dead man switch instead of the main line disconnect devices.

Paragraph 2-3.1.7. We will test those controls necessary for the crane operations to be conducted.

Paragraph 2-3.1.7.n. Safety during maintenance work on cranes will be in accordance with the plant clearance procedure.

The remainder of Chapter 2-3 of the ANSI Standard (i.e.: Handling the Load, Attaching the Load, Moving the Load, Hoist Limit Device, Signals, Miscellaneous) will be met in a general manner in procedures or in crane operator training with the following exception:

Paragraph 2-3.2.4.a. At shift change, we will try out the upper limit device under no load unless a load is hanging from the hook at shift change or unless no crane operation in the area of the upper limit is anticipated.

TURKEY POINT UNITS 3 AND 4

RESPONSE TO NRC REQUEST FOR ADDITIONAL

INFORMATION ON CONTROL OF HEAVY LOADS - NUREG 0612

SECTIONS 2.2, 2.3 AND 2.4

SPECIFIC REQUIREMENTS

TABLE OF CONTENTS

I. Introduction

This report is submitted in response to the NRC generic letter "Control of Heavy Loads" dated December 22, 1980. The NRC letter requests a two part response to the "Request for Additional Information" (Enclosure 3 of the letter). The first part of the response, concerning the general requirements for overhead load handling systems, has been previously submitted. This report contains the second response providing information on the specific requirements. Section II, III and IV of this report provides the information corresponding to Sections 2.2, 2.3 and 2.4 of the "Request for Additional Information." Section V provides a summary with a clarification of the previous response based upon findings in this report.

II. Specific Requirements for Overhead Handling Systems Operating in the Vicinity of Fuel Storage Pools

Section 2.2 of Enclosure 3 of the December 22, 1980 NRC generic letter requests specific information concerning the design and operation of load-handling systems in the vicinity of stored, spent fuel. It requests that the information provided should demonstrate that adequate measures have been taken to ensure that in this area, either the likelihood of a load drop which might damage spent fuel is extremely small, or that the consequences of such a drop will not exceed the limits set by the evaluation criteria of NUREG 0612, Section 5.1. The following discussion demonstrates how the above requirements are met in this area.

The following is a list of heavy load handling systems physically capable (i.e., ignoring interlocks, moveable mechanical stops, or operating procedures) of carrying loads which could, if dropped, land or fall into the spent fuel pool.

Name	Capacity	Equipment Designator
Spent Fuel Cask Crane (1 serves both units)	105 tons-main hook 15 tons-aux. hook	Whiting Company
Fuel Pool Bulkhead Monorail (1 ea. unit)	2 tons	American Chain and Cable

The Spent Fuel Handling Machine and the New Fuel Monorail are not included above since these devices do not handle "heavy loads"; i.e., loads weighing more than the weight of a spent fuel assembly with lifting tool. This exclusion is based upon Section 2.2.2 of Enclosure 3 of the NRC generic letter.

The Spent Fuel Cask Crane is used to transport the spent fuel cask in and out of the spent fuel storage pools of both units. Although the crane is rated for 105 tons, the Technical Specifications prohibit the handling of loads larger than 25 tons in the pool. The Technical Specifications also prohibit movement of a spent fuel shipping cask over fuel assemblies stored in the spent fuel storage pool. To assure that this requirement will not be violated, FP&L has installed a shipping cask crane movement interlock system. The crane is switched into this restricted movement mode when the cask is being handled in the spent fuel pool. This is a requirement of Operating Procedure 16702.1 "Spent Fuel Shipment Using Model NFS-4 Shipping Cask." Bypassing of the limit switches during cask handling operations is allowed only after the cask has been lowered to the bottom of the pool to allow trolley movement to facilitate unlatching of the crane hook from the cask lifting yoke. The operability of the restricted zone interlocks is verified prior to their required use in accordance with ANSI B30.2 "Overhead and Gantry Cranes."

Since the Technical Specifications and the interlock system prohibit the movement of a shipping cask over spent fuel, an accident resulting in a shipping cask falling upon stored fuel assemblies could only occur from the dropped cask tipping during its fall. The potential radiological consequences resulting from such an accident were evaluated and found to be well within 10CFR100 limits assuming the spent fuel has decayed a minimum of 1000 hours. Technical Specification 3.12 "Cask Handling" assures that this assumption remains valid.

The cask drop accident was reviewed by the NRC staff to determine if K_{eff} could be significantly affected by a change in fuel assembly configuration resulting from the dropped cask impacting the fuel storage racks. Based upon the review (Reference 7) it was concluded that the required use of borated water at the refueling boron concentration in the spent fuel pools will assure that K_{eff} remains less than 0.95 for all possible cask drop accidents. A K_{eff} of less than 0.95 satisfies NRC requirements and assures that no undesirable criticality conditions will result from a dropped and tipped cask accident.

The fuel pool slab was evaluated for a vertical cask drop assuming a 2 foot free fall and a water depth of 40 feet. The evaluation determined that the fuel pool integrity is maintained in the event of a cask drop accident.

The foregoing discussion and evaluation of the cask handling system and potential cask drop accidents has been previously submitted and accepted by the NRC staff (Reference 8) and is reiterated here for the sake of completeness. It has been demonstrated that a cask drop accident over the spent fuel assemblies is unlikely due to the design of the cask handling system and that, in the event of such an accident, the consequences are within acceptable limits. In addition, in order to achieve maximum practicable "defense-in-depth" the interim requirements and general guidelines of NUREG 0612 are being implemented for the operation of the Spent Fuel Cask Crane. This includes a safe load path which is shown on Figure 3.

The Fuel Pool Bulkhead Monorail is used to lift and move the pool gate bulkhead from the normal location on the inside face of the spent fuel pool to the designated storage location. The monorail is located directly above the inside face of the wall and does not travel over the spent fuel racks. A special procedure MP 1407.23 "Removal and Installation of the Spent Fuel Pit Keyway Gate" has been prepared for the handling of the bulkhead which delineates steps and the proper sequence to be followed.

III. Specific Requirements for Overhead Handling Systems Operating in the Containment

Section 2.3 of Enclosure 3 of the December 22, 1980 NRC generic letter requests specific information concerning the design and operation of load-handling systems in the vicinity of the reactor core. It requests that the information provided should demonstrate that adequate measures have been taken to ensure that, in this area, either the likelihood of a load drop which might damage spent fuel is extremely small, or that the consequences of such a drop will not exceed the limits set by the evaluation criteria of NUREG 0612, Section 5.1. The following discussion demonstrates how the above requirements are met.

The following crane is physically capable (i.e., ignoring interlocks, moveable mechanical stops, or operating procedures) of carrying heavy loads over the reactor vessel.

Name	Capacity	Equipment Designator
Polar Crane	135 tons - Main Hook	Whiting Company
	35 tons-Aux Hook	

The Manipulator Crane is not listed since it does not handle "heavy loads", i.e., loads weighing more than the weight of a spent fuel assembly with lifting tool.

The Turkey Point Plant Maintenance Procedure 0736, "Heavy Load Handling" defines a safe load path (Figures 2a and 2b) which prohibits hook travel over the reactor vessel without prior special approval. However, during plant maintenance and refueling operations it is sometimes necessary to carry heavy loads over the reactor vessel. Special procedures have been prepared for those loads which are handled periodically over the reactor vessel and have been referenced in FP&L's first phase response (Reference 5). These procedures identify the required equipment; inspection and acceptance criteria required before movement of the load; the steps and proper sequence to be followed in handling the load; the load path and any special precautions. Any load lifts not covered by a special procedure are controlled generically by the Plant Maintenance Procedure 0736 previously mentioned. This procedure requires that approval from the Maintenance Superintendant be obtained prior to movement of these loads over the reactor vessel. The Maintenance Superintendant will assure that the proper controls are present.

In addition to these procedures, which are available at the site for review, safe operation of the cranes is assured by the crane maintenance and operator training and qualification programs which follow ANSI B30.2-1976 guidelines. Based upon FP&L's review of the procedures, equipment and personnel used in load handling operations over the core, we believe that the likelihood of the load drop in the area is extremely small.

IV. Specific Requirements for Overhead Handling Systems Operating in Plant Areas Containing Equipment Required for Reactor Shutdown, Core Decay Heat Removal or Spent Fuel Pool Cooling

Section 2.4 of Enclosure 3 of the December 22, 1980 NRC generic letter requests specific information concerning the design and operation of load-handling systems in the vicinity of equipment or components required for safe reactor shutdown and decay heat removal. It requests that the information provided should demonstrate that adequate measures have been taken to ensure that in these areas, either the likelihood of a load drop -which might prevent safe reactor shutdown- is extremely small, or that damage to such equipment from load drops will be limited in order not to result in the loss of their safety-related functions. The following discussion demonstrates how the above requirements are met.

The following is a list of cranes 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. This list includes those cranes of this type

in Group I of Table 1 of the initial response to the NRC generic letter.

Name	Capacity (tons)	Equipment Designator
Charging Pump Monorails	5	American Chain and Cable
Safety Injection Pump Monorails	5	American Chain and Cable
Main Steam Platform	1	American Chain and Cable
Spent Fuel Cask Bridge Crane	105 Main Hook 15 Aux. Hook	Whiting Company
Turbine Building Gantry Crane Units 3 & 4	145 Main Hook 35 Aux. Hook	Whiting Company
Turbine Building Gantry Crane Units 1 & 2	70 Main Hook 15 Aux. Hook	Harnischfeger
Intake Structure Bridge Crane	25	Whiting Company
Reactor Polar Cranes	135 Main Hook 35 Aux Hook	Whiting Company

The Charging Pump and Safety Injection Pump Monorails have been listed since a load drop from these monorails could potentially damage a safe shutdown system. In every case, however, the component which could potentially be damaged from a load drop would be inoperative for maintenance purposes. These monorails are used for maintenance of these pumps only and are not required to carry heavy loads over operational safety related equipment to reach the laydown area. The Technical Specifications require that one redundant system must be operational in order to remove the other train from service for maintenance. Therefore, plant safe shutdown capability would not be defeated by a load drop on a component which is being serviced, since a backup system will be operational.

The Main Steam Platform Monorails are used to remove safety related valves. However, these valves can only be removed when the plant is shut down and their safety related function not required. These monorails handle no other heavy loads.

The Spent Fuel Cask Bridge Crane is located on the Reactor Auxiliary Building roof and serves both units. The principal function of this crane is the movement of the spent fuel cask as described in Section II of this report. Under normal conditions this is the heaviest load handled by the crane in the vicinity of safety related equipment or fuel. Cask drop analyses along the cask travel path were performed (see Reference 8) wherein it was determined that postulated accidents can be acceptably accomodated and unit safe-shutdown capability is maintained. The crane is also used to handle relatively light loads over the Reactor Auxiliary Building roof. There is no safety related equipment within the operating envelope of the crane hook which could be directly impacted by a load drop. Safety related components within the Reactor Auxiliary Building are protected from potential load drops by a reinforced concrete roof with a minimum thickness of one foot supported by structural steel framing. The Component Cooling Water equipment under the crane operating envelope is similarly protected by steel framing and heavy duty grating. In order to assure that only light loads are handled in these areas, the plant Maintenance Procedure 0736 "Heavy Load Handling" restricts the handling of loads greater than 5 tons over the concrete roof area and 1760 pounds over the Component Cooling Water area grating (refer to Figure 3). Also, as mentioned previously, the interim requirements and general guidelines of NUREG 0612 are being implemented for the operation, maintenance and qualification of operators for this crane to minimize the possibility of a load handling accident and to achieve maximum "defense-in-depth".

The Unit No. 1 and 2 (fossil) and Unit No. 3 and 4 Turbine Gantry Cranes can operate over the Unit No. 3 and 4 Turbine Building. Two reinforced concrete enclosed switchgear rooms, one for each unit, are located within the range of Turbine Gantry Crane operating envelope. Although it is considered highly unlikely that a heavy load drop could penetrate the two foot thick concrete roof and cause sufficient damage to equipment located in this room that would result in defeating plant safe shutdown capability or decay heat removal, the handling of heavy loads is restricted in this area. A safe load path has been defined for this crane (refer to Figure 1) which prohibits the handling of loads in excess of 5 tons in this area. In addition to the safe load path, in order to achieve maximum practicable "defense-in-depth", the interim requirements and general guidelines of NUREG 0612 have been adopted for the operation, maintenance and qualification of operators for this crane.

The Intake Structure Bridge Crane could potentially carry heavy loads over the Intake Cooling Water (ICW) pumps. However, a review of the loads handled by this crane has identified no heavy loads which are normally carried over the ICW pumps. Also, if a heavy load drop is postulated it is considered unlikely that such an event could cause sufficent damage to the

redundant ICW systems to defeat safe shutdown and decay heat removal. To assure that no heavy loads are carried over the pumps a safe load path has been defined which restricts load handling in this area (refer to Figure 4). Also, the interim requirements and general guidelines of NUREG 0612 have been implemented for this crane.

The Reactor Building Polar Crane is operated during plant cold shutdown and refueling modes. During these modes the residual heat removal (RHR) system is required to remain functional to remove decay heat from the reactor core. Since the piping for this system is within the hook envelope of the reactor polar crane, heavy load drops are reviewed.

The majority of the RHR piping in the containment is located within the confines of the reinforced concrete internal structure. The piping within this area is considered to be adequately protected from load drops. On the one side of the building the piping exits the internal structure and follows the containment wall to the piping penetration area.

Although there is structural steel framing between the piping and the crane which will provide some protection, load handling will be restricted in this area. This area is indicated on the safe load path sketches on Figure 2a and 2b.

As previously stated in Section III of this report, the NUREG 0612 general guidelines and interim requirements have been adopted for the operation of the Reactor Building Polar Crane.

V. Summary and Clarification of Response to General Requirements

This report documents the final phase of FPL&L's review of the controls for the handling of heavy loads at Turkey Point Units 3 and 4 as requested by the NRC generic letter dated December 22, 1980. As a result of the findings in this report, the safe load path sketches presented in the first phase response have been changed. A complete set of the new safe load path sketches are presented in Figures 1 through 4.

The results of Florida Power and Light Company's review of NUREG 0612 finds no equipment modifications required to meet the NUREG 0612 specific requirements. New procedures, training programs and other actions necessary to comply with the interim requirements and general guidelines are being implemented and have been addressed in the previous response. A training program in accordance with ANSI B 30.2-1976 has been developed and our standard company physical for new employees generally meets or exceeds the physical requirements of the ANSI standard. Some minor exceptions to the ANSI standard have been taken and are listed in the attachment at the end of this report. These training programs and procedures will be available at the site for review.

VI. References

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

2. NRC Generic Letter - "Control of Heavy Loads" dated December 22, 1980.

3. Enclosure 2 of Generic Letter - "Staff Position - Interim Actions for Control of Heavy Loads"

4. Enclosure 3 of Generic Letter - "Request for Additional Information on Control of Heavy Loads"

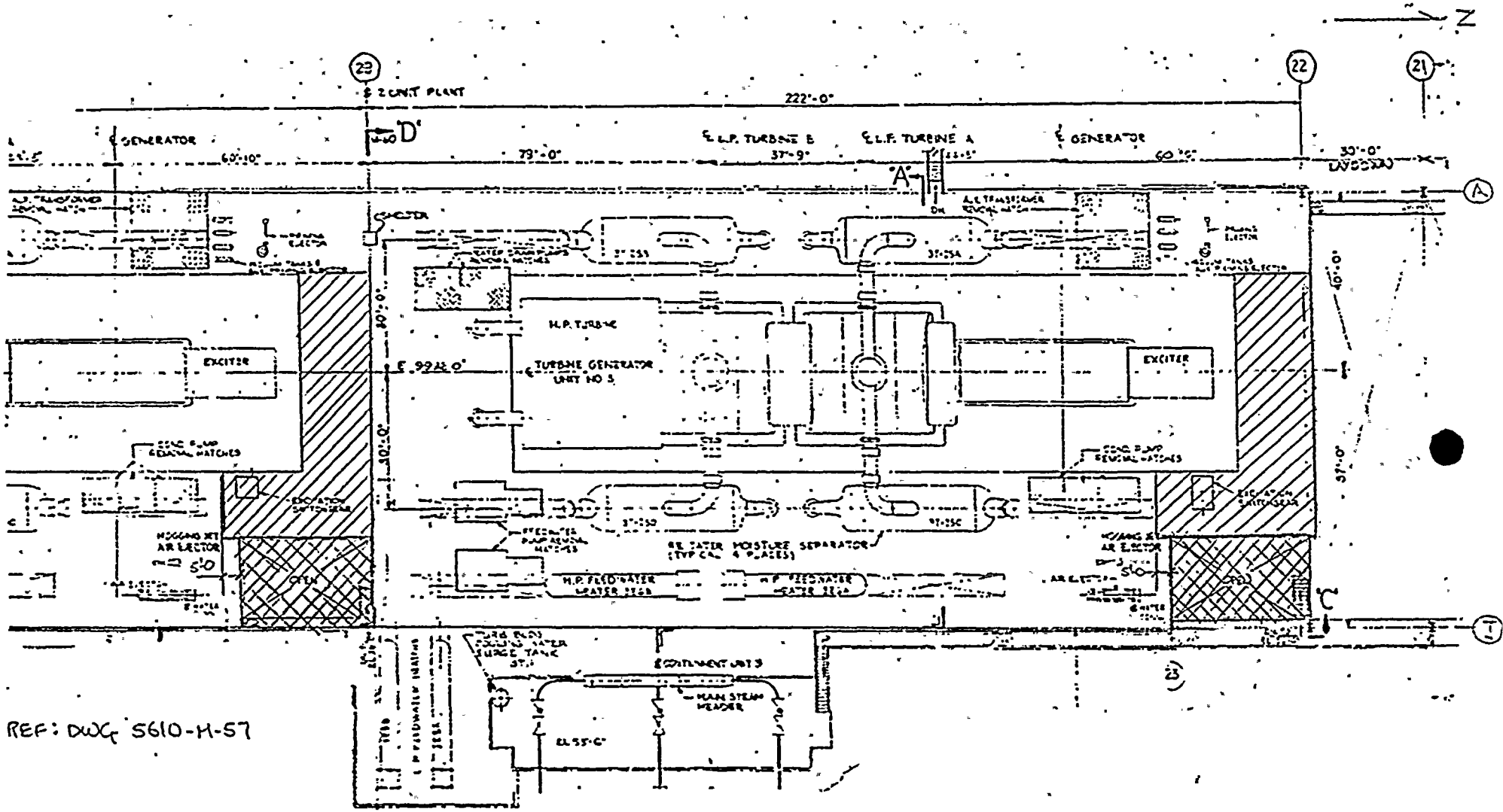
5. FPL letter L-81-382 to Mr. Eisenhut of NRC dated September 4, 1981, "Control of Heavy Loads" (First Phase response).

6. Plant Maintenance Procedure 0736 - "Heavy Load Handling"

7. Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Amendment No. 23 to License No. DPR-31 and Amendment No. 22 to License No. DPR-41.

8. FPL letter L-78-324 to Mr. Stello of NRC dated October 4, 1978 "Control of Heavy Loads"

APPENDIX



LEGEND: RESTRICTED AREA FOR HANDLING OF LOADS GREATER THAN 5 TONS

RESTRICTED AREA FOR HANDLING OF LOADS GREATER THAN 1760#

Safe load path is outside of cross-hatched areas.

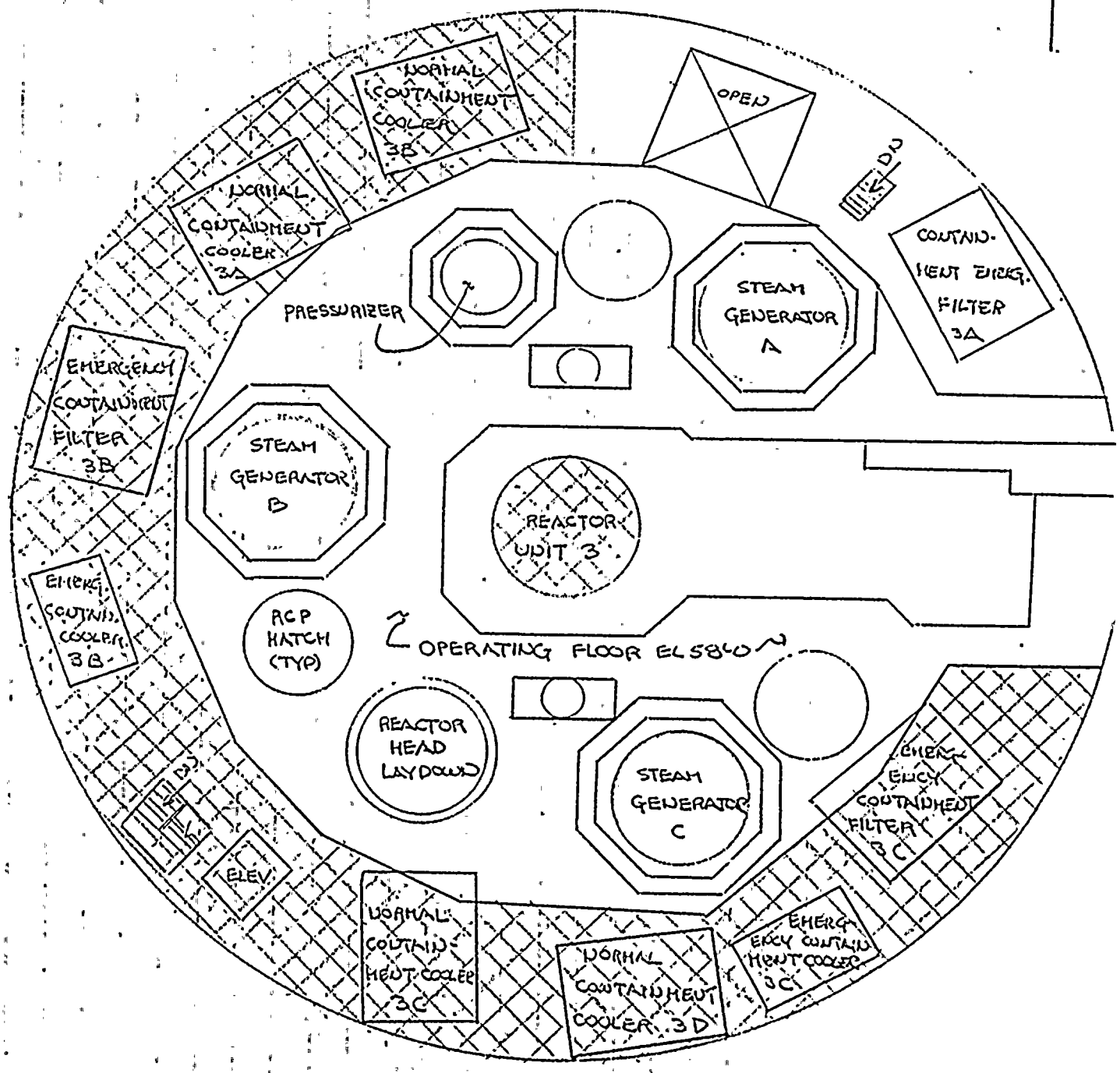
FIGURE 1 - SAFE LOAD PATH

TURBINE GANTRY CRANES

BY DATE

CHKD. BY DATE FLORIDA POWER & LIGHT COMPANY PROJECT NO.

REF: DWG 5610-M-57



LEGEND: ▨ RESTRICTED AREA FOR HANDLING OF LOADS > 1760#

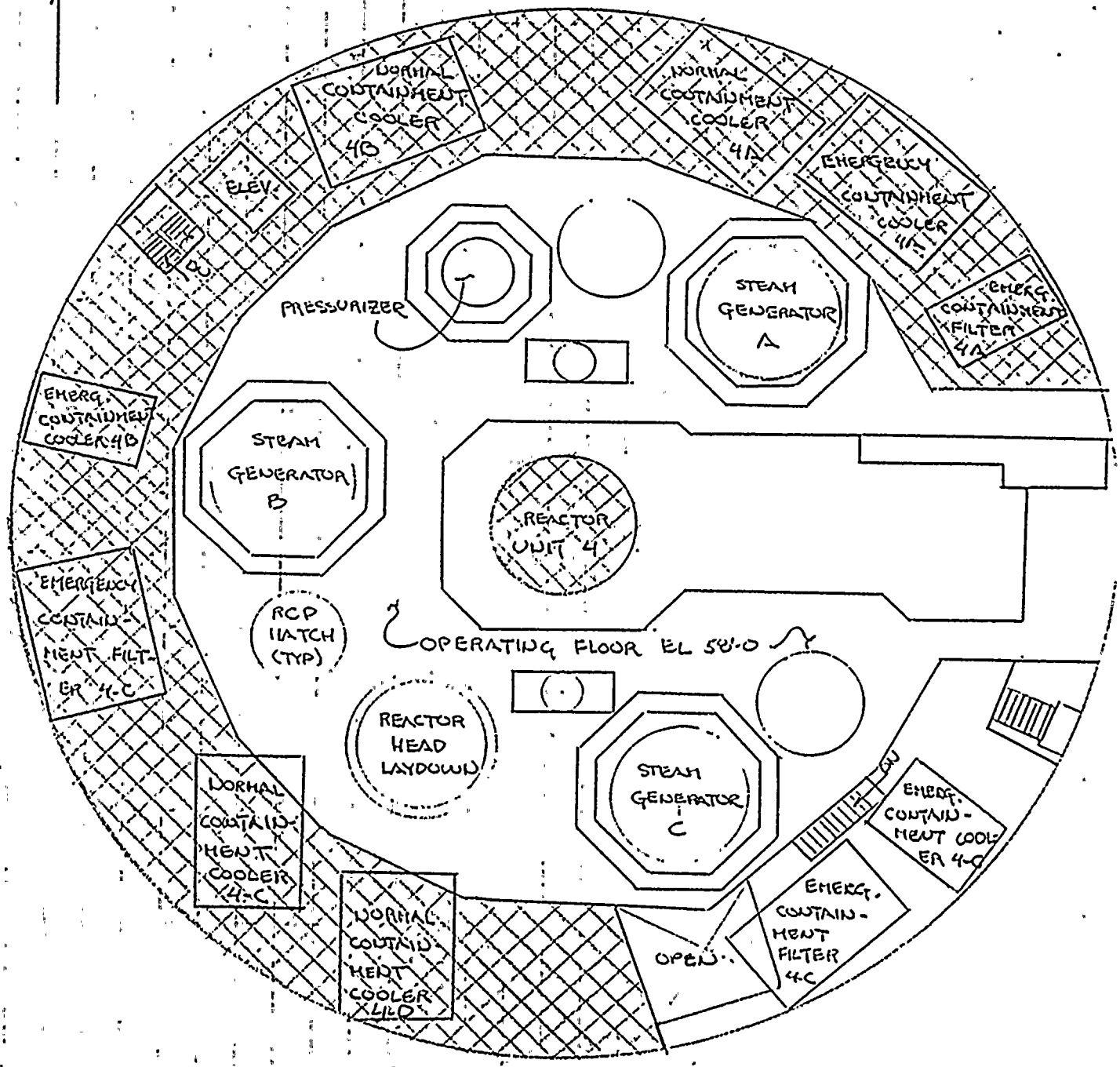
Safe load path is outside of cross-hatched areas.

FIGURE 2a - SAFE LOAD PATH

REACTOR POLAR CRANE UNIT 3

FORM 73 REV. 7/74

REF: DWG 5610-M-57



LEGEND: ⊠ RESTRICTED AREA FOR HANDLING OF LOADS > 1760#

Safe load path is outside of cross-hatched areas.

FIGURE 2b - SAFE LOAD PATH

REACTOR POLAR CRANE UNIT 4

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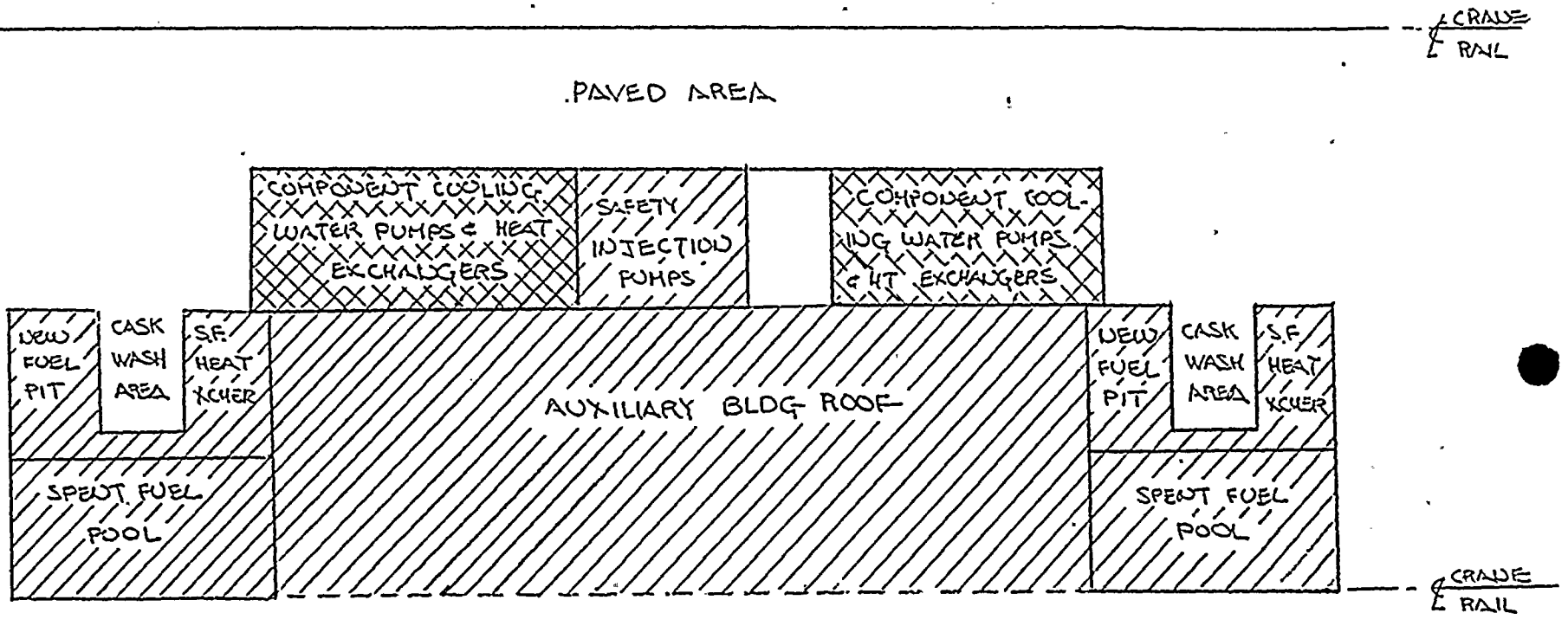
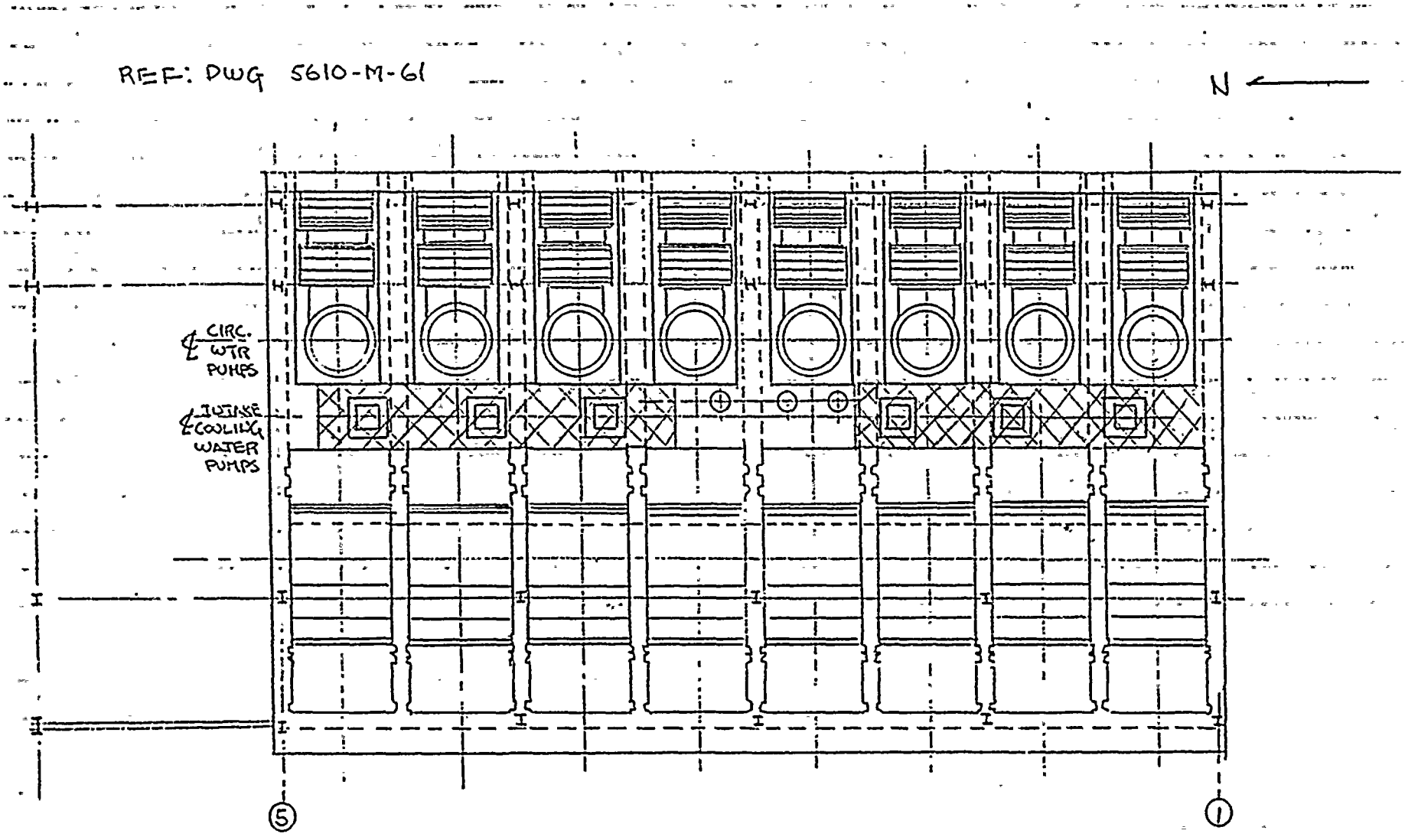


Safe load path is outside of cross-hatched areas.

FIGURE 3 - SAFE LOAD PATH

SPENT FUEL CASK HANDLING CRANE



LEGEND: ⊠ RESTRICTED AREA FOR HANDLING OF LOADS GREATER THAN 1760#

Safe load path is outside of cross-hatched areas.

FIGURE 4 - SAFE LOAD PATH

INTAKE STRUCTURE BRIDGE CRANE

CHKD. BY

DATE

DATE

FLORIDA POWER & LIGHT COMPANY

PROJECT NO.

FORM 73 REV. 7/

STATE OF FLORIDA)
) ss.
COUNTY OF DADE)

John A. DeMastry, being first duly sworn, deposes and says:

That he is Manager, Nuclear Licensing of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this said document are true and correct to the best of his knowledge, information, and belief, and that he is authorized to execute the document on behalf of said Licensee.

John a DeMastry
John A. DeMastry

Subscribed and sworn to before me this

12 day of November, 1981

Cheryl L. Fredrick
NOTARY PUBLIC, in and for the County of Dade, State of Florida

My commission expires: Notary Public, State of Florida at Large My Commission Expires October 30, 1983 Bonded thru Maynard Bonding Agency