ENCLOSURE 1

NUREG-0612 GENERAL GUIDELINES AND

INTERIM PROTECTION MEASURES FOR HEAVY LOAD HANDLING

PLANT E. I. HATCH UNITS 1 AND 2

TABLE OF CONTENTS

## I. INTRODUCTION

The December 22, 1980 NRC Letter on Control of Heavy Load Handling transmitted to Georgia Power Company (GPC) three enclosures:

NUREG-0612 "Control of Heavy Loads at Nuclear Power Plants" (Enclosure 1)

Staff Position-Interim Actions for the Control of Heavy Loads (Enclosure 2)

Request for Additional Information on Control of Heavy Loads (Enclosure 3)

GPC responded to Enclosure 2 and Section 2.1 of Enclosure 3 (which addressed the NUREG-0612 "General Guidelines") with submittals dated June 29, 1981 and May 24, 1982. Franklin Research Center's draft Technical Evaluation Report (TER) C5257-095/446 was transmitted to GPC by an NRC letter dated August 19, 1982 and provided an evaluation of the compliance of Plant Hatch Units 1 and 2 with the Interim Actions and General Guidelines. This submittal revises GPC's previous responses to address the concerns raised in the TER.

## II. GENERAL GUIDELINES FOR HEAVY LOAD HANDLING

Section 2.1 of Enclosure 3 to the December 22, 1980 NRC letter requested documentation of how the General Guidelines of NUREG-0612 would be satisfied. GPC's revised response to Section 2.1 is as follows:

### A. STAFF POSITION

2.1.1 "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)."

RESPONSE

A complete, systematic evaluation of all overhead load handling systems in the Reactor Buildings, Diesel Generator Building, Water Intake Structure, and Turbine Buildings in the vicinity of the Control Building was performed at Plant Hatch Units 1 and 2. All load handling systems in these areas were identified and their load paths determined. Credit was not taken for interlocks, technical specifications, or procedural controls. Loads considered were those weighing more than a single spent fuel assembly and its associated handling tool (725 lbs), in accordance with the NUREG-0612 "Heavy Load" criteria. Factors considered in the determination of the load path included a possible load swing of $\pm 5^{0}$ prior to the load drop, existing structural restriction, and the potential for the dropped load to penetrate the floor. In performing the floor penetration analyses it was assumed that the load was dropped from the maximum possible height and that it struck the floor in the orientation which caused the most severe consequences. If the load could not penetrate the floor or cause spalling which could damage safe shutdown or decay heat removal equipment, impact on equipment below the floor was not considered.

The accessible load paths were walked down to determine if a load drop could impact irradiated fuel or equipment required for safe shutdown or decay heat removal. All components, pipes, electrical panels, and cable trays in the load paths were evaluated to determine if they were essential for safe shutdown or decay heat removal. The drywell was not walked down on either unit because lifts of heavy loads in the drywell would only be performed during plant shutdowns, and furthermore, the ECCS systems have sufficient capacity to mitigate the consequences of any damage resulting from a load drop in the drywell.

Table 1 provides a list of the overhead handling systems from which the drop of a heavy load could result in damage to any system required for plant shutdown or decay heat removal. No credit is taken for interlocks, technical specifications, operating procedures, or detailed structural analysis other than floor penetration analysis.

TABLE 1

| ITEM NO. | DESCRIPTION | LOCATION |
|---|---|---|
| 1. | HNP-1 RHR Pump "B" Hoist | HNP-1 Reactor Building, NE Corner Room |
| 2. | HNP-1 RHR Pump "D" Hoist | HNP-1 Reactor Building, NE Corner Room |
| 3. | HNP-1 Core Spray Pump "B" Hoist | HNP-1 Reactor Building NE Corner Room |
| 4. | HNP-1 RHR Heat Exchanger "B" Hoist | HNP-1 Reactor Building, NE Corner Room |
| 5. | HNP-1 RHR Pump "A" Hoist | HNP-1 Reactor Building, SE Corner Room |
| 6. | HNP-1 RHR Pump "C" Hoist | HNP-1 Reactor Building, SE Corner Room |
| 7. | HNP-1 Core Spray Pump "A" Hoist | HNP-1 Reactor Building, SE Corner Room |
| 8. | HNP-1 RHR Heat Exchanger "A" Hoist | HNP-1 Reactor Building, SE Corner Room |
| 9. | HNP-1 Recirc Pump M-G Set "A" Hoist | HNP-1 Reactor Building Elevation 158' |
| 10. | HNP-1 Recirc Pump M-G Set "B" Hoist | HNP-1 Reactor Building Elevation 158" |
| 11. | HNP-2 Core Spray Pump "A" Hoist | HNP-2 Reactor Building, NE Corner Room, El. 130' |
| 12. | HNP-2 RHR Pump "A" Hoist | HNP-2 Reactor Building, NE Corner Room, El. 130' |
| 13. | HNP-2 RHR Pump "C" Hoist | HNP-2 Reactor Building, NE Corner Room, El. 130' |
| 14. | HNP-2 RHR Heat Exchanger "A" Hoist | HNP-2 Reactor Building, NE Corner Room, El. 130' |
| 15. | HNP-2 Core Spray Pump "B" Hoist | HNP-2 Reactor Building, SE Corner Room, El. 130' |
| 16. | HNP-2 RHR Pump "D" Hoist | HNP-2 Reactor Building, SE Corner Room, El. 130' |
| 17. | HNP-2 RHR Pump "B" Hoist | HNP-2 Reactor Building, SE Corner Room, El. 130' |

TABLE 1 (CONTINUED)

| ITEM NO. | DESCRIPTION | LOCATION |
|---|---|---|
| 18. | HNP-2 RHR Heat Exchanger "B" Hoist | HNP-2 Reactor Building, SE Corner Room, El. 130' |
| 19. | HNP-2 Recirc Pump M-G Set "A" Hoist | HNP-2 Reactor Building Elevation 158' |
| 20. | HNP-2 Recirc Pump M-G Set "B" Hoist | HNP-2 Reactor Building Elevation 158' |
| 21. | HNP-1 Turbine Building Overhead Crane | HNP-1 Turbine Building, El. 164' |
| 22. | HNP-2 Turbine Building Overhead Crane | HNP-2 Turbine Building, El. 164' |
| 23. | HNP-1 Reactor Building Overhead Crane | Reactor Building, Refueling Floor |
| 24. | HNP-2 Reactor Building Overhead Crane | Reactor Building, Refueling Floor |

B. STAFF POSITION

2.1.2 "Justify the exclusion of any overhead handling system from the above category 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."

RESPONSE

Table 2 provides a list of overhead handling systems which are excluded from the category of Paragraph 2.1.1. The majority of the exempted overhead handling systems were accepted in the TER. It has been determined from further evaluation that exclusion of additional handling systems (Items 1, 4, 7, 8, 9, 10, and 11) from the category of Paragraph 2.1.1 is justified. Exclusion criteria were:

1. 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, or

2. While the capacity of the refueling platforms (1000 lbs.) exceeds the heavy load criteria for Plant Hatch (725 lbs.), the design of these platforms is such that they are limited to the movement of fuel assemblies and lighter loads and thus could not be used to lift a "heavy load", or

3. The overhead handling system has a sole-purpose lift function and any system which could be damaged following a load drop will necessarily be out of commission prior to the lift. (This criteria appeared in Paragraph 1.3 of Enclosure 3 to the December 22, 1980 letter and in the TER as an acceptable basis for exclusion).

TABLE 2

| ITEM NO. | DESCRIPTION | JUSTIFICATION OF EXCLUSION FROM PARAGRAPH 2.2.1 |
|---|---|---|
| 1. | HNP-1 HPCI Pump & Turbine Hoist | Criterion 3 |
| 2. | HNP-2 CRD Pump & Hatch Hoist | Criterion 1 (accepted by TER) |
| 3. | HNP-2 RCIC Pump, Turbine, and Hatch Hoist | Criterion 3 (accepted by TER) |
| 4. | HNP-2 HPCI Pump & Turbine Hoist | Criterion 3 |
| 5. | HNP-2 Chiller Unit "A" Hoist | Criterion 1 (accepted by TER) |
| 6. | HNP-2 Chiller Unit "B" Hoist | Criterion 1 (accepted by TER) |
| 7. | Diesel Generator "1A" Hoist | Criterion 3 |
| 8. | Diesel Generator "1B" Hoist | Criterion 3 |
| 9. | Diesel Generator "1C" Hoist | Criterion 3 |
| 10. | Diesel Generator "2A" Hoist | Criterion 3 |
| 11. | Diesel Generator "2C" Hoist | Criterion 3 |
| 12. | HNP-1&2 Water Intake Structure Mobile Crane | Criterion 1 (accepted by TER) |
| 13. | HNP-1 MSIV "A" Hoist | Criterion 1 (accepted by TER) |
| 14. | HNP-1 MSIV "B" Hoist | Criterion 1 (accepted by TER) |
| 15. | HNP-1 MSIV "C" Hoist | Criterion 1 (accepted by TER) |
| 16. | HNP-1 MSIV "D" Hoist | Criterion 1 (accepted by TER) |
| 17. | HNP-2 RWCU Regenerative Heat Exchanger Trolley | Criterion 1 (accepted by TER) |

TABLE 2 (Continued)

| ITEM NO. | DESCRIPTION | JUSTIFICATION OF EXCLUSION FROM PARAGRAPH 2.2.1 |
|---|---|---|
| 18. | HNP-2 RWCU Non-regenerative Heat Exchanger Trolley | Criterion 1 (accepted by TER) |
| 19. | HNP-2 Spent Fuel Pool Cooling Heat Exchanger Hoist | Criterion 1 (accepted by TER) |
| 20. | HNP-2 CRD Repair Area Monorail | Criterion 1 (accepted by TER) |
| 21. | HNP-1 CRD Repair Area Jib Crane | Criterion 1 (accepted by TER) |
| 22. | HNP-2 MSIV Bridge Crane | Criterion 1 (accepted by TER) |
| 23. | HNP-1 Refueling Platform | Criterion 2 (accepted by TER) |
| 24. | HNP-2 Refueling Platform | Criterion 2 (accepted by TER) |

C. STAFF POSITION

2.1.3 "With respect to the design and operation of heavy-load-handling systems in the reactor building and those load-handling systems identified in 2.1-1 above, provide your evaluation concerning compliance with the guidelines of NUREG-0612, Section 5.1.1. The following specific information should be included in your reply:"

a. Drawings or sketches sufficient to clearly identify the location of safe load paths, spent fuel, and safety-related equipment.

b. A discussion of measures taken to ensure that load-handling operations remain within safe load paths, including procedures, if any for deviation from these paths.

c. A tabulation of heavy loads to be handled by each crane which includes the load identification, load weight, its designated lifting device, and verification that the handling of each load is governed by a written procedure containing, as a minimum, the information identified in NUREG-0612, Section 5.1.1(2).

d. Verification that lifting devices identified in 2.1.3-c, above, comply with the requirements of ANSI N14.6-1978, or ANSI B30.9-1971 as appropriate. For lifting devices where these standards, as supplemented by NUREG-0612, Section 5.1.1(4) or 5.1.1(5), are not met, describe any proposed alternatives and demonstrate their equivalency in terms of load-handling reliability.

e. Verification that ANSI B30.2-1976, Chapter 2-2, has been involved with respect to crane inspection, testing, and maintenance. Where any exception is taken to this standard, sufficient information should be provided to demonstrate the equivalency of proposed alternatives.

f. Verification that crane design complies with the guidelines of CMAA Specification 70 and Chapter 2-1 of ANSI B30.2-1976, including the demonstration of equivalency of actual design requirements for instances where specific compliance with these standards is not provided.

g. Exceptions, if any taken to ANSI B30.2-1976 with respect to operator training, qualification, and conduct."

RESPONSE

All load handling systems capable of carrying heavy loads over irradiated fuel in the reactor vessel or spent fuel pool (taking no credit for interlocks, technical specifications, operating procedures, or detailed structural analysis) and those listed in Table 1 (overhead handling systems from which a load drop could damage equipment required for plant shutdown or decay heat removal) have been evaluated with respect to Section 5.1.1, General Guidelines, of NUREG-0612. Table 3 provides a list of the crane/load combinations which are within the scope of this evaluation. Compliance with the seven General Guidelines is discussed below:

GUIDELINE 1 - SAFE LOAD PATHS [NUREG-0612 SECTION 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."

COMPLIANCE

Safe load paths have been established for lifts of heavy loads over the refueling floor and the control building roof. These load paths are shown in the applicable heavy load handling procedures on scale area sketches derived from equipment layout drawings and are clearly marked on the floor. Sketches showing the location of these safe load paths are provided in Appendix A. For heavy lifts over the reactor building corner rooms, definition of safe load paths is impractical due to the high concentration of structures and equipment. Load "exclusion areas" have therefore been established for each lift in lieu of safe load paths. These exclusion areas allow sufficient room for making the lift while minimizing the potential for the load, if dropped, to impact plant shutdown or decay heat removal equipment. Scale area sketches derived from equipment layout drawings showing load exclusion areas are included in the applicable heavy load handling procedures and are also provided in Appendix A. Attempting to mark exclusion areas on corner room floors would not provide a useful visual aid to operators. There are several different exclusion areas in a single corner room, which would necessitate several different markings. Furthermore, the floors consist of a base concrete slab, which is virtually obscured from view by structures and equipment, with several levels of steel grating above, most of which would be removed prior to making the lift. Thus, there is no surface on which any useful markings could be made. The exclusion area drawings are judged to provide sufficiently detailed and unambiguous guidance to crane operators.

We believe that Plant Hatch is in compliance with the intent of Guideline 1, "Safe Load Paths," because (1) the established safe load paths and exclusion areas minimize the potential for a dropped load to impact irradiated fuel or plant shutdown or decay heat removal equipment, (2) the safe load paths and exclusion areas guide heavy load movement, to the extent practical, over structural floor members, beams, etc., (3) safe load paths and exclusion areas are shown on scale area sketches in the applicable heavy load handling procedure, marked on the floor where practical, and clearly posted in the area of the lift, and (4) deviations from safe load paths or into exclusion areas require the approval of the Superintendent of Plant Engineering Services or his designee.

GUIDELINE 2 - PROCEDURES [NUREG-0612 SECTION 5.1.1(2)]

"Procedures should be developed to cover load handling operations for heavy loads that are or could be handled over or in proximity to irradiated fuel or safe shutdown equipment. At a minimum, procedures should cover handling of those loads listed in Table 3.1-1 of this report. 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."

COMPLIANCE

Table 3 provides a listing of the crane/load combinations which were determined to be within the scope of the General Guidelines. The weight of each load, its designated lifting device, and the number of the plant procedure governing its handling are listed in the table. All of the BWR loads listed in NUREG-0612 Table 3.1-1, "Survey of Heavy Loads," which are currently handled at Plant Hatch are covered by procedures. The load handling procedures designated in Table 3 contain identification of required equipment, special precautions, safe load path or exclusion area sketches, and detailed instructions for rigging and lifting the load. In addition, reference is made in the load handling procedure to separate procedures for crane operator and rigger qualifications, crane inspection and acceptance criteria, and rigging inspection and acceptance criteria. We therefore believe that Plant Hatch is in compliance with Guideline 2.

GUIDELINE 3 - CRANE OPERATOR TRAINING [NUREG-0612 SECTION 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."

COMPLIANCE

Crane operators for all of the lifts listed in Table 3 are required by the designated procedure to be trained, qualified, and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976. We therefore believe Plant Hatch complies with Guideline 3.

GUIDELINE 4 - SPECIAL LIFTING DEVICES [NUREG-0612 SECTION 5.1.1(4)]

"Special lifting devices should satisfy the guidelines of ANSI N14.6-1978, 'Standards for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4500 kg) or More for Nuclear Materials'. 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 the 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."

* "For the purpose of selecting the proper sling, loads imposed by the SSE need not be included in the dynamic loads imposed on the sling or lifting device."

COMPLIANCE

Special lifting devices in use at Plant Hatch are identified in Table 3. These devices are currently being evaluated with respect to the guidelines of ANSI N14.6-1978. The results of this evaluation will be documented in Appendix B at a later date.

GUIDELINE 5 - SLINGS [NUREG-0612 SECTION 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'. 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."

* "For the purpose of selecting the proper sling, loads imposed by the SSE need not be included in the dynamic loads imposed on the sling or lifting device."

COMPLIANCE

Lifts of heavy loads requiring the use of slings are listed in Table 3. The plant procedure designated in the table requires that slings be installed and used in accordance with ANSI B30.9-1971. Allowance for dynamic loading of slings is made by the application of conservative safety factors in the sling selection process. In addition to the safety factor of 5 required by ANSI B30.9-1971, an additional safety factor of 2 is used for a resultant rigging safety factor of at least 10. There are no slings at Plant Hatch which are restricted in use to certain cranes. Since the guidelines of ANSI B30.9-1971 are followed for sling installation and use and allowance is made for dynamic loading, we believe Plant Hatch is in compliance with Guideline 5.

GUIDELINE 6 - CRANE INSPECTION, TESTING, MAINTENANCE [NUREG-0612 SECTION 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 accesible 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, tests, and maintenance should be performed prior to their use.)"

COMPLIANCE

All cranes and hoists listed in Table 3 are required by the designated procedure to be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976. We therefore believe that Plant Hatch is in compliance with Guideline 6.

GUIDELINE 7 - CRANE DESIGN [NUREG-0612 SECTION 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 Travelling Cranes'. 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."

COMPLIANCE

The standards to which the cranes and hoists are designed are listed in Table 3. ANSI B30.2-1976 and CMAA-70 (1975) apply to top-running bridge, multiple girder overhead cranes, of which there are four at Plant Hatch: the HNP-1&2 Turbine Building Overhead Cranes and the HNP-1&2 Reactor Building Overhead Cranes (Items 21 through 24 of Table 3). Compliance of these four overhead cranes as well as other types of cranes and hoists with Guideline 7 is discussed below:

1. HNP-1 Turbine Building Overhead Crane and HNP-1&2 Reactor Building Overhead Cranes (Items 21, 23, and 24) - These cranes were designed in accordance with EOCI-61, with the HNP-1 Reactor Building Overhead Crane meeting the requirements of NUREG-0554, "Single Failure Proof Cranes for Nuclear Power Plants" as well. The designs of these cranes have been evaluated with respect to the guidelines of CMAA-70 and found to be equivalent in terms of load handling safety. This evaluation is documented in Appendix C. It cannot be verified that the initial design of these cranes was performed to the ANSI B30.2 guidelines; however, an evaluation has determined that their designs comply with Chapter 2-2 of ANSI B30.2-1976. These three cranes therefore meet the intent of Guideline 7.

2. HNP-2 Turbine Building Overhead Crane (Item 23) - This crane was designed in accordance with Chapter 2-2 of ANSI B30.2-1976 and CMAA-70 (1975) and therefore complies with Guideline 7.

3. Other Cranes and Hoists (Items 1 through 20) - The standards to which these cranes and hoists were designed are listed in Table 3. ANSI B30.2 and CMAA-70 have limited applicability to this equipment. In all cases these cranes and hoists were designed to the then current applicable standards. Design in accordance with these standards is considered to meet the intent of Guideline 7 for load handling safety.

TABLE 3

| ITEM NO. | CRANE OR HOIST IDENTIFICATION | LOAD | WEIGHT (TONS) | LIFTING DEVICE | GUIDELINE 1 SAFE LOAD PATHS | GUIDELINE 2 LOAD HANDLING PROCEDURES | GUIDELINE 3 CRANE OPERATOR TRAINING | GUIDELINES 4, 5 SPECIAL LIFTING DEVICES, SLINGS | GUIDELINE 6 CRANES-INSPECTION, TESTING, MAINTENANCE | GUIDELINE 7 CRANE DESIGN |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | HNP-1 RHR Pump "B" Hoist* (N.E.Corner Room) | RHR Pump "B" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 005 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "B" ** Motor | 3.4 | | | | | | | |
| 2. | HNP-1 RHR Pump "D" Hoist* (N.E.Corner Room) | RHR Pump "D" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 006 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "D" ** Motor | 3.4 | | | | | | | |
| 3. | HNP-1 Core Spray Pump "B" Hoist* (N.E.Corner Room) | Core Spray Pump "B" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 007 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | Core Spray Pump "B" Motor ** | 3.5 | | | | | | | |
| 4. | HNP-1 RHR Heat Exchanger Hoist* (N.E. Corner Room) | RHR Heat Exchanger "B" ** | 23.5 | Wire Rope Sling | Appendix "A" Sketch No. 008 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| 5. | HNP-1 RHR Pump "A" Hoist* (S.E.Corner Room) | RHR Pump "A" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 001 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "A" ** Motor | 3.4 | | | | | | | |
| 6. | HNP-1 RHR Pump "C" Hoist* (S.E.Corner Room) | RHR Pump "C" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 002 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "C" ** Motor | 3.4 | | | | | | | |
| 7. | HNP-1 Core Spray Pump "A" Hoist* (S.E.Corner Room) | Core Spray Pump "A" ** | 3.1 | Wire Rope Sling | Appendix "A" Sketch No. 003 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | Core Spray Pump "A" Motor ** | 3.5 | | | | | | | |
| 8. | HNP-1 RHR Heat Exchanger Hoist* (S.E.Corner Room) | RHR Heat Exchanger "A" ** | 23.5 | Wire Rope Sling | Appendix "A" Sketch No. 004 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |

TABLE 3 (cont'd.)

| ITEM NO. | CRANE OR HOIST IDENTIFICATION | LOAD | WEIGHT (TONS) | LIFTING DEVICE | GUIDELINE 1 SAFE LOAD PATHS | GUIDELINE 2 LOAD HANDLING PROCEDURES | GUIDELINE 3 CRANE OPERATOR TRAINING | GUIDELINES 4, 5 SPECIAL LIFTING DEVICES, SLINGS | GUIDELINE 6 CRANES-INSPECTION, TESTING, MAINTENANCE | GUIDELINE 7 CRANE DESIGN |
|---|---|---|---|---|---|---|---|---|---|---|
| 9. | HNP-1 Recirc M-G Set "A" Hoist (Rx Bldg El 158') | Generator | 17 | Wire Rope Sling | Appendix "A" Sketch No. 019 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | Motor | 15.2 | | | | | | | |
| | | Fluid Drive | 16.5 | | | | | | | |
| 10. | HNP-1 Recirc M-G Set "B" Hoist (Rx Bldg El 158') | Generator | 17 | Wire Rope Sling | Appendix "A" Sketch No. 020 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1981 HMI 100-74 CMAA-70 (Structural) |
| | | Motor | 15.2 | | | | | | | |
| | | Fluid Drive | 16.5 | | | | | | | |
| 11. | HNP-2 Core Spray Pump "A" Hoist (N.E.Corner Room) | Core Spray Pump "A" ** | 2.8 | Wire Rope Sling | Appendix "A" Sketch No. 009 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | Core Spray Pump "A" Motor ** | 3.6 | | | | | | | |
| 12. | HNP-2 RHR Pump "A" Hoist (N.E. Corner Room) | RHR Pump "A" ** | 3.8 | Wire Rope Sling | Appendix "A" Sketch No. 010 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "A" Motor ** | 3.4 | | | | | | | |
| 13. | HNP-2 RHR Pump "C" Hoist (N.E.Corner Room) | RHR Pump "C" ** | 3.8 | Wire Rope Sling | Appendix "A" Sketch No. 011 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "C" Motor ** | 3.4 | | | | | | | |
| 14. | HNP-2 RHR Heat Exchanger "A" Hoist (N.E.Corner Room) | RHR Heat Exchanger "A" ** | 23.5 | Wire Rope Sling | Appendix "A" Sketch No. 012 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1973 HMI 100-74 CMAA-70 (Structural) |
| 15. | HNP-2 Core Spray Pump "B" Hoist (S.E.Corner Room | Core Spray Pump "B" ** | 2.8 | Wire Rope Sling | Appendix "A" Sketch No. 013 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | Core Spray Pump "B" Motor ** | 3.6 | | | | | | | |
| 16. | HNP-2 RHR Pump "B" Hoist (S.E.Corner Room) | RHR Pump "B" ** | 3.8 | Wire Rope Sling | Appendix "A" Sketch No. 014 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "B" Motor ** | 3.4 | | | | | | | |

TABLE 3 (cont'd.)

| ITEM NO. | CRANE OR HOIST IDENTIFICATION | LOAD | WEIGHT (TONS) | LIFTING DEVICE | GUIDELINE 1 SAFE LOAD PATHS | GUIDELINE 2 LOAD HANDLING PROCEDURES | GUIDELINE 3 CRANE OPERATOR TRAINING | GUIDELINES 4, 5 SPECIAL LIFTING DEVICES, SLINGS | GUIDELINE 6 CRANES-INSPECTION, TESTING, MAINTENANCE | GUIDELINE 7 CRANE DESIGN |
|---|---|---|---|---|---|---|---|---|---|---|
| 17. | HNP-2 RHR Pump "D" Hoist (S.E.Corner Room) | RHR Pump "D" ** | 3.8 | Wire Rope Sling | Appendix "A" Sketch No. 015 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 HMI 100-74 CMAA-70 (Structural) |
| | | RHR Pump "D" Motor ** | 3.4 | | | | | | | |
| 18. | HNP-2 RHR Heat Exchanger "B" Hoist (S.E.Corner Room) | RHR Heat Exchanger "B" ** | 23.5 | Wire Rope Sling | Appendix "A" Sketch No. 016 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.16-1973 HMI 100-74 CMAA-70 (Structural) |
| 19. | HNP-2 Recirc M-G Set "A" Hoist (Rx Bldg El 158') | Generator | 18.4 | Wire Rope Sling | Appendix "A" Sketch No. 021 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 ANSI B30.16-1973 HMI 100-74 CMAA-70 (Structural) |
| | | Motor | 15.2 | | | | | | | |
| | | Fluid Drive | 16.5 | | | | | | | |
| 20. | HNP-2 Recirc M-G Set "B" Hoist (Rx Bldg El 158') | Generator | 18.4 | Wire Rope Sling | Appendix "A" Sketch No. 022 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | ANSI B30.11-1973 ANSI B30.16-1973 HMI 100-74 CMAA-70 (Structural) |
| | | Motor | 15.2 | | | | | | | |
| | | Fluid Drive | 16.5 | | | | | | | |
| 21. | HNP-1 Turbine Bldg Overhead Crane (Control Bldg Roof) | Crane Load Block | 4.5 | N.A. | Appendix "A" Sketch No. 017 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | N.A. | ANSI B30.2-1976 (HNP-6922) | EOCI-61 Appendix "C" |
| | | Air Handling Unit (Z41-B003A,B,C) | 5.3 | Wire Rope Sling | | | | ANSI B30.9-1971 (HNP-6975)*** | | |
| | | Filter Unit (Z41-D004A,B) | 2 | | | | | | | |
| | | Exchaust Fan (Z41-C010) | 1 | | | | | | | |
| | | Supply Fan (Z41-C009) | 1 | | | | | | | |
| 22. | HNP-2 Turbine Bldg Overhead Crane (Control Bldg Roof) | Crane Load Block | 4.5 | N.A. | Appendix "A" Sketch No. 017 | HNP-6977 | ANSI B30.2-1976 (HNP-6976) | N.A. | ANSI B30.2-1976 (HNP-6922) | ANSI B30.2-1976 CMAA-70 |
| | | Air Handling Unit (Z41-B003A,B,C) | 5.3 | Wire Rope Sling | | | | ANSI B30.9-1971 (HNP-6975)*** | | |
| | | Filter Unit (Z41-D004A,B) | 2 | | | | | | | |
| | | Exhaust Fan (Z41-C010) | 1 | | | | | | | |
| | | Supply Fan (Z41-C009) | 1 | | | | | | | |

# TABLE 3 (cont'd.)

| ITEM NO. | CRANE OR HOIST IDENTIFICATION | LOAD | WEIGHT (TONS) | LIFTING DEVICE | GUIDELINE 1 SAFE LOAD PATHS | GUIDELINE 2 LOAD HANDLING PROCEDURES | GUIDELINE 3 CRANE OPERATOR TRAINING | GUIDELINES 4, 5 SPECIAL LIFTING DEVICES, SLINGS | GUIDELINE 6 CRANES-INSPECTION, TESTING, MAINTENANCE | GUIDELINE 7 CRANE DESIGN |
|---|---|---|---|---|---|---|---|---|---|---|
| 23. | HNP-1 Reactor Bldg Overhead Crane (Refueling Floor) | Crane Load Block | 9 | N.A. | Appendix "A" Sketch No. 018 | HNP-6929<br>HNP-6977 | ANSI B30.2-1976 (HNP-6976) | N.A. | ANSI B30.2-1976 (HNP-6922) | EOCI-61<br>NUREG-0554<br>Appendix "C" |
| | | HNP-1 Rx Vessel Head | 65 | F13-E009 | | HNP-6710,6720<br>HNP-6977 | | Appendix "B" | | |
| | | HNP-2 Rx Vessel Head | 65 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 Moisture Separator | 56 | F13-E008 | | HNP-6730<br>HNP-6977 | | | | |
| | | HNP-1 Steam Dryer | 43 | | | HNP-6730<br>HNP-6977 | | | | |
| | | HNP-1 Drywell Head | 45 | F13-E009 | | HNP-6705<br>HNP-6977 | | | | |
| | | HNP-2 Drywell Head | 45 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 Rx Vessel Head Insulation | 6 | Wire Rope Sling | | HNP-6715<br>HNP-6977 | | ANSI B30.9-1971 (HNP-6975)*** | | |
| | | HNP-2 Rx Vessel Head Insulation | 6 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 Spent Fuel Pool Cattle Chute | 10 | | | HNP-6721<br>HNP-6977 | | | | |
| | | HNP-2 Spent Fuel Pool Cattle Chute | 10 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 Refueling Slot Plugs | 4@10 | | | HNP-6740<br>HNP-6977 | | | | |
| | | HNP-2 Refueling Slot Plugs | 4@10 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 D/S Pool Shield Plugs | 3@33<br>1@76 | | | HNP-6725<br>HNP-6977 | | | | |
| | | HNP-2 D/S Pool Shield Plugs | 3@33<br>1@76 | | | HNP-2-6702<br>HNP-6977 | | | | |
| | | HNP-1 Reactor Well Shield Plugs | 4@81<br>2@80 | | | HNP-6700<br>HNP-6977 | | | | |
| | | HNP-2 Reactor Well Shield Plugs | 4@81<br>2@80 | | | HNP-2-6702<br>HNP-6977 | | | | |

TABLE 3 (cont'd.)

| ITEM NO. | CRANE OR HOIST IDENTIFICATION | LOAD | WEIGHT (TONS) | LIFTING DEVICE | GUIDELINE 1 SAFE LOAD PATHS | GUIDELINE 2 LOAD HANDLING PROCEDURES | GUIDELINE 3 CRANE OPERATOR TRAINING | GUIDELINES 4, 5 SPECIAL LIFTING DEVICES, SLINGS | GUIDELINE 6 CRANES-INSPECTION, TESTING, MAINTENANCE | GUIDELINE 7 CRANE DESIGN |
|---|---|---|---|---|---|---|---|---|---|---|
| | HNP-1 Reactor Bldg Overhead Crane (Refueling Floor) | HNP-1 Rx Vessel Service Platform | 5 | Wire Rope Sling | Appendix "A" Sketch No. 018 | HNP-6760 HNP-6977 | ANSI B30.2-1976 (HNP-6976) | ANSI B30.9-1971 (HNP-6975)*** | ANSI B30.2-1976 (HNP-6922) | EOCI-61 NUREG-0554 Appendix "C" |
| | | HNP-2 Rx Vessel Service Platform | 5 | | | HNP-2-6702 HNP-6977 | | | | |
| | | HNP-1 Spent Fuel Pool Gates | 1@3.75 1@5.5 | | | HNP-6726 HNP-6977 | | | | |
| | | HNP-2 Spent Fuel Pool Gates | 1@3.75 1@5.5 | | | HNP-2-6702 HNP-6977 | | | | |
| | | HNP-1 Spent Fuel Racks | 15 | | | HNP-1-10153 HNP-6977 | | | | |
| | | HNP-1 RPV Head Nut & Washer Rack | 1 | | | HNP-6710,6720 HNP-6977 | | | | |
| | | HNP-2 RPV Head Nut & Washer Rack | 1 | | | HNP-2-6702 HNP-6977 | | | | |
| 24. | HNP-2 Reactor Bldg Overhead Crane (Refueling Floor) | Crane Load Block | 9 | N.A. | Appendix "A" Sketch No. 018 | HNP-6929 HNP-6977 | ANSI B30.2-1976 (HNP-6976) | N.A. | ANSI B30.2-1976 (HNP-6922) | EOCI-61 Appendix "C" |
| | | HNP-2 Moisture Separator | 56 | F13-E008 | | HNP-2-6702 HNP-6977 | | Appendix "B" | | |
| | | HNP-2 Steam Dryer | 43 | | | | | | | |
| | | HNP-2 Reactor Well Shield Plugs (Over Floor Only) | 4@81 2@80 | Wire Rope Sling | | | | ANSI B30.9-1971 (HNP-6975)*** | | |

NOTES

* Provisions exist for the permanent installation of a hoist; however, none is currently installed. The design standards listed are the current applicable standards for the type of equipment which would be used here.

** It may be necessary to use a mobile crane to make this lift. In the event that a mobile crane is used, all guidelines will be met; however, the crane design standard would be ANSI B30.5-1968, which meets the intent of Guideline 7.

*** An additional safety factor of 2 is applied to the factor of 5 required by ANSI B30.9-1971 resulting in a total safety factor of 10.

## III INTERIM PROTECTION

Section 5.3 of NUREG-0612 specifies six "Interim Protection Measures" which the staff considered necessary until the General Guidelines could be satisfied. Five of these appeared in Enclosure 2 to the December 22, 1980 letter. GPC's compliance with the six Interim Protection Measures is discussed below:

### A. INTERIM MEASURE 1

"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 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 (see Table 3.2-1)."

#### COMPLIANCE

Plant Hatch Unit 1 Technical Specification 3/4.10.I and Unit 2 Technical Specification 3/4.9.8 prohibit the movement of any load weighing in excess of 1600 lbs. over fuel assemblies in the spent fuel storage racks.

### B. INTERIM MEASURE 2

"Safe load paths should be defined per the guidelines of Section 5.1.1(1)."

#### COMPLIANCE

Safe Load Paths have been defined in accordance with the intent of Guideline 1 [NUREG-0612 Section 5.1.1(1)].

### C. INTERIM MEASURE 3

"Procedures should be developed and implemented per the guidelines of Section 5.1.1(2)."

#### COMPLIANCE

Procedures have been developed and implemented in accordance with Guideline 2 [NUREG-0612 Section 5.1.1(2)].

### D. INTERIM MEASURE 4

"Crane operators should be trained, qualified, and conduct themselves per the guidelines of Section 5.1.1(3)."

#### COMPLIANCE

Crane operators are trained, qualified, and conduct themselves in accordance with Guideline 3 [NUREG-0612 Section 5.1.1(3)].

E. INTERIM MEASURE 5

"Cranes should be inspected, tested, and maintained in accordance with the guidelines of Section 5.1.1(6)."

COMPLIANCE

Cranes are inspected, tested, and maintained in accordance with Guideline 6 [NUREG-0612 Section 5.1.1(6)].

F. INTERIM MEASURE 6

"In addition to the above, 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 and 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."

COMPLIANCE

Procedures for the handling of heavy loads over the reactor core have been reviewed and verified to contain sufficient detail with clear and concise directions for installation of rigging or lifting devices and load movement. Visual inspections of load bearing components of the Reactor Building Overhead Cranes and the slings and lifting devices used for lifts over the core have been performed to identify flaws or deficiencies which could lead to failures. No repairs to cranes or special lifting devices have been found necessary; however, some slings have been replaced. Crane operators have been trained per General Guideline 3 and are familiar with the content of procedures for handling heavy loads over the core.

## IV CONCLUDING SUMMARY

Franklin Research Center (FRC) made several recommendations in draft TER C5257-095/446 regarding the compliance of Plant Hatch Units 1 and 2 with the NUREG-0612 General Guidelines and Interim Protection Measures. GPC has implemented these recommendations as summarized below:

### A. FRC FINDING - NUREG-0612 HEAVY LOADS OVERHEAD HANDLING SYSTEMS

"The licensee's conclusion to exclude all overhead handling systems at Hatch Units 1 and 2 from the safe load handling practices outlined by Section 5.1.1 of NUREG-0612 is not consistent with the NRC goals for improving load handling safety and reliability. The licensee should be requested to review those load handling systems considered to be exempt from NUREG-0612 and provide a revised list of systems requiring compliance based upon the discussion contained in this evaluation."

IMPLEMENTATION

A revised list of overhead handling systems which were determined to be within the scope of the General Guidelines is provided in Table 3. The criteria used in selecting these handling systems were consistent with the NRC goals for improving load handling safety and reliability.

### B. FRC FINDING - GUIDELINE 1

"Insufficient information has been provided to determine compliance with Guideline 1 of NUREG-0612. The licensee should provide the following information:

1. Equipment layout drawings depicting safe load paths,

2. Details of the type of visual aids provided to crane operators and load handling supervisors during load handling,

3. Details concerning the handling of deviations from safe load paths."

IMPLEMENTATION

1. Scale area sketches depicting safe load paths are provided in Appendix A.

2. Details of the type of visual aids provided to crane operators and load handling supervisors are described in the preceding discussion of compliance with Guideline 1.

3. Details concerning the handling of deviations from safe load paths are provided in the preceding discussion of compliance with Guideline 1.

C. FRC FINDING - GUIDELINE 2

"Insufficient information has been provided by the licensee to determine compliance with Guideline 2 of NUREG-0612 at Hatch Units 1 and 2. The licensee should provide additional detail of the composition and scope of load handling procedures at Hatch Units 1 and 2."

IMPLEMENTATION

Details of the composition and scope of load handling procedures are provided in the preceding discussion of compliance with Guideline 2.

D. FRC FINDING - GUIDELINE 3

"Hatch Units 1 and 2 comply with Guideline 3 of NUREG-0612."

E. FRC FINDING - GUIDELINE 4

"Hatch Units 1 and 2 do not comply with Guideline 4 of NUREG-0612. The licensee should provide information relative to Sections 3, 4, and 5 of ANSI N14.6-1978 so that a proper review can be performed to ensure that Hatch special lifting devices meet the intent of Section 5.1.1(4) of NUREG-0612."

IMPLEMENTATION

Special lifting devices are currently under evaluation with respect to Sections 3, 4, and 5 of ANSI N14.6-1978. The results of this evaluation will be documented at a later date.

F. FRC FINDING - GUIDELINE 5

"Hatch Units 1 and 2 do not comply with Guideline 5 of NUREG-0612. In order to comply, the licensee should perform the following:

1. Verify that slings are installed and used in accordance with ANSI B30.9-1971,

2. Verify that the load used in selecting and marking the proper sling is based on the sum of the maximum static and dynamic loads,

3. Verify that slings restricted in use to certain cranes are clearly marked to so indicate."

IMPLEMENTATION

1. Slings are installed and used in accordance with ANSI B30.9-1971.

2. Conservative safety factors allow for dynamic loading of slings.

3. No slings are restricted in use to certain cranes.

G. FRC FINDING - GUIDELINE 6

"Hatch Units 1 and 2 comply with Guideline 6 of NUREG-0612."

H. FRC FINDING - GUIDELINE 7

"Hatch Units 1 and 2 partially comply with this guideline. In order to fully comply, the licensee should compare the design criteria for all cranes at Hatch Units 1 and 2 to CMAA-70 (1975) and ANSI B30.2-1976, and evaluate the differences relative to crane reliability and safety."

IMPLEMENTATION

The design criteria for cranes have been evaluated with respect to the appropriate standards. Details are provided in the preceding discussion of compliance with Guideline 7.

I. FRC FINDING - INTERIM PROTECTION MEASURE 1

"Hatch Units 1 and 2 comply with Interim Protection Measure 1."

J. FRC FINDING - INTERIM PROTECTION MEASURES 2, 3, 4, AND 5

"Evaluations, conclusions, and recommendations are contained in the respective general guidelines in Sections 2.1.2 (Guideline 1), 2.1.3 (Guideline 2), 2.1.4 (Guideline 3), and 2.1.7 (Guideline 6)."

K. FRC FINDING - INTERIM PROTECTION MEASURE 6

"Insufficient information has been provided to determine compliance with Interim Protection Measure 6 at Hatch Units 1 and 2. In order to comply, the licensee should:

1. Verify that procedures for installation of rigging or lifting devices and movement of the load contain sufficient detail and that instructions are clear and precise,

2. Verify that 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 have been performed, and the repair/replacement of identified components accomplished,

3. Verify that the crane operators have been properly trained and are familiar with specific procedures used in handling heavy loads over the core."

IMPLEMENTATION

1. The applicable procedures contain sufficient detail with clear and concise instructions.

2. The required inspections and replacements have been performed.

3. Operators are trained and familiar with the applicable procedures.

# APPENDIX A

## SAFE LOAD PATH AND

## LOAD EXCLUSION AREA SKETCHES

# ENCLOSURE A - LOAD EXCLUSION AREA

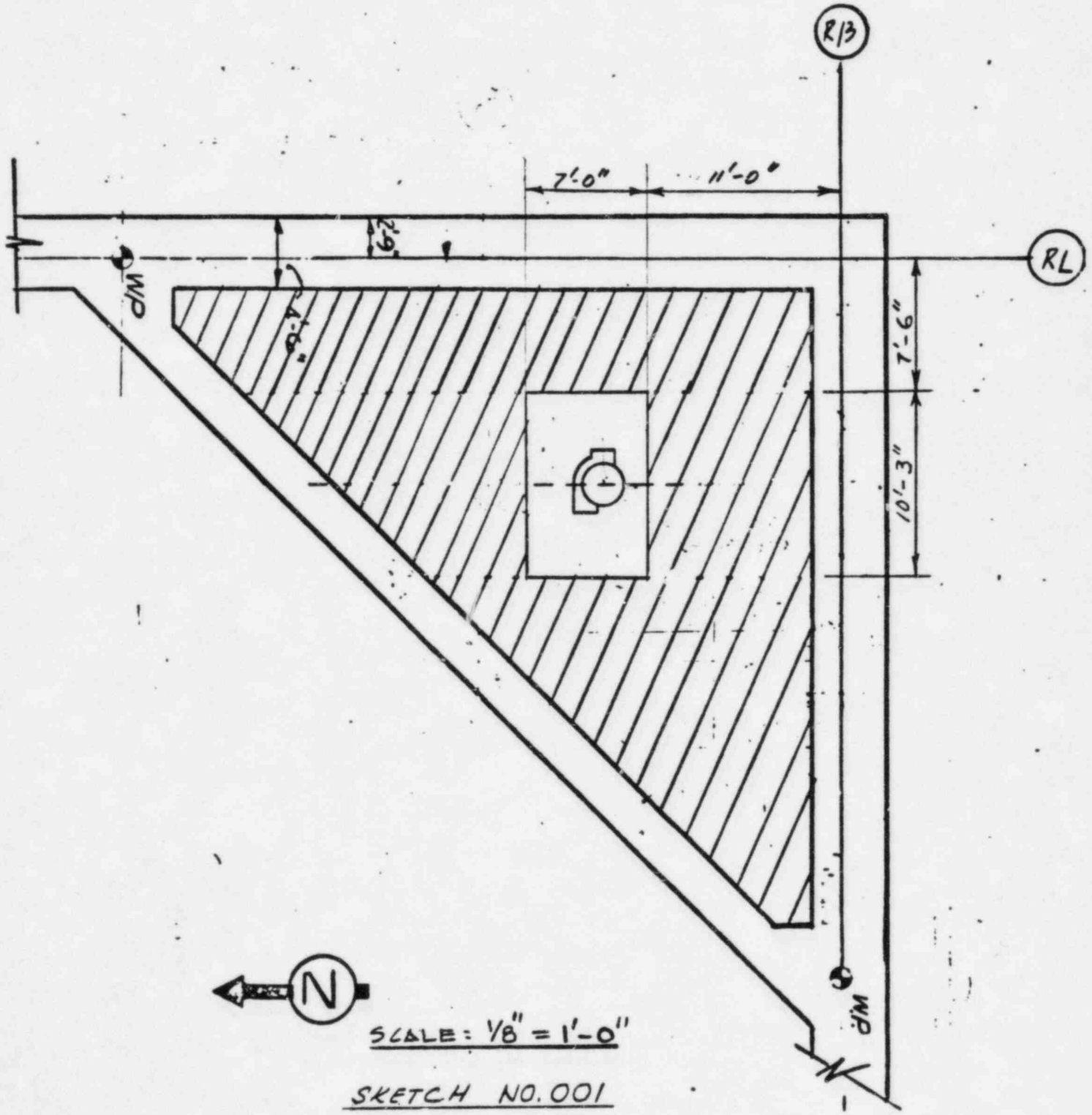
HANDLED LOAD = HNP-1, RHR PUMPS, E11-C002A.

LOCATION = HNP-1, RX BLD, SE CORNER, EL 87'-0"

LOAD DESCRIPTION:

| | |
|---|---|
| PUMP 4'OD X 5' (H) | 6,100 LBS |
| MOTOR 3'OD X 6' (H) | 6,800 LBS |

MAXIMUM LANDING ELEVATION = 130'-0"




SCALE: 1/8" = 1'-0"

SKETCH NO. 001

# ENCLOSURE A - LOAD EXCLUSION AREA

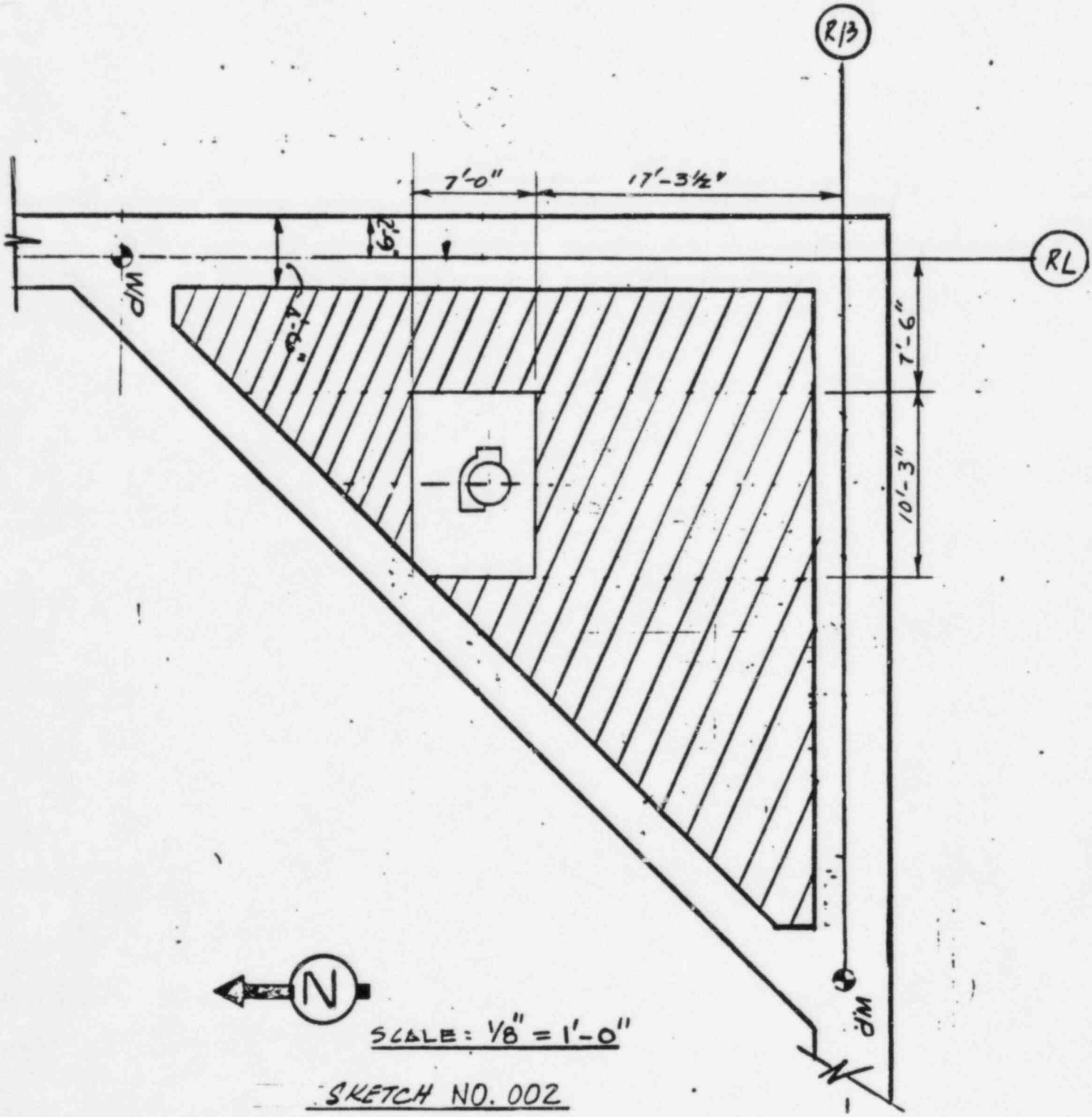
HANDLED LOAD = HNP-1, RHR PUMPS, E11-C002, C

LOCATION = HNP-1, RX BLD, SE CORNER, EL 87'-0"

LOAD DESCRIPTION: PUMP 4'OD X 5' (H) 6,100 LBS

MOTOR 3'OD X 6' (H) 6,800 LBS

MAXIMUM LANDING ELEVATION = 130'-0"




SCALE: ⅛" = 1'-0"

SKETCH NO. 002

# ENCLOSURE A - LOAD EXCLUSION AREA

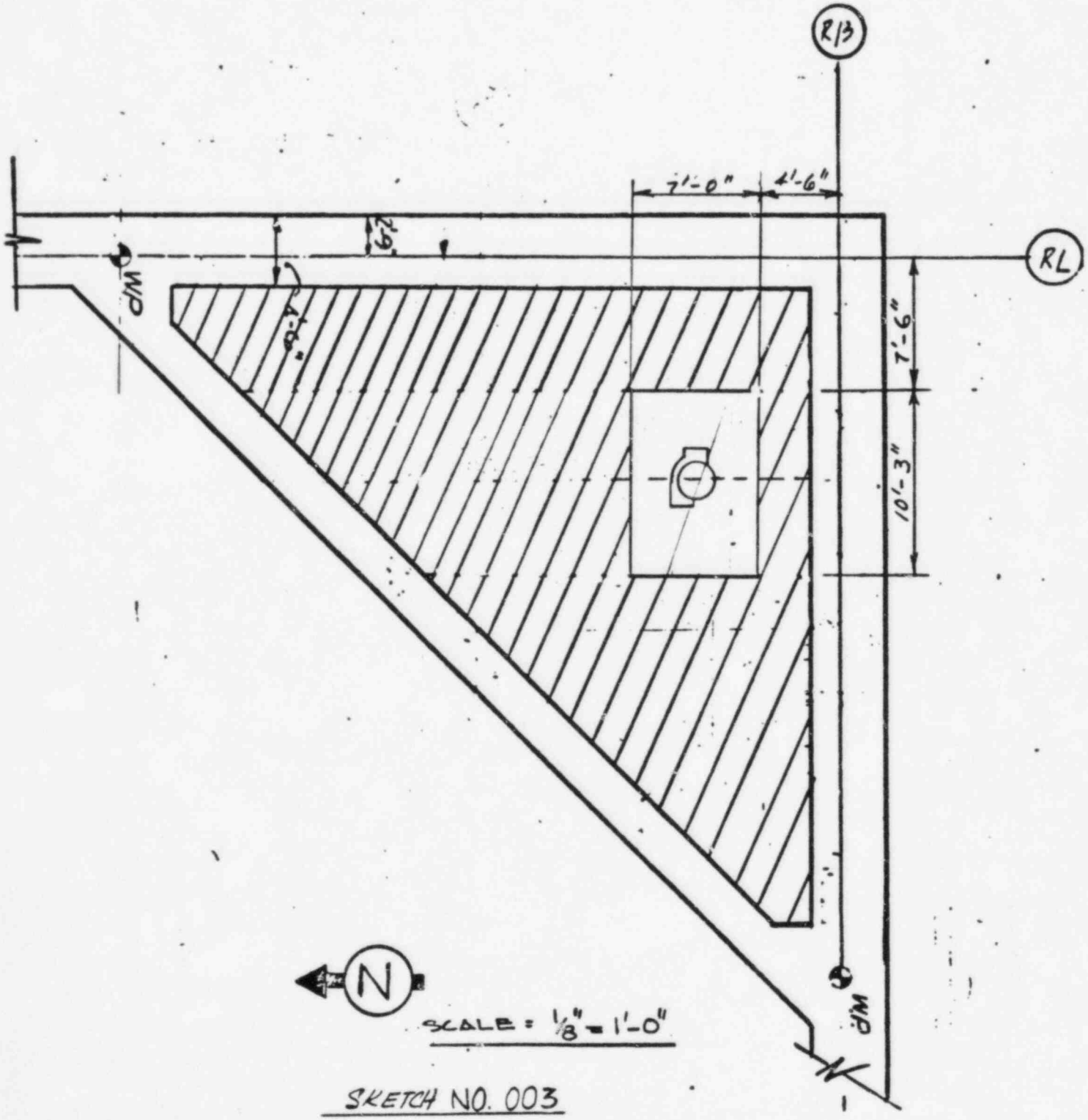
HANDLED LOAD = HNP-1, CORE SPRAY PUMP, E21-C001A

LOCATION = HNP-1, RX BLD, SE CORNER, EL 87'-0"

LOAD DESCRIPTION:

| | |
|---|---|
| PUMP 4'OD x 4'-6" (H) | 6,200 LBS |
| MOTOR 3'ODx 6' (H) | 7,000 LBS |

MAXIMUM LANDING ELEVATION = 130'-0"




SCALE = 1/8" = 1'-0"

SKETCH NO. 003

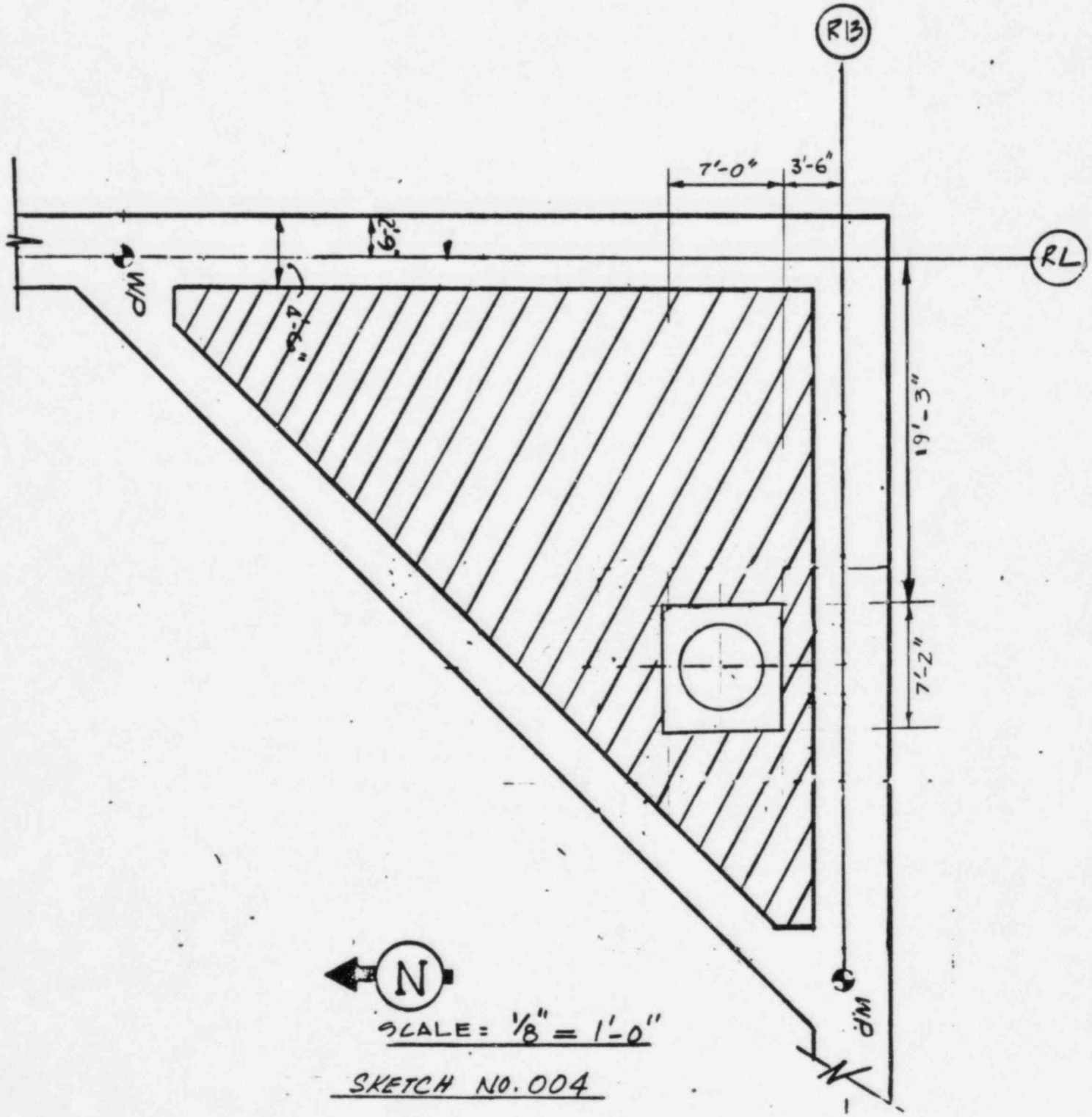
# ENCLOSURE A - LOAD EXCLUSION AREA

HANDLED LOAD = HNP-1, RHR HX, E11-B001A

LOCATION = HNP-1, RX BLDG, SE CORNER, EL 95'-1½"

LOAD DESCRIPTION: 25'L x 5'OD 47,000 #

MAXIMUM LANDING ELEVATION = 130'-0"



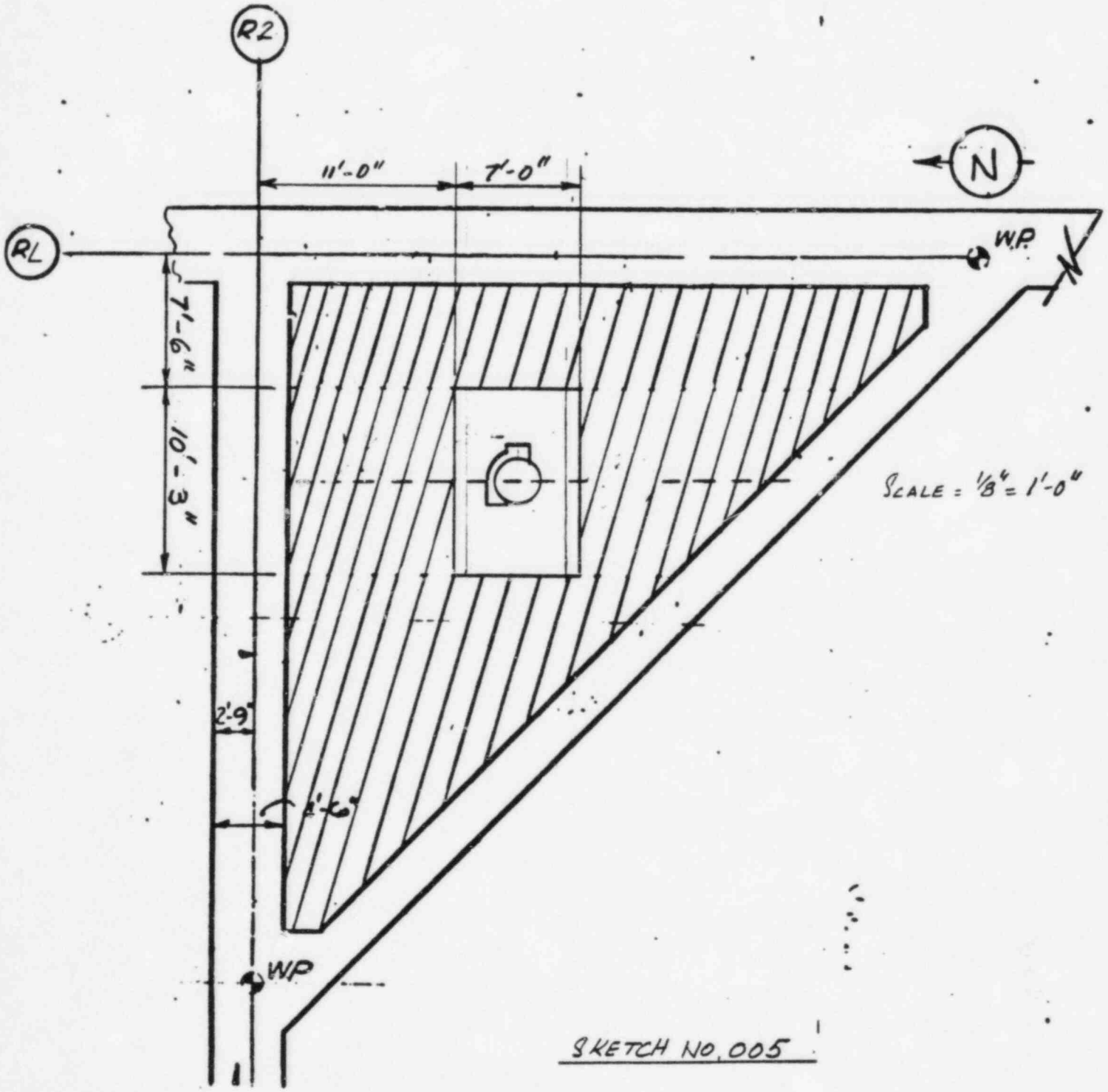

SCALE: 1/8" = 1'-0"

SKETCH NO. 004

# ENCLOSURE A - LOAD EXCLUSION AREA

- HANDLED LOADS : HNP-1, RHR PUMPS, E11-C002B
- LOCATION : HNP-1, RX BLD, NE CORNER, EL 87'-0"
- LOAD DESCRIPTION : PUMP 4'OD X 3'-6"(H) 6,100 LBS
  MOTOR 3'OD X 6'(H) 6,800 LBS

MAXIMUM LANDING ELEVATION = 130'-0"

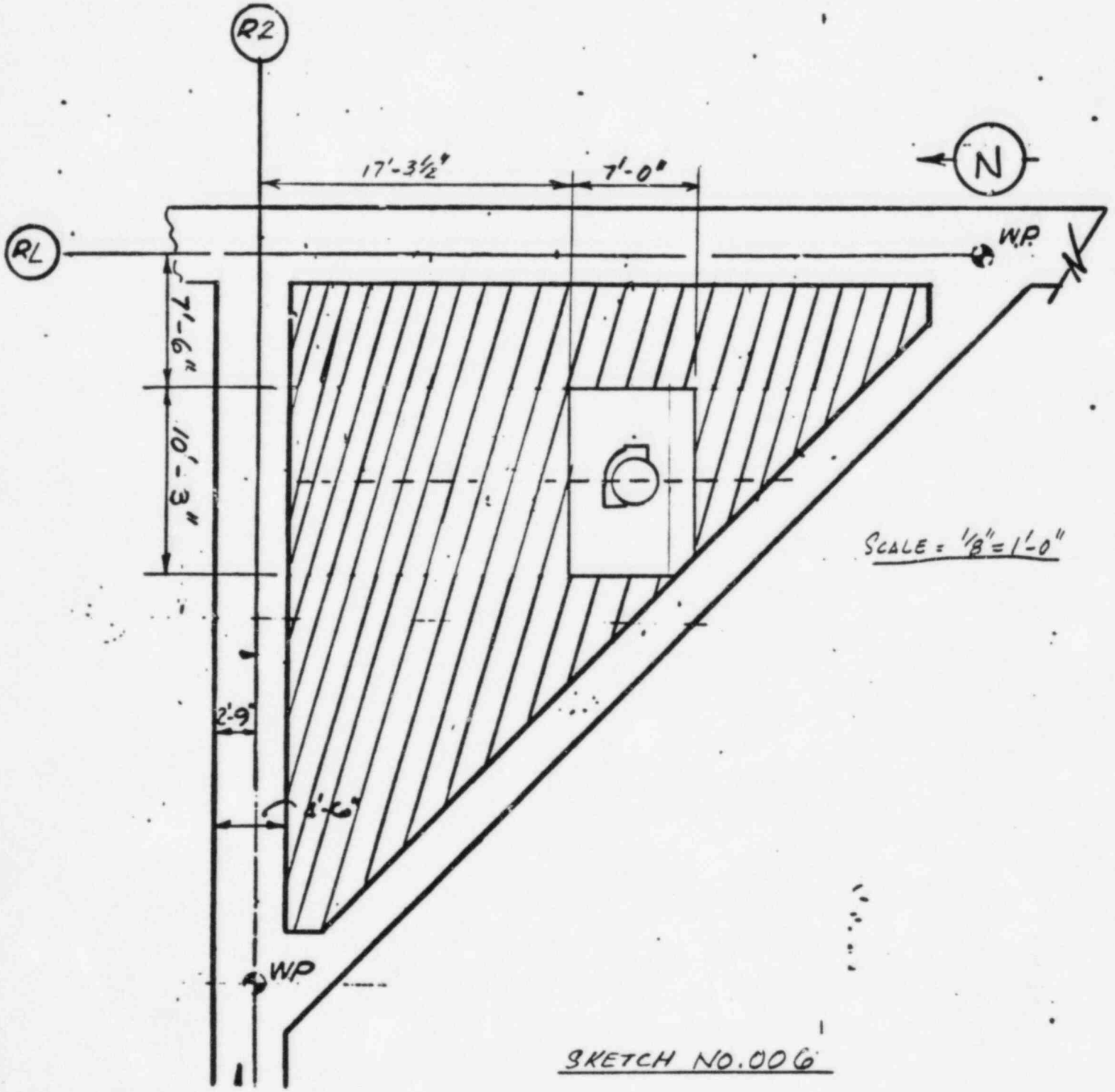



SKETCH NO. 005

# ENCLOSURE A - LOAD EXCLUSION AREA

- HANDLED LOADS : HNP-1, RHR PUMPS, E11-C002, D
- LOCATION : HNP-1, RX BLD, NE CORNER, EL. 87'-0"
- LOAD DESCRIPTION : PUMP 4'OD X 3'-6"(H) 6,100 LBS
  MOTOR 3'OD X 6'(H) 6,800 LBS

MAXIMUM LANDING ELEVATION = 130'-0"



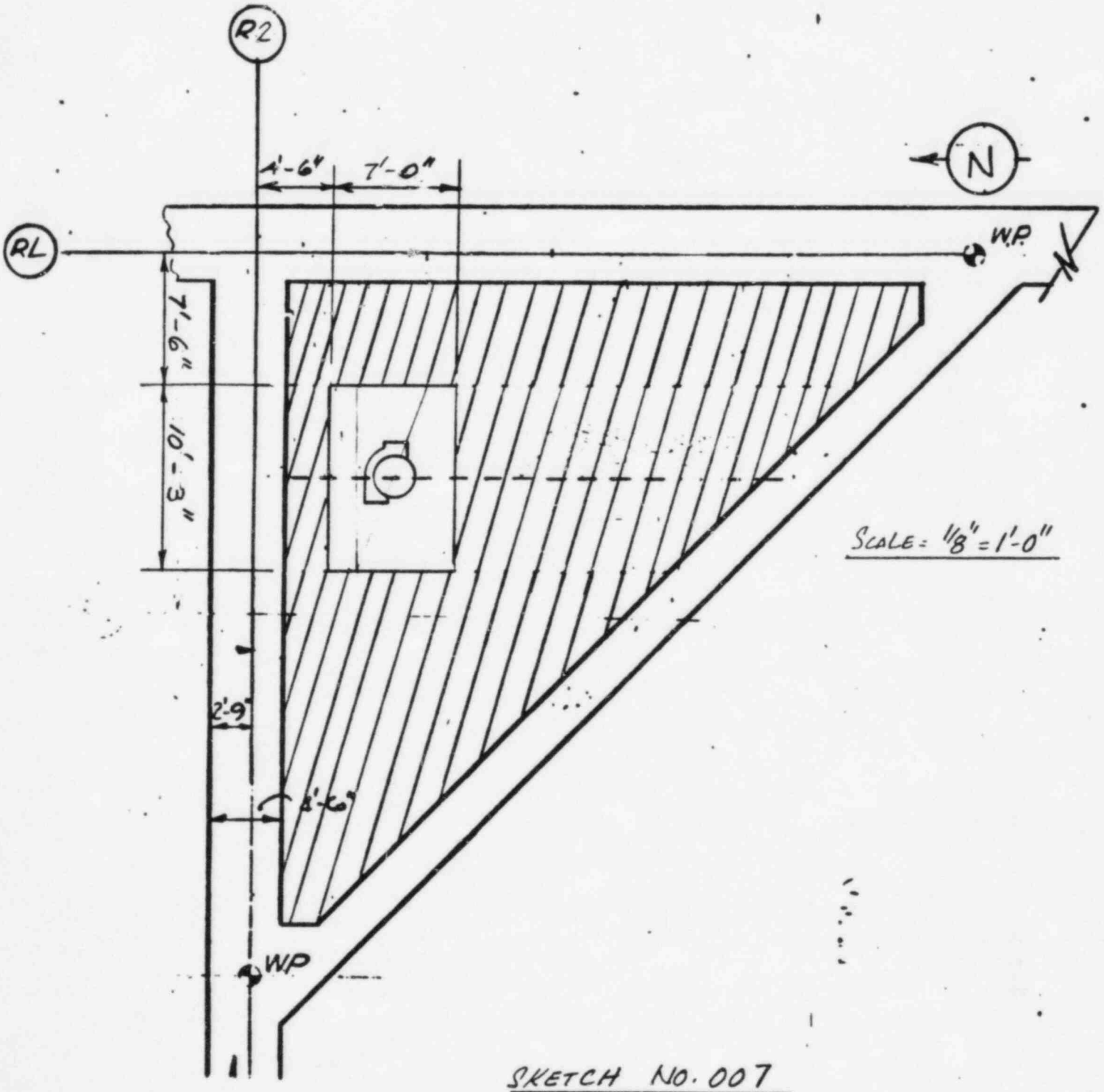

SCALE = 1/8" = 1'-0"

SKETCH NO. 006

# ENCLOSURE A - LOAD EXCLUSION AREA

- HANDLED LOADS : HNP-1, CORE SPRAY PUMP, E21-C001B
- LOCATION : HNP-1, RX BLD, NE CORNER, EL 87'-0"
- LOAD DESCRIPTION : PUMP 4'OD X 4'-6" (H) 6,200 LBS
  MOTOR 3'OD X 6' (H) 7,000 LBS

MAXIMUM LANDING ELEVATION : 130'-0"




SCALE = 1/8" = 1'-0"

SKETCH NO. 007

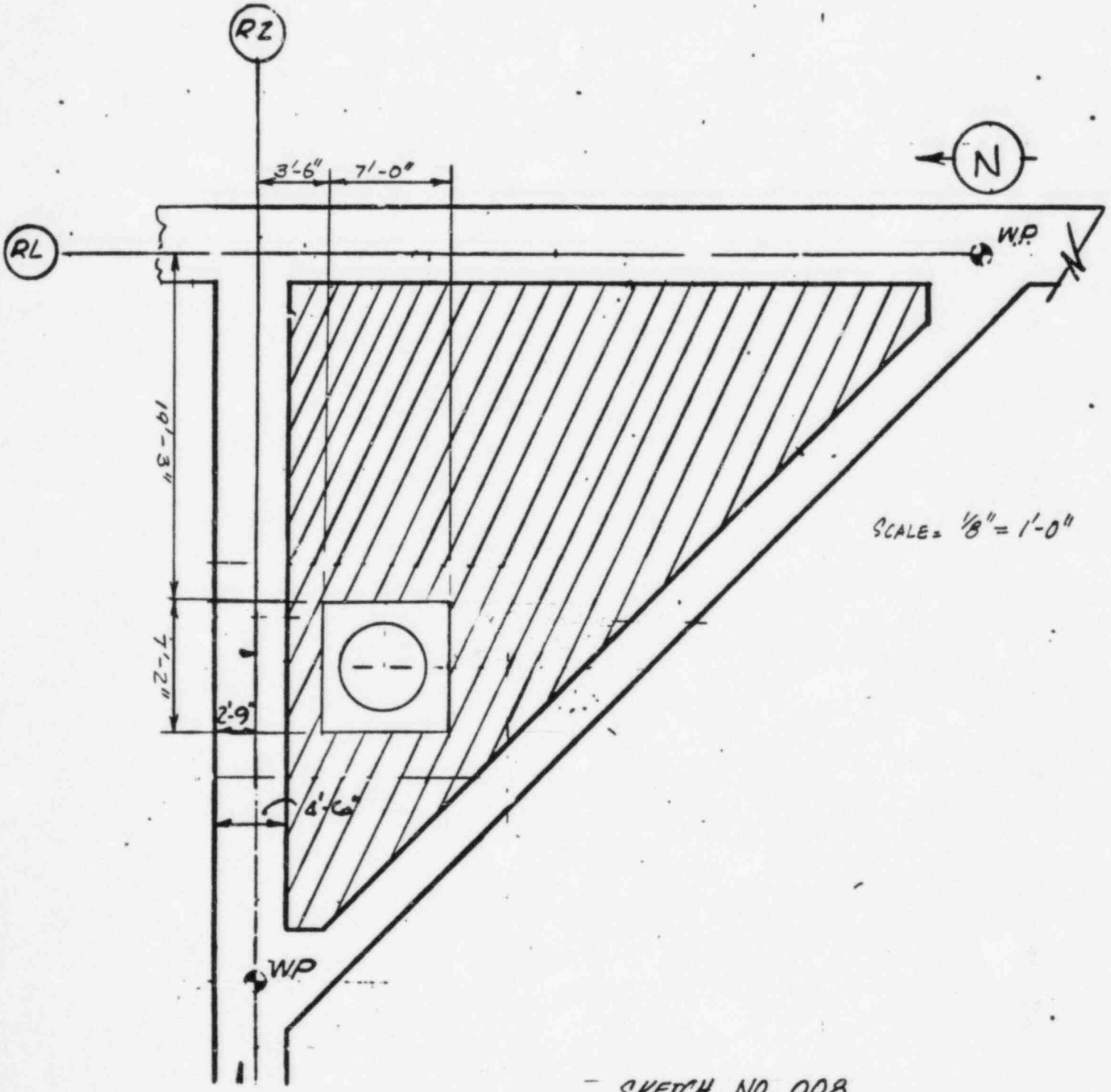
# ENCLOSURE A - LOAD EXCLUSION AREA

HANDLED LOADS : HNP-1 , RHR HX , E11-B001B

LOCATION : HNP-1 , RX BLDG , NE CORNER , EL 95'-1½"

LOAD DESCRIPTION : 25'L x 5'OD 47,000 #

MAXIMUM LANDING ELEVATION = 130'-0"




SCALE = 1/8" = 1'-0"

SKETCH NO. 008

# ENCLOSURE A - LOAD EXCLUSION AREA

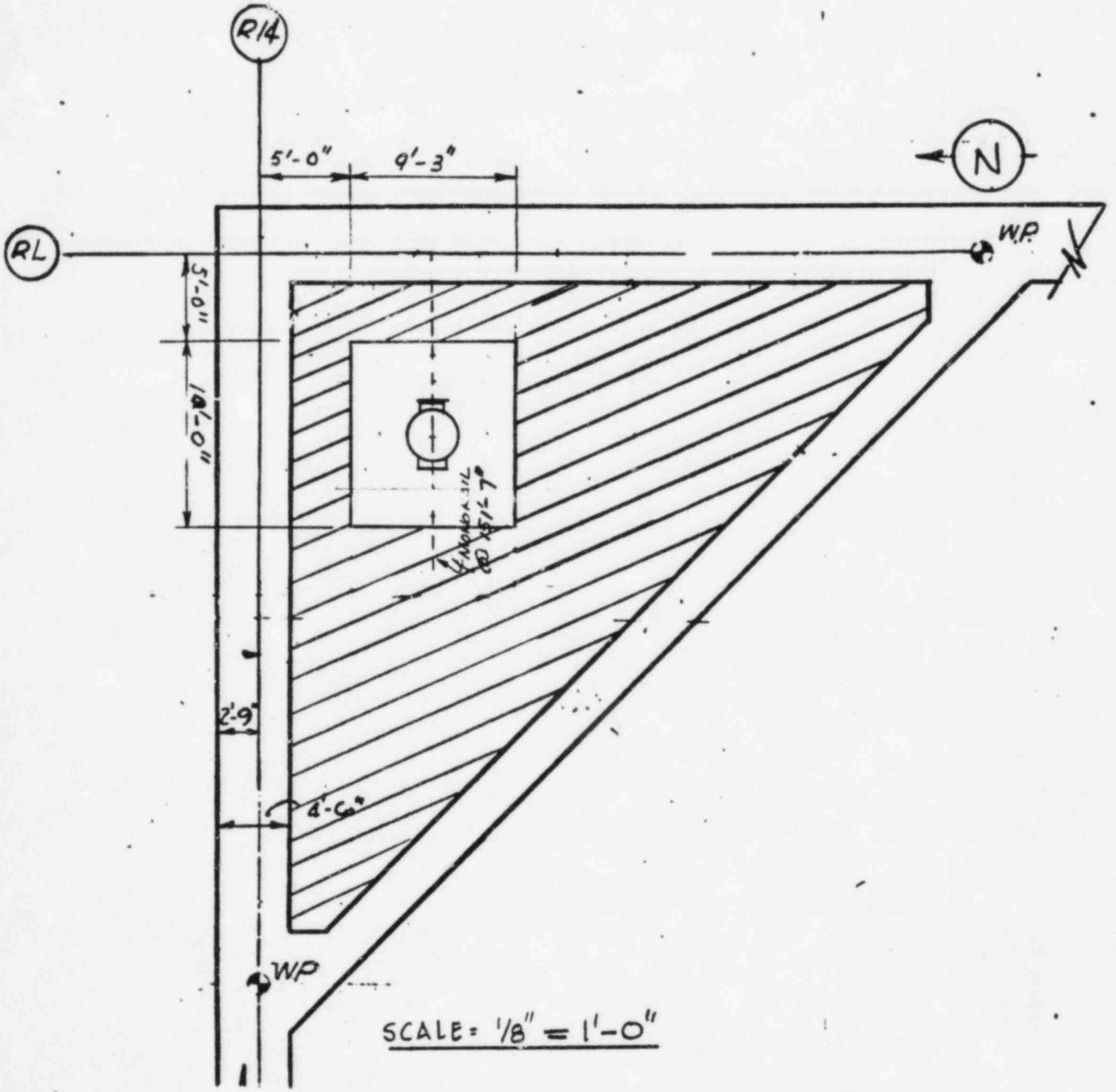
HANDLED LOADS : HNP-2, CORE SPRAY PUMP & MOTOR, 2E21-C001A

LOCATION : HNP-2, RX BLDG, NE CORNER EL. 87'-0"

LOAD DESCRIPTION : PUMP ELEMENT + DISCH. HD. = 5'0D X 16' (L) 5490 #

MOTOR ASSEMBLY : 3'0D X 6' (L) 7200 #

MAXIMUM LANDING ELEVATION : 130'-0"




SCALE : 1/8" = 1'-0"

SKETCH NO. 009

## ENCLOSURE A - LOAD EXCLUSION AREA

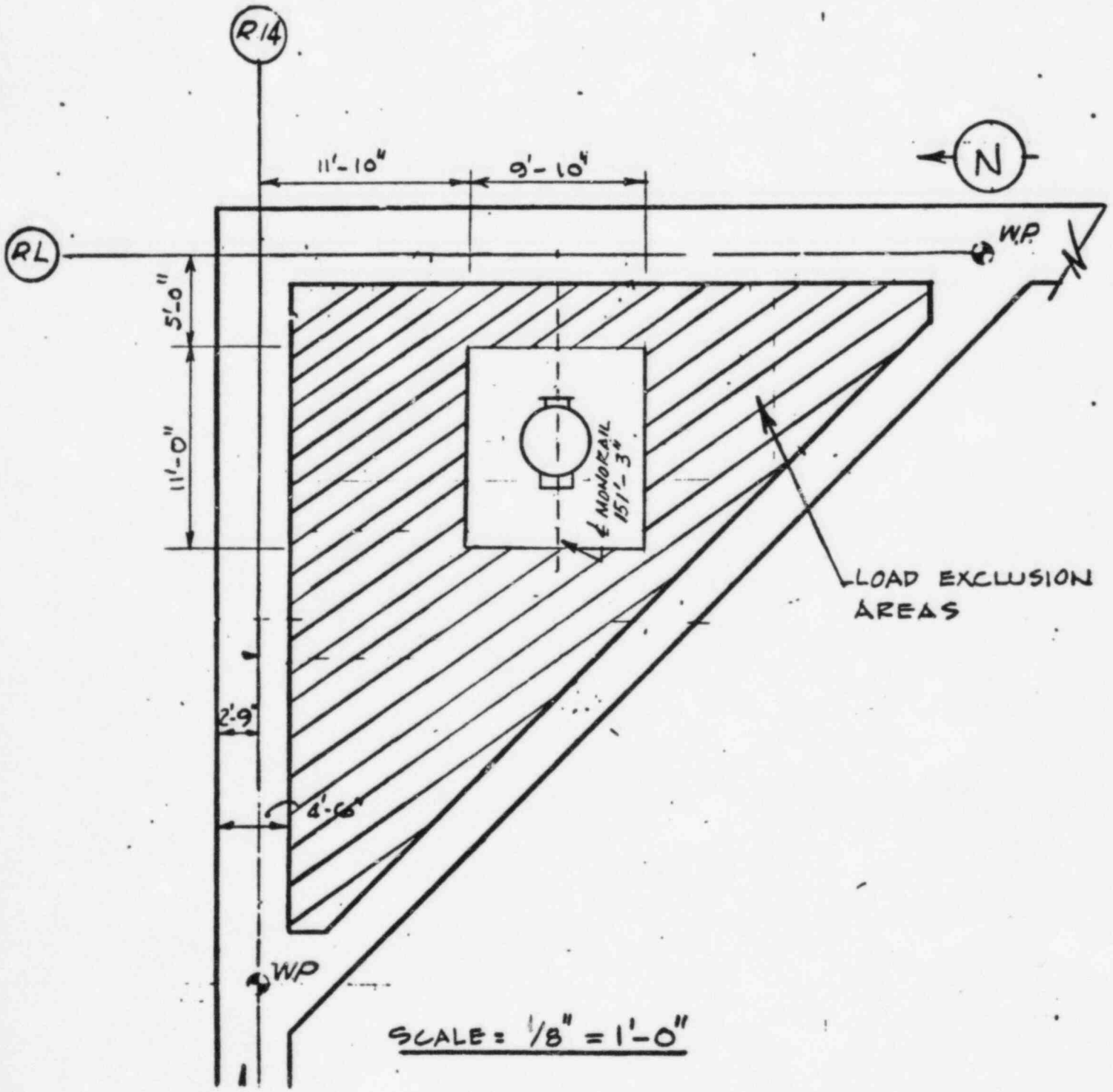
HANDLED LOADS : HNP-2, RHR PUMP & MOTOR, 2E11-C002A

LOCATION : HNP-2, RX BLDG, NE CORNER EL. 87'-0"

LOAD DESCRIPTION : PUMP ELM. + DISCH. HD = 5'-6" O.D X 24'L, 7600 LB

MOTOR ASSEMB. = 4'O.D. X 6'L, 6800 LB

MAXIMUM LANDING ELEVATION : 130'-0"




SCALE : 1/8" = 1'-0"

SKETCH NO. 010

# ENCLOSURE A - LOAD EXCLUSION AREA

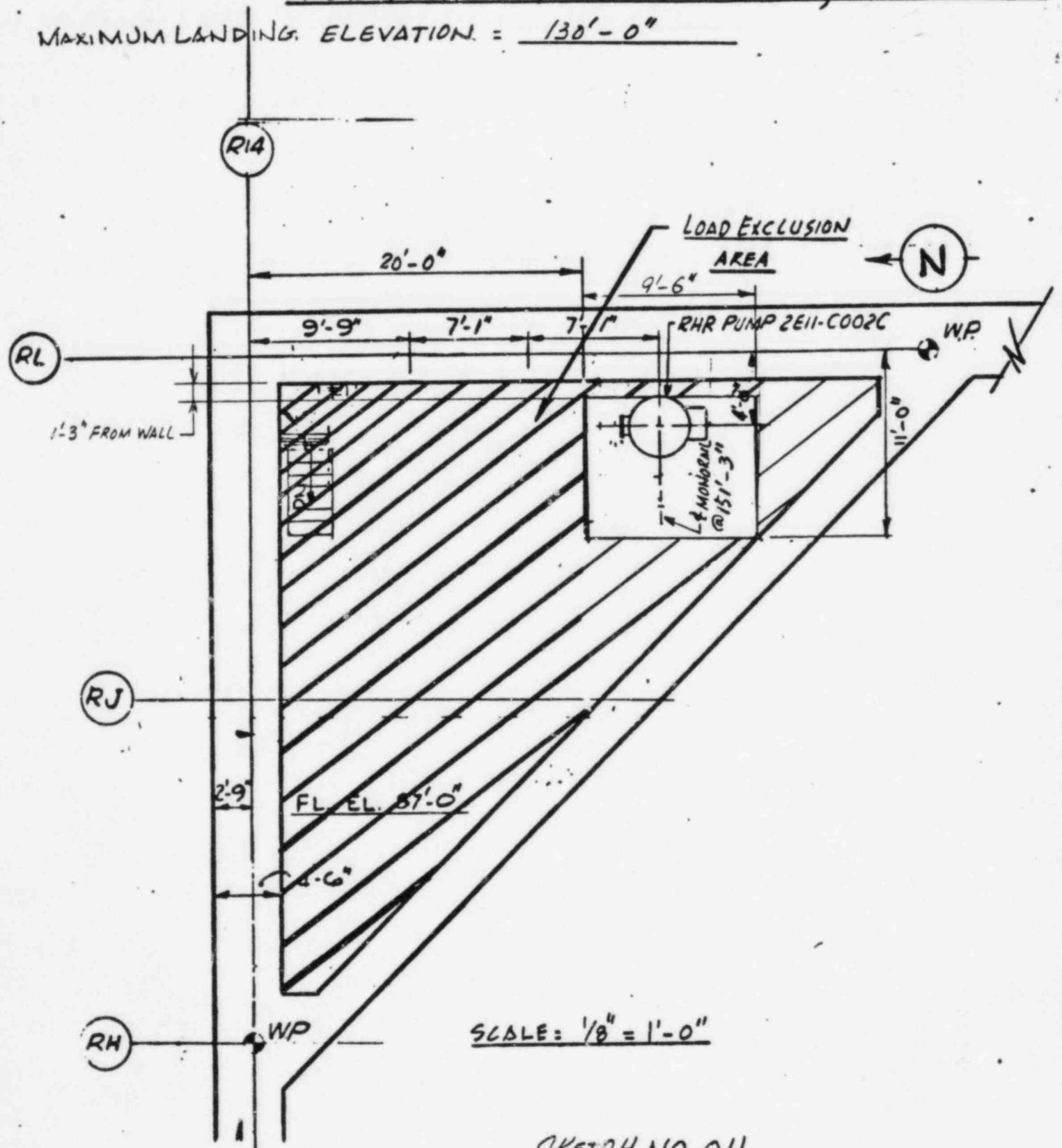
HANDLED LOADS : HNP-2, RHR PUMP & MOTOR, 2E11-C002C

LOCATION : HNP-2, RX BLDG, NE CORNER, EL - 87'-0"

LOAD DESCRIPTION : PUMP & DISCH. HD = 5'-6" O.D. X 24' L., 7600 LB.

MOTOR ASSEMBLY = 4' O.D. X 6' L., 6800 LB.

MAXIMUM LANDING ELEVATION = 130'-0"




SCALE: 1/8" = 1'-0"

SKETCH NO. 011

## ENCLOSURE A - LOAD EXCLUSION AREA

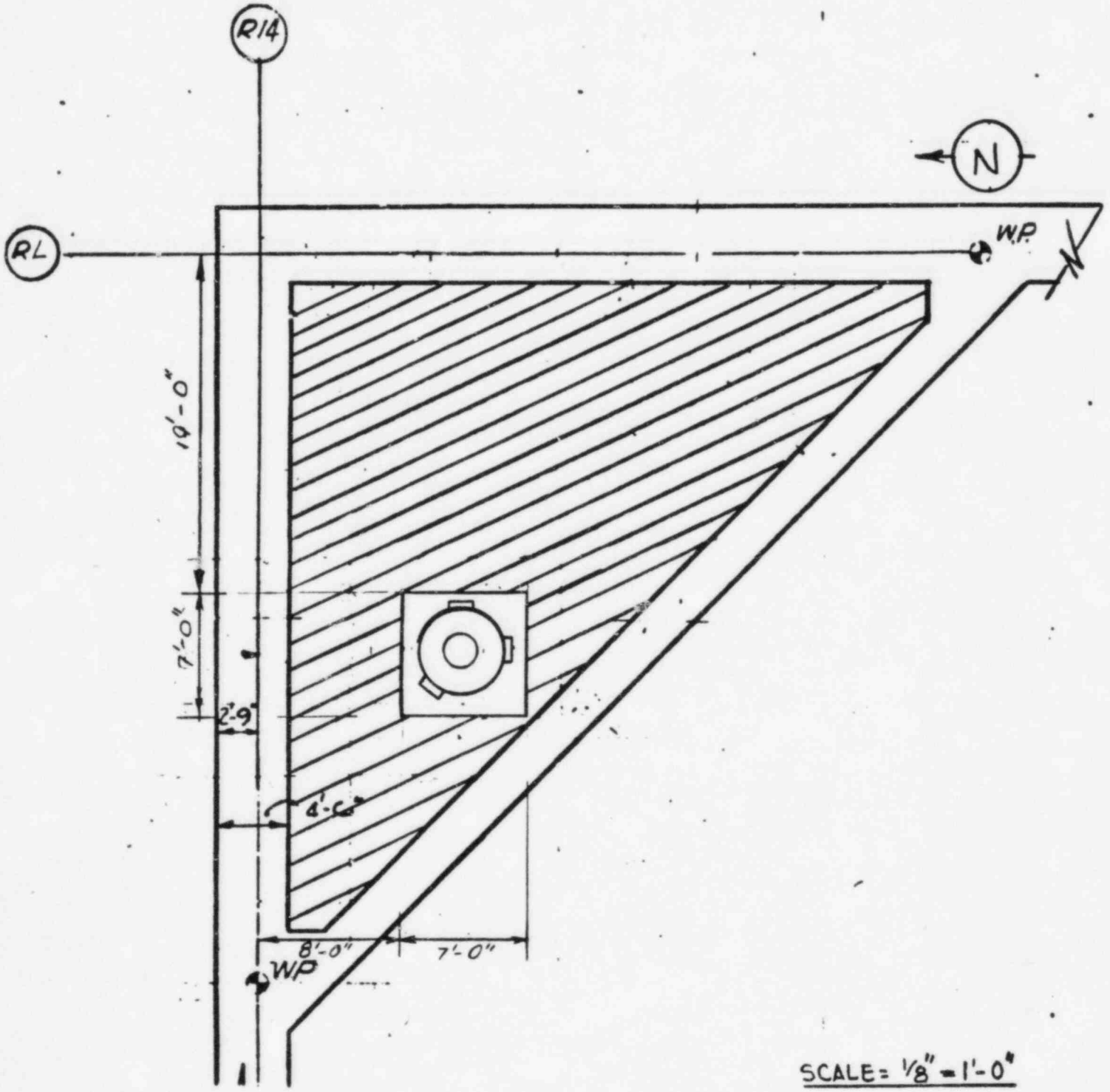
HANDLED LOADS: HNP-2, RHR HX, 2E11-B001A

LOCATION: HNP-2, RX BLDG, NE CORNER EL. 95'-0"

LOAD DESCRIPTION: 25'L X 5'OD ; 47000 LBS

HOIST ATTACHING POINT = 155'-6"

MAXIMUM LANDING ELEVATION: 130'-0"




SCALE = 1/8" = 1'-0"

SKETCH NO. 012

# ENCLOSURE A - LOAD EXCLUSION AREA

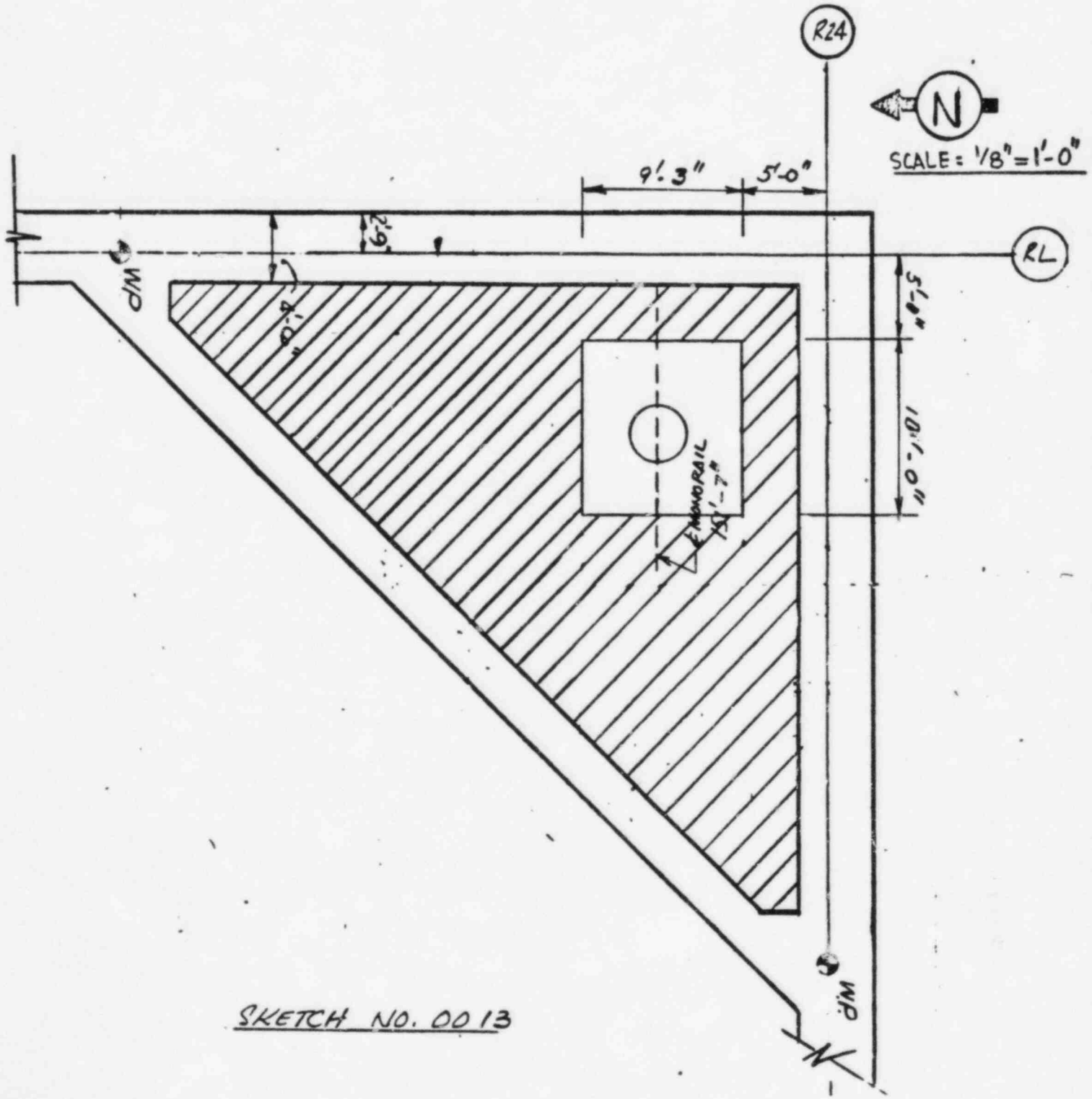
HANDLED LOAD = HNP-2, C.S. PUMP & MOTOR 2E21-C001B

LOCATION = HNP-2, RX BLDG, SE CORNER EL. 87'-0"

LOAD DESCRIPTION: PUMP = 5' O.D. X 16'L : 5490 LB

MOTOR = 3' O.D. X 6'L : 7200 LB

MAXIMUM LANDING ELEVATION: 130'-0"



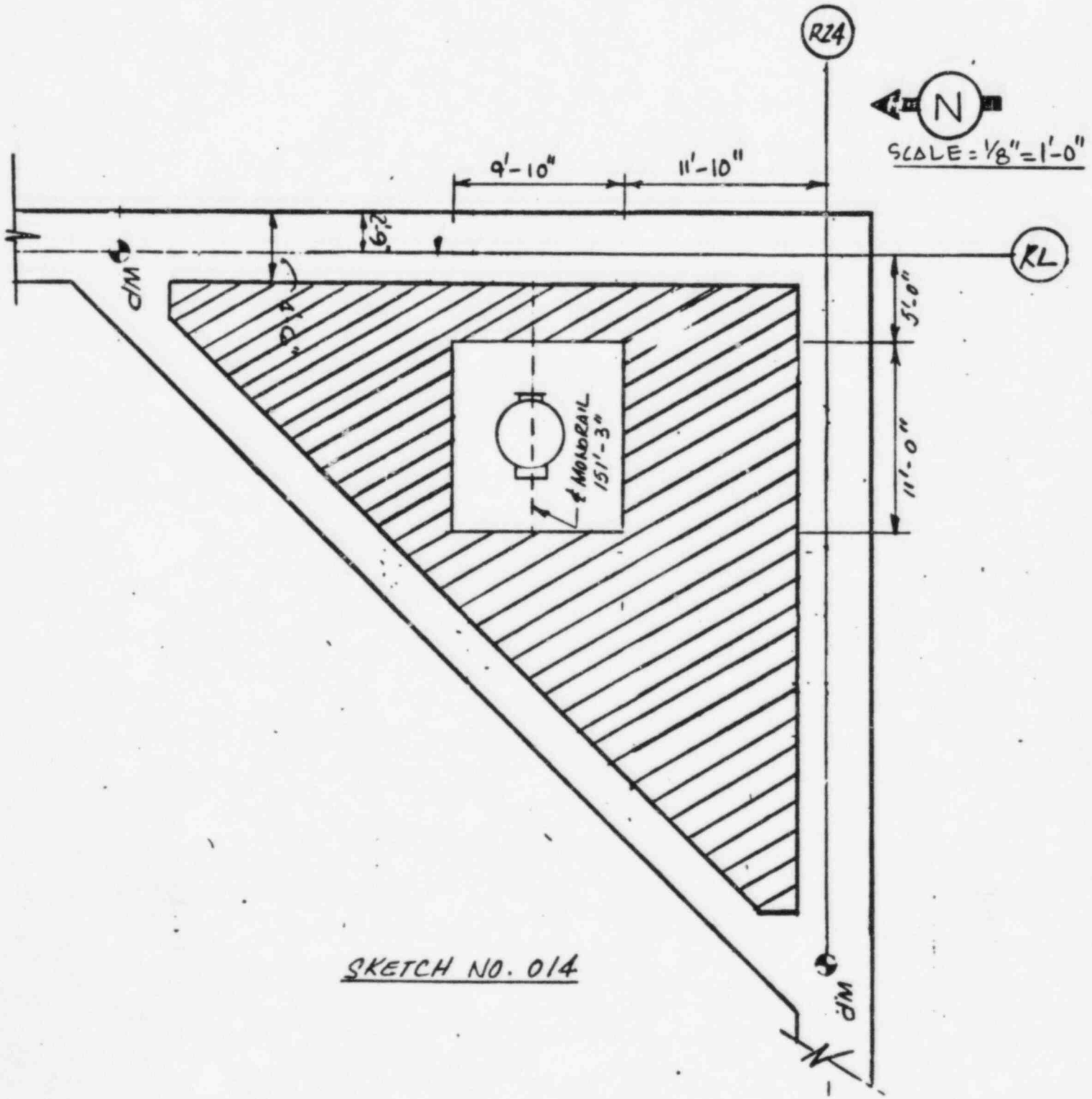

SKETCH NO. 0013

# ENCLOSURE A - LOAD EXCLUSION AREA

HANDLED LOAD = HNP-2, RHR PUMP & MOTOR, 2E11-C002B

LOCATION = HNP-2, RX BLDG, SE CORNER EL 87'-0"

LOAD DESCRIPTION: PUMP 5'-6" OD X 24'L, 7600 LB
MOTOR 4'OD X 6'L, 6800 LB



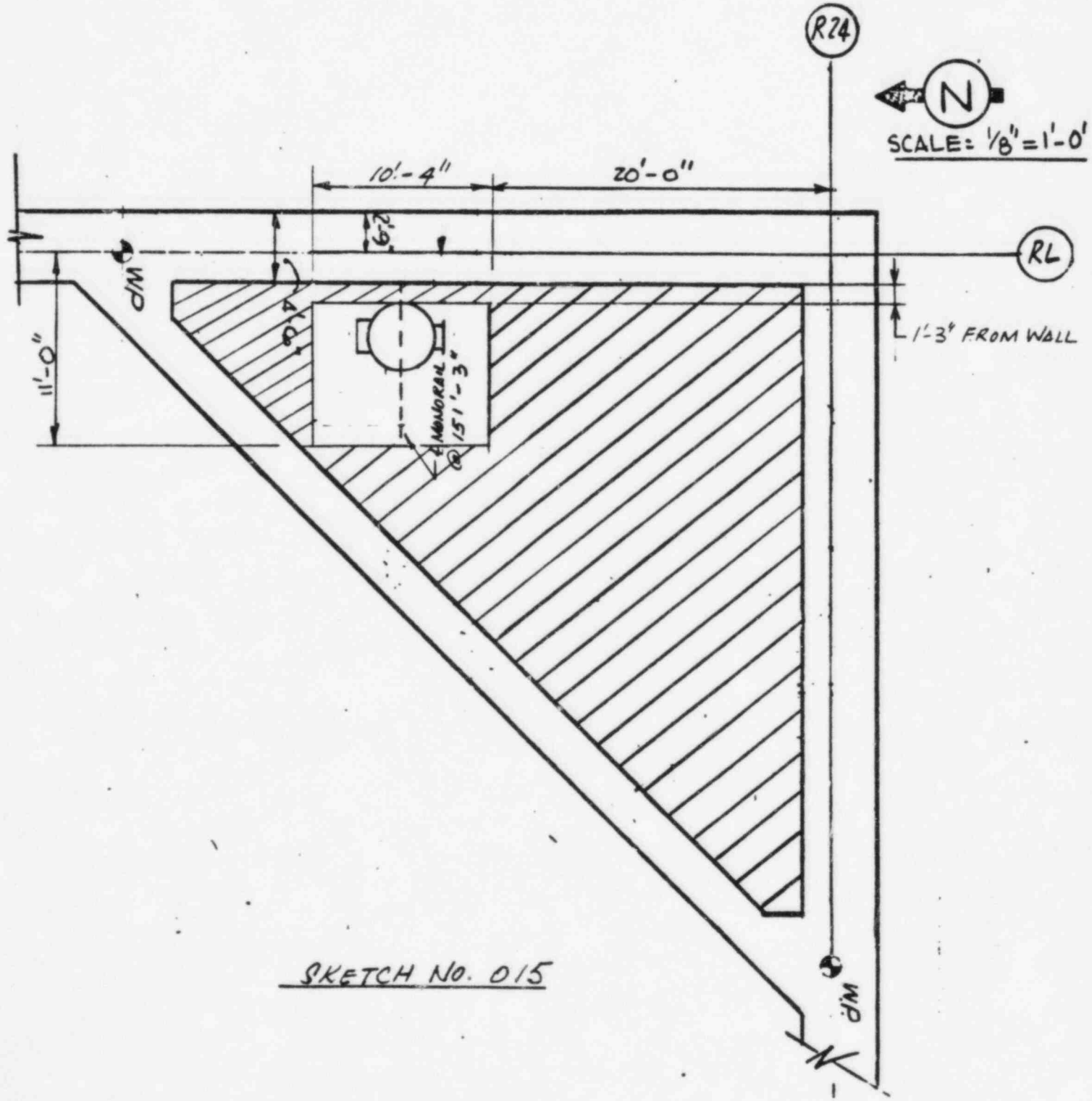

SKETCH NO. 014

# ENCLOSURE A - LOAD EXCLUSION AREA

HANDLED LOAD = HNP-2, RHR PUMP & MOTOR ZE11-C002D

LOCATION = HNP-2, RX BLDG, SE CORNER EL. 87'-0"

LOAD DESCRIPTION: PUMP 5'-6" O.D X 24'L, 7600 LB
MOTOR 4'O.D. X 6'L, 6800 LB




SKETCH NO. 015

# ENCLOSURE A - LOAD EXCLUSION AREA

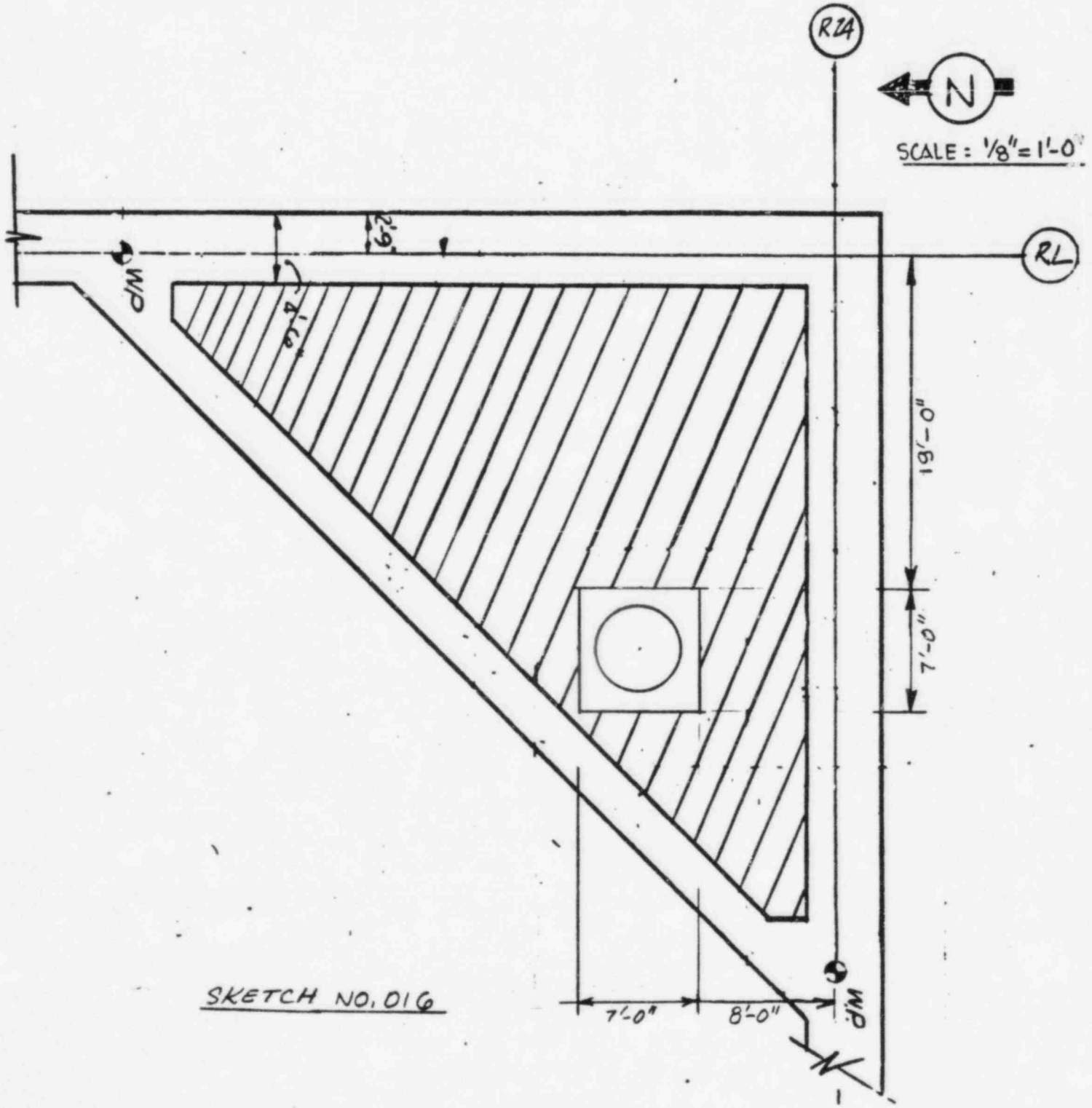
HANDLED LOAD = HNP-2, RHR HX, 2E11-B001B

LOCATION = HNP-2, RX BLDG, SE CORNER EL. 95'-0"

LOAD DESCRIPTION: 25'L X 5'OD ; 47000 LBS

HOIST ATTACHING POINT ELEVATION = 155'-6"

MAXIMUM LANDING ELEVATION = 130'-0"



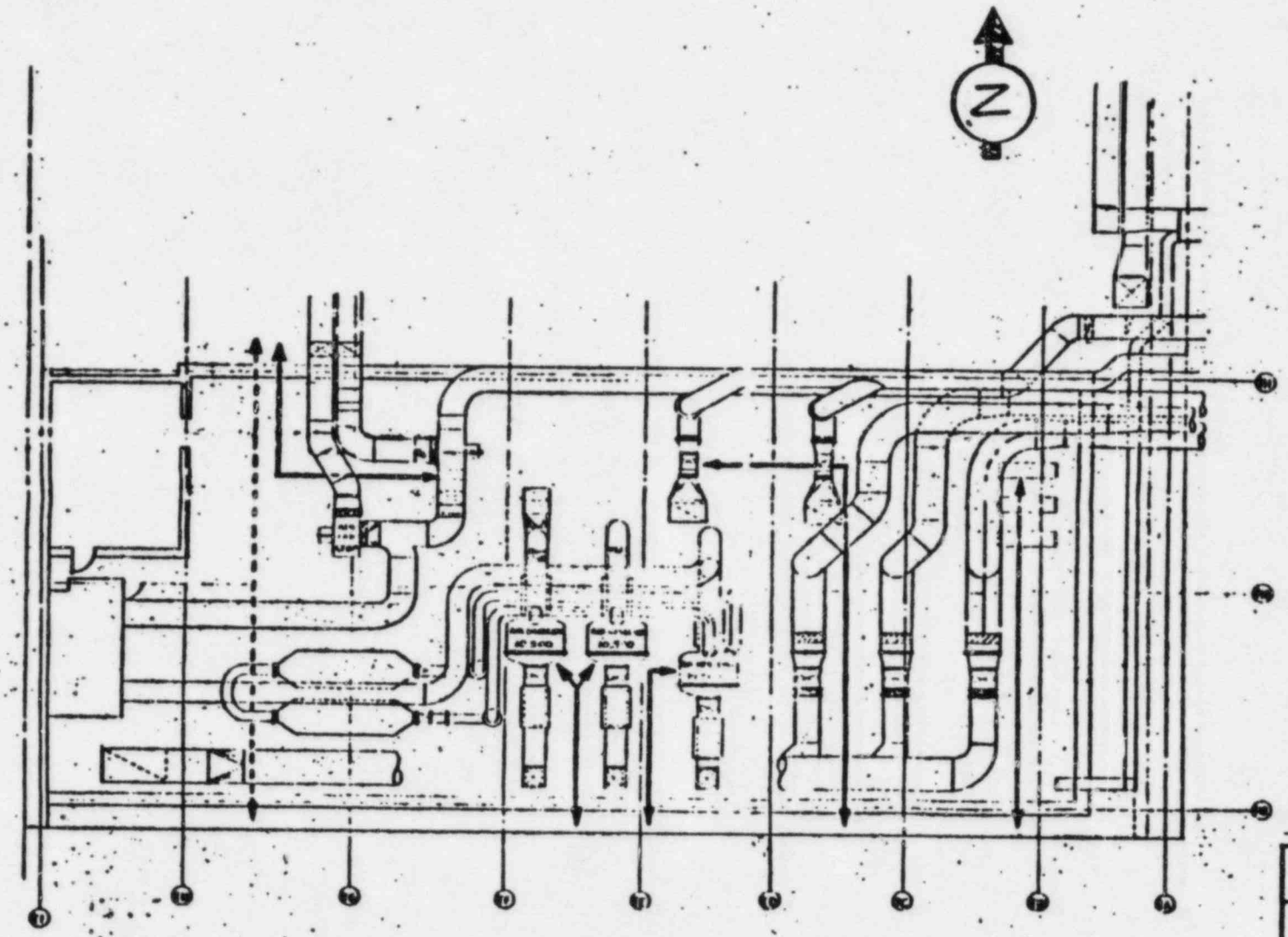

SKETCH NO. 016

# HNP-6977 ENCLOSURE A

HANDLED LOAD = HNP-1&2 CONTROL ROOM ROOF HVAC EQUIPMENT

LOCATION = HNP-1 CONTROL ROOM ROOF, EL. 180'-0"

LOAD DESCRIPTION = (1) AIR HANDLING UNITS (Z41-B003A THRU C), 5.3 TONS
(2) FILTER UNITS (Z41-D004A1B), 2 TONS
(3) EXHAUST FAN (Z41-C010), 1 TON
(4) SUPPLY FAN (Z41-C009), 1 TON




SKETCH NO.: 017

GEORGIA POWER CO.

EDWIN I. HATCH NUCLEAR PLANT UNIT NO. 1

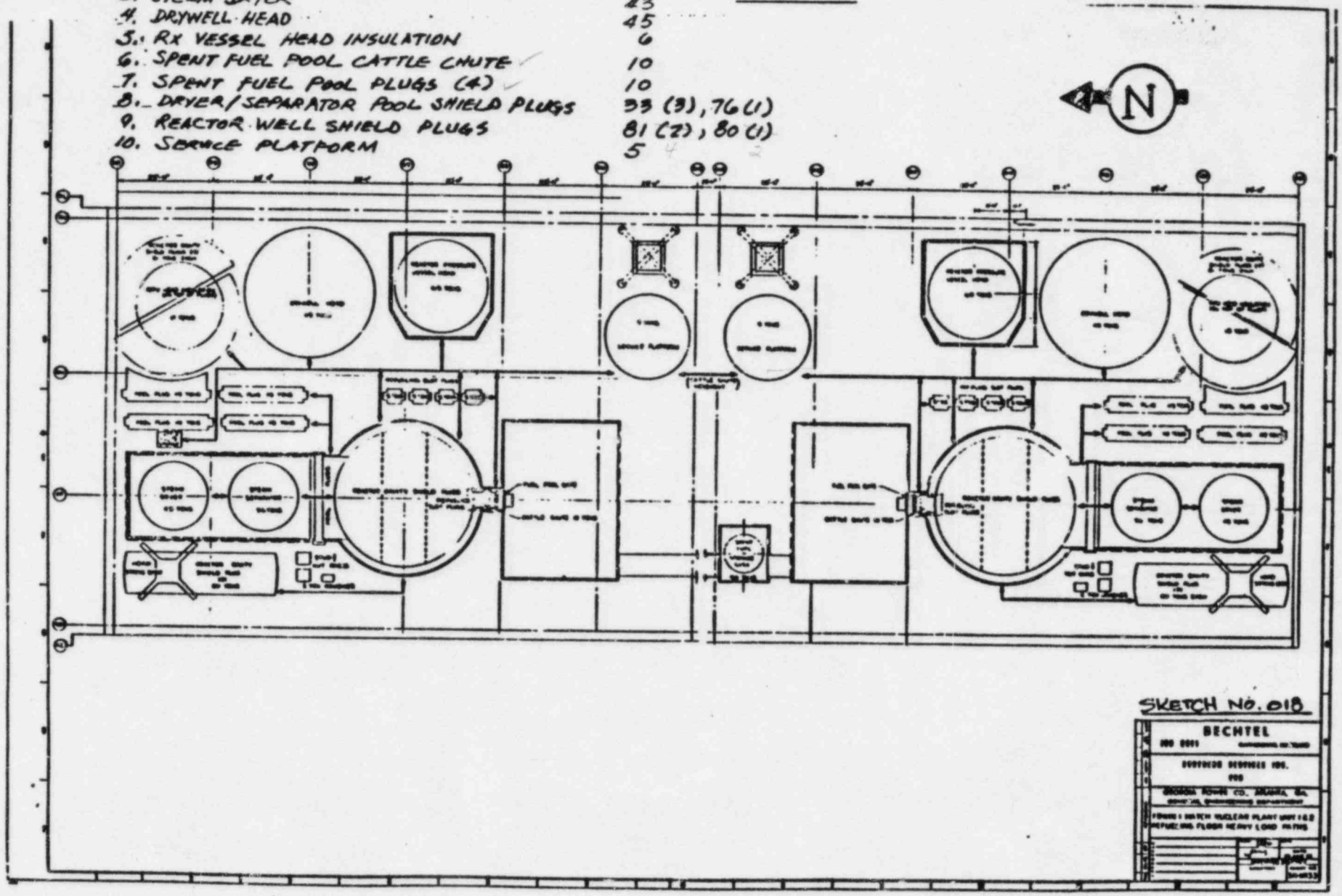
- - - HEAVY LOAD PATHS FOR CONTROL ROOM ROOF

MADE BY [illegible] | CHECKED [illegible] | APP. [illegible]

A-17

# HNP-6977 ENCLOSURE A

| LOAD DESCRIPTION: | WT. (TONS) |
|---|---|
| 1. RX VESSEL HEAD | 65 |
| 2. MOISTURE SEPARATOR | 56 |
| 3. STEAM DRYER | 43 |
| 4. DRYWELL HEAD | 45 |
| 5. RX VESSEL HEAD INSULATION | 6 |
| 6. SPENT FUEL POOL CATTLE CHUTE | 10 |
| 7. SPENT FUEL POOL PLUGS (4) | 10 |
| 8. DRYER/SEPARATOR POOL SHIELD PLUGS | 33 (3), 76 (1) |
| 9. REACTOR WELL SHIELD PLUGS | 81 (2), 80 (1) |
| 10. SERVICE PLATFORM | 5 |




SKETCH NO. 018

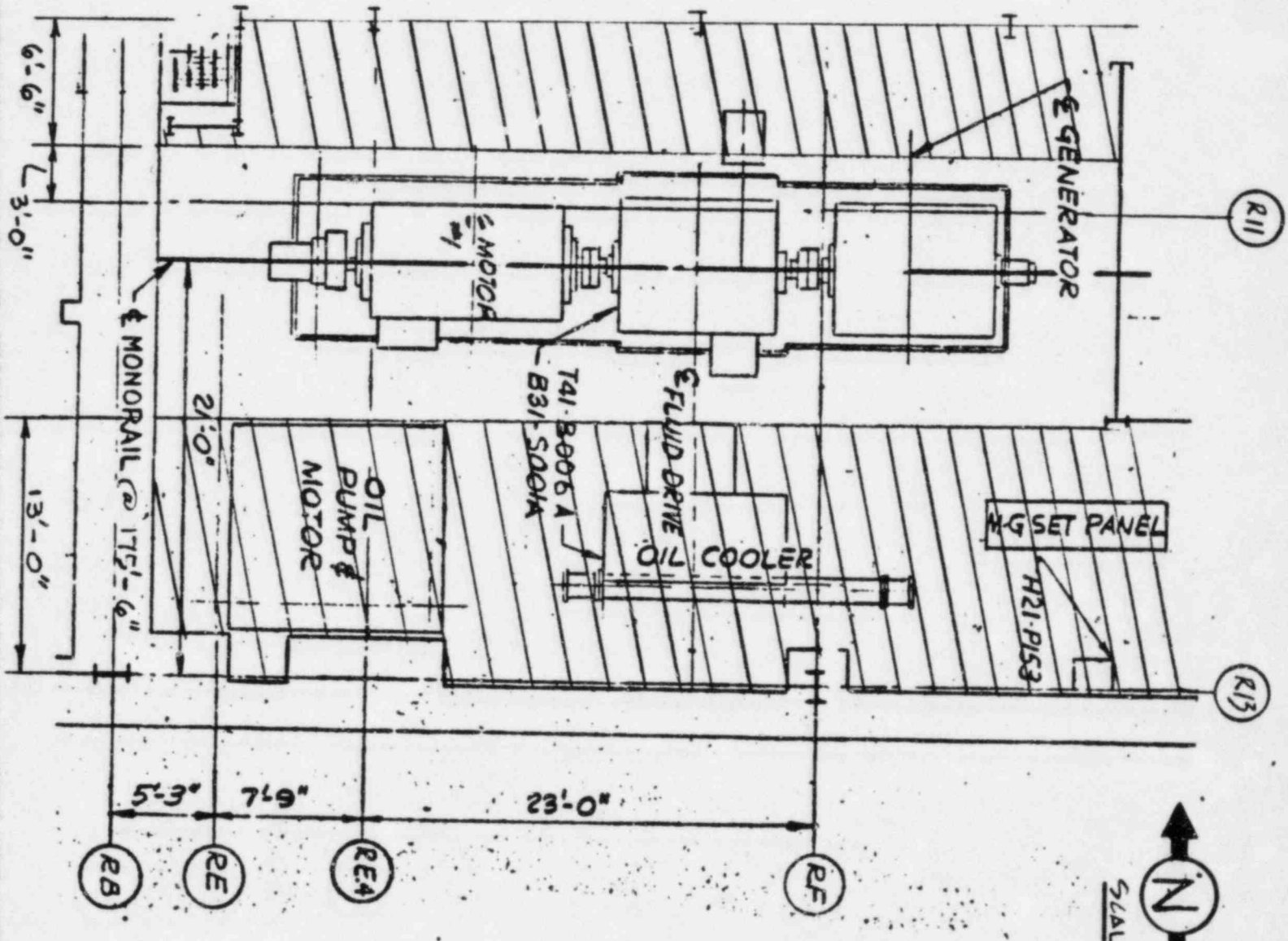
BECHTEL

# ENCLOSURE A- LOAD EXCLUSION AREA

HANDLED LOAD: HNP-1, RX RECIR. PUMP M.G. SET B31-S001A

LOCATION: HNP-1, RX BLDG EL. 158'-0"

| LOAD DESCRIPTION: | | |
|---|---|---|
| MOTOR | 9'-6"(W) x 5'-6"(H) x 12'(L) | 30,300# |
| FLUID DRIVE | 9'(W) x 8'(H) x 11'-2"(L) | 33,000# |
| GENERATOR | 7'(W) x 6'(H) x 11'-6"(L) | 34,000# |



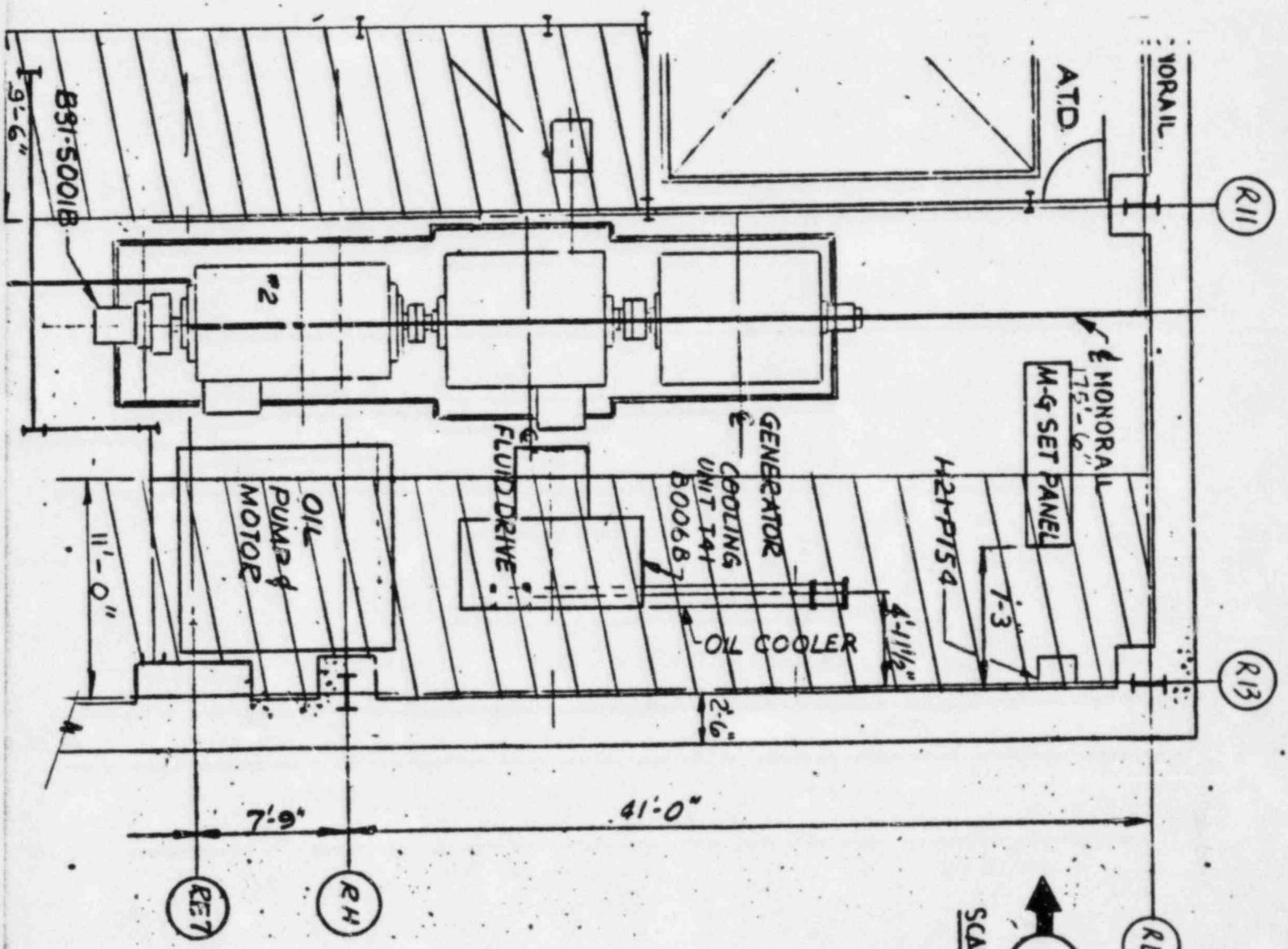

SKETCH NO. 019

# ENCLOSURE A- LOAD EXCLUSION AREA

HANDLED LOAD: HNP-1, RX RECIR. PUMP MG SET, B31-5001B

LOCATION: HNP-1, RX BLDG, EL 158'-0"

| LOAD DESCRIPTION: | | |
|---|---|---|
| MOTOR | 9'-6"(W) x 5'-6"(H) x 12'(L) | 30,300 # |
| FLUID DRIVE | 9'(W) x 8'(H) x 11'-2"(L) | 33,000 # |
| GENERATOR | 7'(W) x 6'(H) x 11'-6"(L) | 34,000 # |



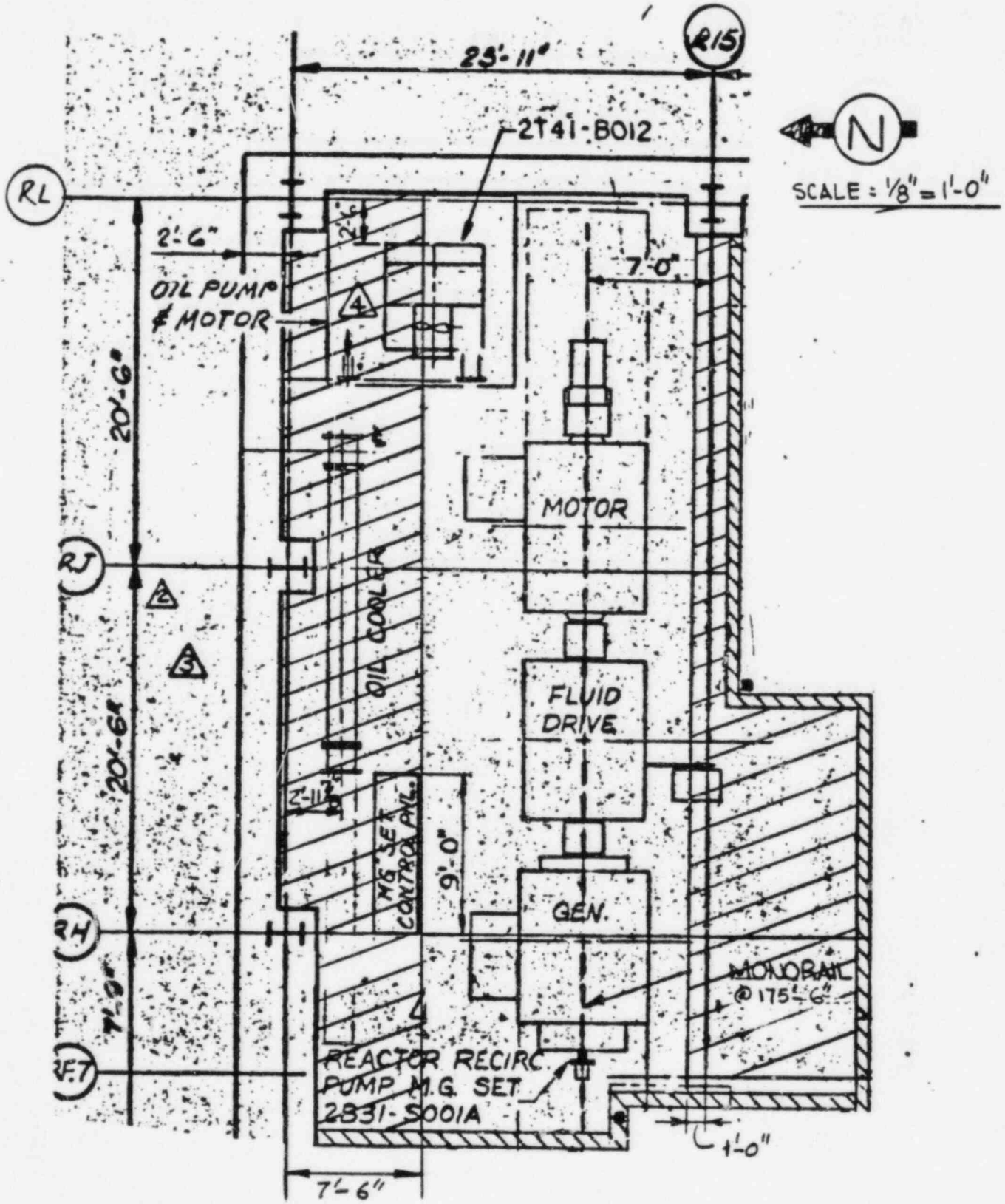

SKETCH No. 020

# ENCLOSURE A- LOAD EXCLUSION AREA

HANDLED LOAD: HNP-2, REACTOR RECIRC. PUMP M.G. SET, 2B31-S001A

LOCATION: HNP-2 RX BLDG, EL. 158'

| LOAD DESCRIPTION: | | |
|---|---|---|
| GENERATOR | 11'(L) X 8'-1"(H) X 7'-3"(W) | 36,750 LBS |
| MOTOR | 12'-6"(L) X 9'-2"(H) X 9'(W) | 30,300 LBS |
| FLUID DRIVE | 11'-2"(L) X 8'(H) X 9'(W) | 33,000 LBS |




SKETCH NO. 021

# ENCLOSURE A- LOAD EXCLUSION AREA

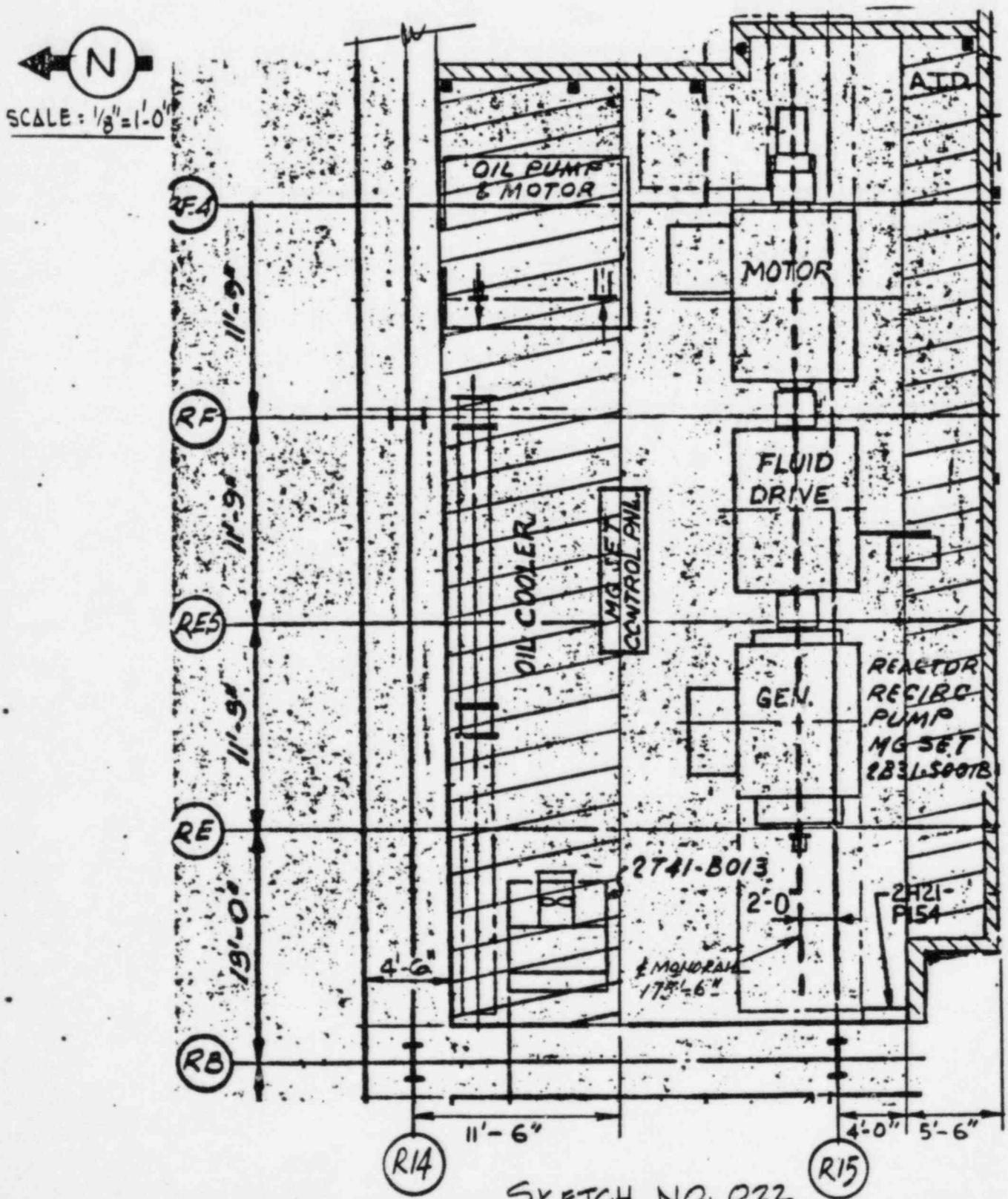


HANDLED LOAD: HNP-2, REACTOR RECIR. PUMP M.G. SET, 2B31-S001B

LOCATION: HNP-2 RX BLDG, EL 158'-0"

LOAD DESCRIPTION:

| | | |
|---|---|---|
| GENERATOR | 11'(L) x 8'-1"(H) x 7'-3"(W) | 36,750 LBS |
| MOTOR | 12'-6"(L) x 9'-2"(H) x 9'(W) | 30,300 LBS |
| FLUID DRIVE | 11'-2"(L) x 8'(H) x 9'(W) | 33,000 LBS |




SKETCH NO. 022

# APPENDIX B

## COMPARISON OF SPECIAL LIFTING DEVICE DESIGN TO ANSI N14.6-1978

(LATER)

# APPENDIX C

## COMPARISON OF OVERHEAD CRANE DESIGN

## TO CMAA SPECIFICATION 70

## I. INTRODUCTION

The purpose of the evaluation is to determine the extent of compliance of the HNP-1 Turbine Building Overhead Crane and the HNP-1&2 Reactor Building Overhead Cranes, which were designed to EOCI-61, with the guidelines of CMAA-70. Franklin Research Center (FRC) has compared the recommendations of CMAA-70 against those of EOCI-61 and identified fifteen areas where differences exist. The designs of the above three cranes were evaluated with respect to these fifteen areas as follows:

## II. HATCH OVERHEAD CRANE EVALUATION

### A. FRC FINDING - IMPACT ALLOWANCE

"CMAA-70, Article 3.3.2.1.1.3 requires that crane design calculations include an impact allowance of 0.5% of the load per foot per minute of hoisting speed but not less than 15%. EOCI-61 specifies only a minimum allowance of 15%. Consequently, for cranes with hoist speeds in excess of 30 feet per minute, it is possible that the impact allowance applied under EOCI-61 will be less than that required by CMAA-70".

EVALUATION

The subject cranes have hoisting speeds ranging from 4 to 28 feet per minute; therefore, the impact allowance applied under EOCI-61 will not be less than that required by CMAA-70.

### B. FRC FINDING - TORSIONAL FORCES

"CMAA-70, Article 3.3.2.1.3 requires that twisting moments due to overhanging loads and lateral forces acting eccentric to the horizontal neutral axis of a grider be calculated on the basis of the distance between the center of gravity of the load, or force center line, and the girder shear center measured normal to the force vector. EOCI-61 states that such moments are to be calculated with reference to girder center of gravity. For girder sections symmetrical about each principal central axis (e.g., box section or I-beam girders commonly used in cranes subject to this review), the shear center coincides with the centroid of the girder section and there is no difference between the two requirements. Such is not the case for nonsymmetrical girder sections (e.g., channels)."

EVALUATION

Box girders are used in the bridges of the subject cranes. Since a box girder is symmetrical about each principal central axis, the shear center coincides with the centroid of the girder section and there is no difference between the EOCI-61 and CMAA-70 requirements.

C. FRC FINDING - BENDING STRESS

"CMAA-70, Article 3.3.2.2 requires that bending stress calculations include a wind load of 5 pounds per square foot in design stress calculations based on the sum of dead and live loads. EOCI-61 requires that the design of outdoor cranes include a wind load of 10 pounds per square foot of projected area, but is not specific concerning the combination of wind loads with other dead and live loads."

EVALUATION

The subject cranes are located indoors and are not subject to wind loading. This requirement is therefore not applicable.

D. FRC FINDING - LONGITUDINAL STIFFENERS

"CMAA-70, Article 3.3.3.1 specifies (1) the maximum allowable web depth/thickness (h/t) ratio for box girders using longitudinal stiffeners and (2) requirements concerning the location and minimum moment of inertia for such stiffeners. EOCI-61 allows the use of longitudinal stiffeners but provides no similar guidance."

EVALUATION

1. The box girder h/t ratios for the subject cranes range from 279 to 288 and are less than the maximum of 564 specified by CMAA-70.

2. The location and minimum moments of inertia of the longitudinal stiffeners comply with the guidelines of CMAA-70.

E. FRC FINDING - ALLOWABLE COMPRESSIVE STRESS

"CMAA-70 Article 3.3.3.1.3 identifies allowable compressive stresses of approximately 50% of yield strength of the recommended structural material (A-36) for girders, where the ratio of the distance between web plates to the thickenss of the top cover plate (b/c ratio) is less than or equal to 38. Allowable compressive stresses decrease linearly for b/c ratios in excess of 38. EOCI-61 provides a similar method for calculating allowable compressive stresses except that the allowable stress decreases from approximately 50% of yield only after the b/c ratio exceeds 41. Consequently, structural members with b/c ratios in the general range of 38 to 52 designed under EOCI-61 will allow a slightly higher compressive stress than those designed under CMAA-70."

EVALUATION

The b/c ratios for the girder systems of the subject cranes are in the range of 24 to 30. Since no structural members have b/c ratios in the range of 38 to 52, the compressive stress allowed by this design will not be higher than that allowed by CMAA-70.

F. FRC FINDING - FATIGUE CONSIDERATIONS

"CMAA-70, Article 3.3.3.1.3 provides substantial guidance with respect to fatigue failure by indicating allowable stress ranges for various structural members in joints under repeated loads. EOCI-61 does not address fatigue failure."

EVALUATION

This requirement of CMAA-70 is not considered to be of consequence for the subject cranes because they are not used for frequent lifts at or near design conditions. The subject cranes are categorized as standby since their use is only intermittently required. The number of lifts required over the life of the plant is not expected to exceed 5000 per crane. Furthermore, the majority of the lifts will involve loads which are a small percentage of the crane's rated capacity. The calculated basic stresses for each crane structure are below the allowable values specified in Article 3.3.3.1.3 of CMAA-70 and the cranes are not subject to stress reversal. It is concluded that the lack of fatigue considerations in EOCI-61 does not constitute a significant discrepancy for the cranes being evaluated.

G. FRC FINDING - HOIST ROPE REQUIREMENTS

"CMAA-70, Article 4.2.1 requires that the capacity load plus the bottom block divided by the number of parts of rope not exceed 20% of the published rope breaking strength. EOCI-61 requires that the rated capacity load divided by the number of parts of rope not exceed 20% of the published rope breaking strength. The effect of this variation on crane safety margins depends on the ratio of the weights of the load block and the rated load."

EVALUATION

The capacity load plus the weight of the bottom block divided by the number of parts of rope is 10% of the manufacturer's published breaking strength for the Reactor Building Cranes' hoist rope and 19.9% for the Turbine Building Crane hoist rope. Since the maximum of 20% specified by CMAA-70 is not exceeded, the subject cranes comply with the CMAA-70 guidelines.

H. FRC FINDING - DRUM DESIGN

"CMAA-70, Article 4.4.1 requires that the drum be designed to withstand combined crushing and bending loads. EOCI-61 requires only that the drum be designed to withstand maximum load, bending and crushing loads, with no stipulation that these loads be combined."

EVALUATION

This cannot be verified for the subject cranes.

I. FRC FINDING - DRUM DESIGN

"CMAA-70, Article 4.4.3 provides recommended drum groove depth and pitch. EOCI-61 provides no similar guidance."

EVALUATION

This cannot be verified for the subject cranes.

J. FRC FINDING - GEAR DESIGN

"CMAA-70, Article 4.5 requires that gearing horsepower rating be based on certain American Gear Manufacturers Association Standards and provides a method for determining allowable horsepower. EOCI-61 provides no similar guidance."

EVALUATION

This cannot be verified for the subject cranes.

K. FRC FINDING - BRIDGE BRAKE DESIGN

"CMAA-70, Article 4.7.2.2 requires that bridge brakes, for cranes with cab control and the cab on the trolley, be rated at least 75% of bridge motor torque. EOCI-61 requires a brake rating of 50% of bridge motor torque for similar configurations."

EVALUATION

The subject cranes have the control cab located on the bridge. The bridge brake on each crane is rated at 150% of motor torque.

L. FRC FINDING - HOIST BRAKE DESIGN

"CMAA-70, Article 4.7.4.2 requies that hoist holding brakes, when used with a method of a control braking other than mechanical, have torque ratings no less than 125% of the hoist motor torque. EOCI-61 requires a hoist holding brake torque rating of no less than 100% of the hoist motor torque without regard to the type of control brake employed."

EVALUATION

The hoist holding brakes on the subject cranes have torque ratings of at least 150% of the respective hoist motor torque, exceeding the CMAA-70 requirement of 125%.

M. FRC FINDING - BUMPERS AND STOPS

"CMAA-70, Article 4.12 provides substantial guidance for the design and installation of bridge and trolley bumpers and stops for cranes which operate near the end of bridge and trolley travel. No similar guidance is provided in EOCI-61."

EVALUATION

The subject cranes are equipped with bridge bumpers and runway stops. While existing documentation does not permit a complete evaluation of these devices to the CMAA-70 guidelines, sufficient details exist to determine that their designs meet the intent of CMAA-70. This is not considered a significant discrepancy because the cranes are not operated under load at substantial bridge or trolley speed near the end of travel.

N. FRC FINDING - STATIC CONTROL SYSTEMS

"CMAA-70, Article 5.4.6 provides substantial guidance for the use of static control systems. EOCI-61 provides guidance for magnetic control systems only."

EVALUATION

The Reactor Building Overhead Cranes utilize static, stepless control systems to control the main and auxiliary hoists, bridges, and trolleys. These static control systems meet the requirements of CMAA-70, Article 5.4.6. The HNP-1 Turbine Building Overhead Crane utilizes a full magnetic, 5 step variable speed control system. This control system complies with the requirements of CMAA-70, Article 5.4.5.

O. FRC FINDING - RESTART PROTECTION

"CMAA-70, Article 5.6.2 requires that cranes not equipped with spring return controllers or momentary contact push buttons be provided with a device that will disconnect all motors upon power failure and will not permit any motor to be restarted until the controller handle is brought to the OFF position. No similar guidance is provided in EOCI-61."

EVALUATION

The Reactor Building Overhead Cranes utilize an induction master in the static control systems to prevent any motor from being restarted after a power failure until the control handle is moved to the "OFF" position. The HNP-1 Turbine Building Overhead Crane magnetic control is equipped with a five step "Dead Man" type pushbutton which will spring return to the "OFF" position when it is released. Both of these control arrangements meet the requirements of CMAA-70.

III. CONCLUSION

The preceding evaluations demonstrate that the designs of the subject cranes comply with the guidelines of CMAA-70 to a substantial degree. For the limited cases where compliance could not be verified, it is expected that the same good engineering practices applied in other areas of crane design were used. GPC therefore concludes that the designs of the HNP-1 Turbine Building Overhead Crane and the HNP-1&2 Reactor Building Overhead Cranes meet the intent of this aspect of NUREG-0612 Guideline 7.