

June 19, 1981

GAI Report No. 2329

CONTROL OF HEAVY LOADS STUDY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
PERRY NUCLEAR POWER PLANT
UNITS 1 AND 2

Docket Nos. 50-440, 50-441

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CONTROL OF HEAVY LOADS STUDY
PERRY NUCLEAR POWER PLANT
UNITS 1 AND 2

INTRODUCTION

This report presents an evaluation of the movement of heavy loads inside the Perry Nuclear Power Plant Units 1 and 2, and the effects that potential failures of lifting devices could have on plant safety. Consideration has been given to the consequences of crane or hoist failures causing radiological damage to fuel, the potential for criticality, and the effects on the ability of the plant to come to a safe shutdown and remain in a long term decay heat removal mode.

The first portion of the report identifies the hoists and cranes that can lift and transport loads heavier than 1048 pounds (the weight of a fuel assembly with lifting tool). The crane and hoist coverage areas have been identified, and where appropriate the specific load paths have been shown.

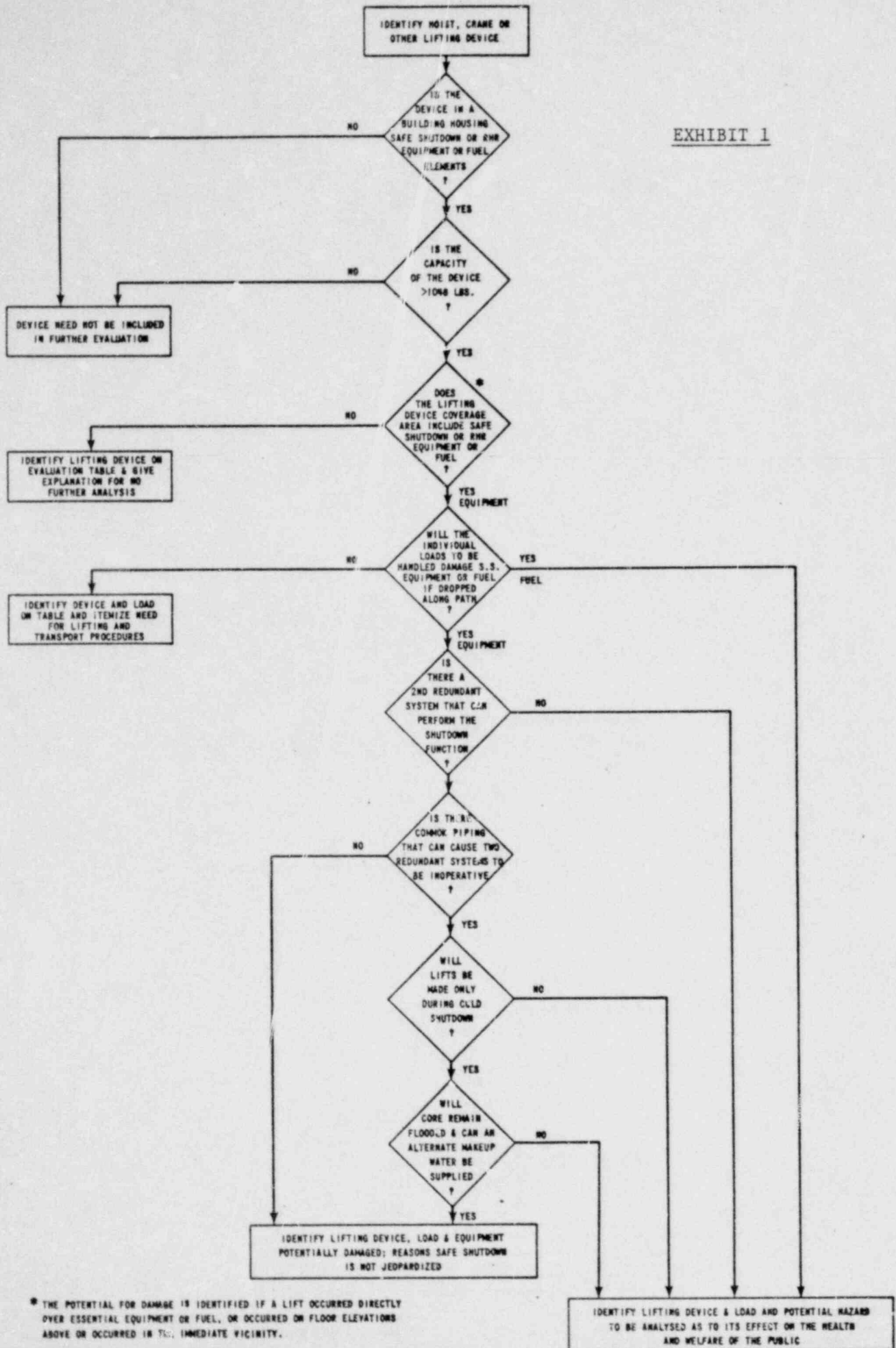
Exhibit 1 (next page) provides the logic chart that was used as the basis for the evaluation and analysis of the movement of heavy loads.

The results of this evaluation are presented in three sections: Section I is the evaluation of hoists and monorails in all buildings housing safety related equipment and/or fuel, and the emergency service water pump house crane; Section II is the evaluation of the reactor building crane; Section III is the evaluation of the fuel handling building crane.

Information packets have been assembled for each elevation or section of the plant. The packets consist of general arrangement drawings that show:

1. Locations of equipment necessary for safe shutdown and continued decay heat removal with the respective emergency power division.
2. Coverage areas for the lifting devices.

EXHIBIT 1



* THE POTENTIAL FOR DAMAGE IS IDENTIFIED IF A LIFT OCCURRED DIRECTLY OVER ESSENTIAL EQUIPMENT OR FUEL, OR OCCURRED ON FLOOR ELEVATIONS ABOVE OR OCCURRED IN THE IMMEDIATE VICINITY.

3. Individual transport paths, both as elevated lifts and along the floor on dollies.

To facilitate the use of the arrangement drawings, a key correlating equipment tag number with the equipment name has been included. Where necessary, piping composite drawings have been added to better show critical safety piping. The results of the heavy load movement study are listed in tables accompanying each packet.

The tables identify the cranes, hoists or other lifting devices that have the capacity to lift more than 1048 pounds in buildings housing fuel or safe shutdown equipment. A separate table is presented for each lifting device; the table includes the impact area, the load or loads lifted by the device, safety related equipment that could be damaged by a load drop, floor elevation and the category for hazard elimination. The categories for hazard elimination (refer to NUREG-0612) are as follows:

- A. Crane travel for this area/load combination prohibited by electrical interlocks or mechanical stops.
- B. System redundancy and separation precludes loss of capability of system to perform its safety-related function following this load drop in this area.
- C. Site-specific consideration eliminate the need to consider load/equipment combination.
- D. Likelihood of handling system failure for this load is extremely small (i.e. Section 5.1.6 of NUREG 0612 satisfied).
- E. Analysis demonstrates that crane failure and load drop will not damage safety-related equipment.
- F. Loads lifted only when reactor is in cold shutdown.

In addition to identification of equipment necessary for safe shutdown of the reactor, an evaluation of the piping systems has been made to identify common lines between two redundant systems and areas where redundant system piping could be damaged by a single load drop. The critical piping sections identified have been shown on the general arrangement drawings or, where necessary to reduce congestion, are shown on supplemental piping composite drawings.

Lifting devices and loads that have the potential to cause fuel damage, a criticality accident or loss of safe shutdown capability are separately identified in the summary portion of this report.

The inspection and preventative maintenance instructions for all of the overhead cranes are being written under the guidelines of ANSI B30.2-1976 and the vendor service manuals. For those cases where requirements differ, the more stringent is being applied.

One local instruction will apply to the Polar, Fuel Handling and Emergency Service Water Pumphouse (ESW) cranes and a second instruction to all remaining cranes.

An Overhead Crane Operator qualification guide is being written. This guide will follow the requirements of ANSI B30.2-1976 for qualification of operators and contain reference to NUREG-0612 for operation of the Polar, Fuel Handling and ESW cranes. The following general guidelines from NUREG-0612 are listed in the qualification guides:

- a. Definition of Safe Load Paths.
- b. Procedures for Handling of Heavy Loads.
- c. Qualification of Operators to ANSI B30.2-1976.
- d. ANSI N14.6-1978 for Special Lifting Devices.
- e. ANSI B30.9 for Slings and Other Lifting Devices.
- f. Crane Inspection and Testing in accordance with ANSI B30.2-1976.

Operator qualification will require familiarity with the PNPP Equipment Removal Scheme and special handling/safe load path procedures. Knowledge will be checked by interview, written exam and a practical demonstration. Completion of these requirements will be documented on a qualification card which will be retained in the operators' training file.

To ensure that safe load paths are followed, crane operators and maintenance personnel involved in supervising load handling will be familiar with all requirements prior to lifts. Information will be presented through on-site training and referenced in maintenance instructions and procedures.

All cranes identified in this report that handle loads in safety-related buildings are designed to CMAA Specification 70 and ANSI B30.2-1976.

SUMMARY CONCLUSIONS

The Perry Nuclear Power Plant, in general, has been designed to avoid potentially damaging drops of heavy loads. Areas of the plant housing fuel or safe shutdown equipment have been evaluated and have been found to be free of hazards due to heavy loads, as defined by NUREG-0612, except the following:

1. Heavy Load Movements Requiring Administrative Procedures
 - a. Loads lifted in the steam tunnel must be made only during cold shutdown since damage to both main steam and feedwater lines can be caused simultaneously (refer to Drawing 021-003).
 - b. The movement of heavy loads in the emergency service water pump house, especially one of the emergency service water pumps over the redundant system components, must be controlled by administrative procedures (refer to Drawing 021-008).
 - c. The refueling chute must be moved within the reactor building by an appropriate procedure so that it is not moved over the reactor vessel (refer to Drawing 021-009).
2. Heavy Load Movements Requiring Separate Detailed Structural or Radiological Analyses
 - a. An analysis must be made to determine the consequences of the accidental dropping of loads lifted directly over the reactor pressure vessel that might cause damage to the fuel in the core, or jeopardize the vessel's ability to keep the core flooded (refer to Drawing 021-009).
 - b. An analysis is required to determine the effect that a drop of the spent fuel cask in the area adjacent to the spent fuel pool might have on the spent fuel pool leakage integrity (refer to Drawing 021-010).

SECTION I
EVALUATION OF ALL HOISTS AND EMERGENCY
SERVICE WATER PUMP HOUSE CRANE

INTRODUCTION

The hoists and monorail used for handling and monitoring equipment in all safety buildings are itemized in the tables provided with this section. Also included in this section are the loads handled by the emergency service water pump house crane.

Since heavy loads can be handled in all buildings during normal operation except the reactor building, consideration has been given to potential damage to all safe shutdown equipment and piping as well as damage to fuel.

The report summary identifies all potentially hazardous lifts.

KEY TO DRAWING 021-001

E1. 568'-6", 574'-10", 577'-6", 580'-6"

<u>EQUIPMENT</u>	<u>TAG NUMBER</u>	
Emergency Closed Cooling Pumps	1P42-C001A 1P42-C001B	2P42-C001A 2P42-C001B
Emergency Closed Cooling Hx	1P42-B001A 1P42-B001B	2P42-B001A 2P42-B001B
Control Complex Chilled Water Chillers	P47-B001A P47-B001B	P47-B001C
Control Complex Chilled Water Pumps	P47-C001A P47-C001B	P47-B001C
Emergency CC Pump Area Cooling System Air Handling Unit	M28-B001A	M28-B001B
Emergency Closed Cooling/Chilled Water Instrument Racks A,B,C	H51-P193 H51-P195	H51P194
ECC Pump Area Air Handling Panel	H51-P036A	H51-P036B
Control Complex Chilled Water Control Panel A,B,C	H51-P318 H51-P320	H51-P319
<u>Auxiliary Building</u>		
Residual Heat Removal Heat Ex.	1E12-B001A 1E12-B001B	2E12-B001A 2E12-B001B
Residual Heat Removal Pumps	1E12-C002A 1E12-C002B 1E12-C002C	2E12-C002A 2E12-C002B 2E12-C002C
Reactor Core Isolation Cooling Pump		1E51-C001 2E51-C001
RCIC Lube Oil Cooler		1E51-B002 2E51-B002
Reactor Core Isolation Cooling Turbine Drive		1E51-C002 2E51-C002
RCIC Pump Room Air Handling Units	1M39-B004	2M39-B004
Residual Heat Removal Pump Room Cooling Air Handling Units	1M39-B001A 1M39-B001B 1M39-B002	2M39-B001A 2M39-C001B 2M39-B002

Key
Drawing 021-001 Cont'd.

RHR Instrument Panels no removal	1H22-P021 1H22-P018	
RCIC Instrument Panels no removal	1H22-P0017 2H22-P0017	
Suppression Pool Level Instrument Panels A,B	1H51-P1046 1H51-P1089 1H51-P1173	2H51-P104C 2H51-P1089 2H51-P1173
	1H51-P1111 1H51-P1121	2H51-P1111 2H51-P1121

Valves

Flow Control after HX		1E12-F003A/B 2E12-F003A/B
Suppression pool isolation loop A/B	1E12-F004 A/B 2E12-F004A/B	
Penetration #421 inboard isolation valve	1E12-F009 2E12-F009	
Shutdown suction to Loop A/B	1E12-F006A/B 2E12-F006A/B	
RHR Steam Cond. to RCIC Pump Suction Isolation	1E12-F026A/B 2E12-F026A/B	
Main Steam to RCIC Turbine	1E51-F045 2E51-F045	
Suppression pool suction isolation for RCIC	1E51-F031 2E51-F031	
Condensate Storage Tank to RCIC Pump isolation	1E51-F010 2E51-F010	
RHR Heat Exchanger Isolation	1P45-F068A/B 2P45-F068A/B 1P45-F014A/B 2P45-F014A/B	

LIFTING DEVICE Hoist 33-1, 33-2 (1L51-E035, 2L51-E035)

BUILDING: Auxiliary

ELEVATION: 594'-10"

IMPACT AREA: COLUMN LINE AX-4 to AX-5; AX-C to AX-B

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-001

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
16,000 lbs (max)	RHR Pump Room Air Handling Unit 1M39-B002 2M39-B002	568'-4"	B	There are two other trains of RHR
	RHR "C" Piping	574'-10"	B	There are two other redundant trains of RHR

001-3

REV. 02/11/71 4' 8 1/2"

E51 RCIC

20' 0" 4 EL 571' 0"

2' 0" 4 EL 570' 8"

4' 0" 4 EL 571' 10"

4' 0" 4 EL 591' 10"

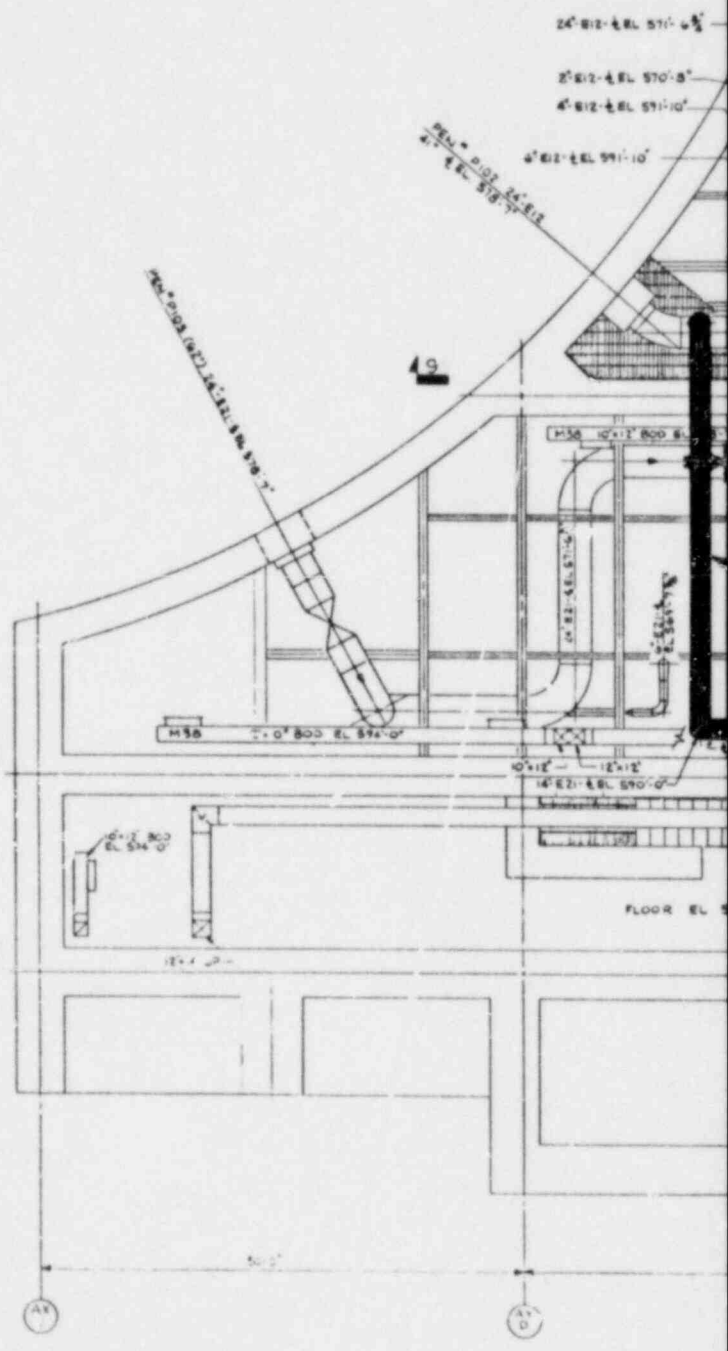
REV. 01/02/71 24' 0" 4 EL 571' 10"

REV. 02/11/71 24' 0" 4 EL 571' 10"

4.9

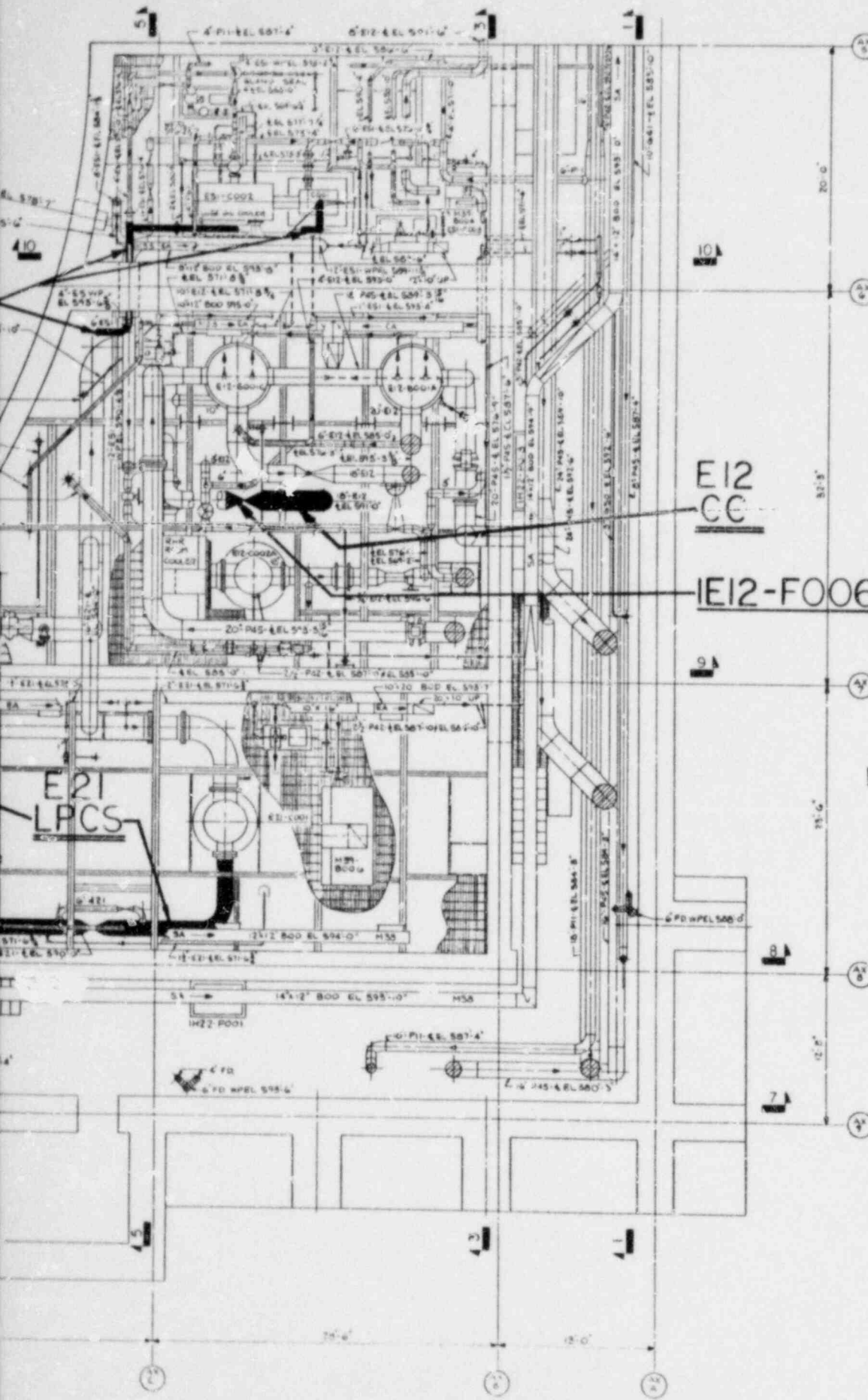
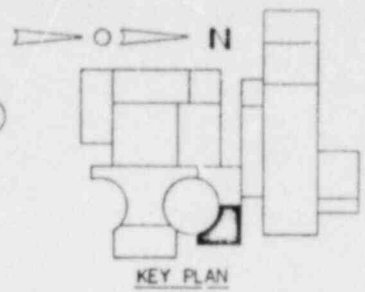
4.8

4.7



4.7

4.8

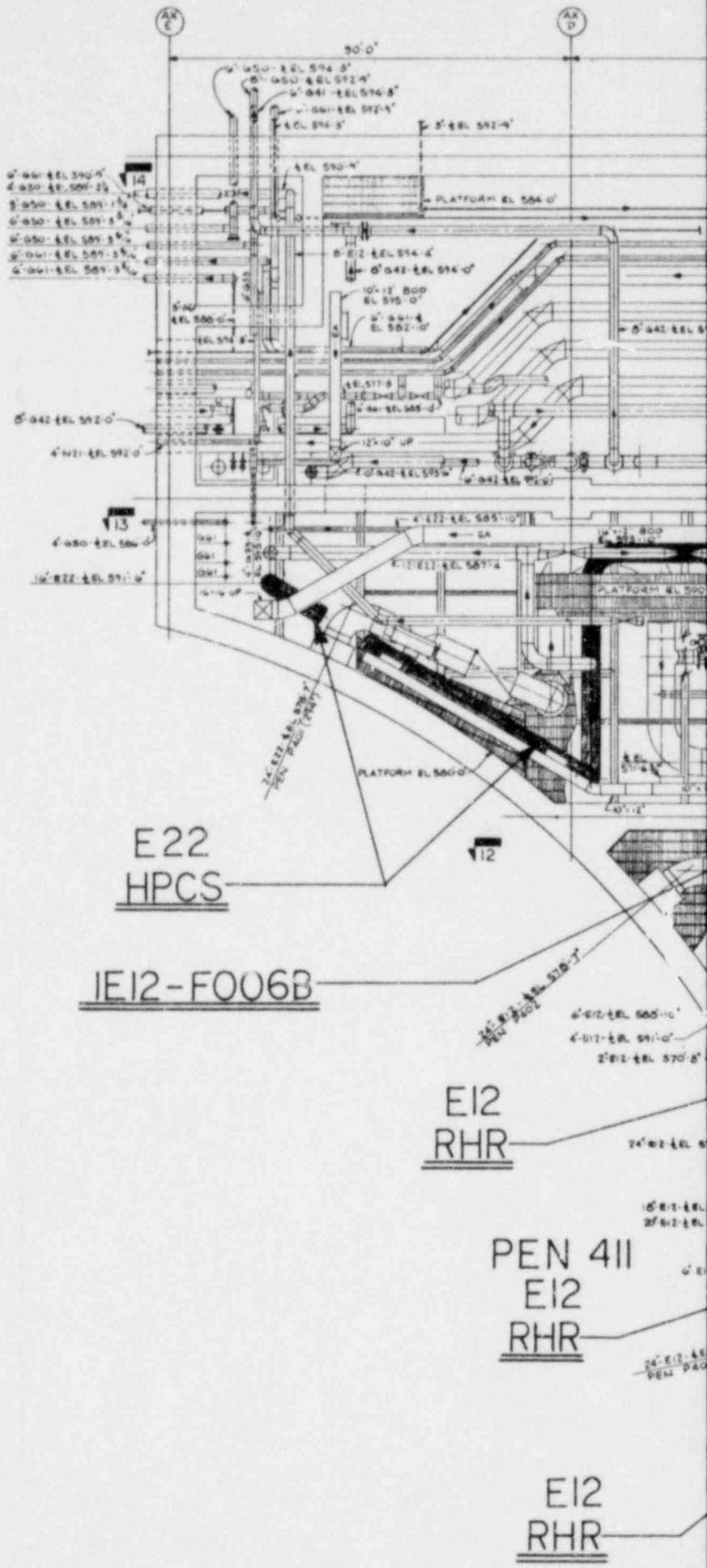


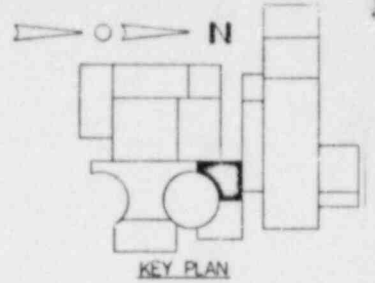
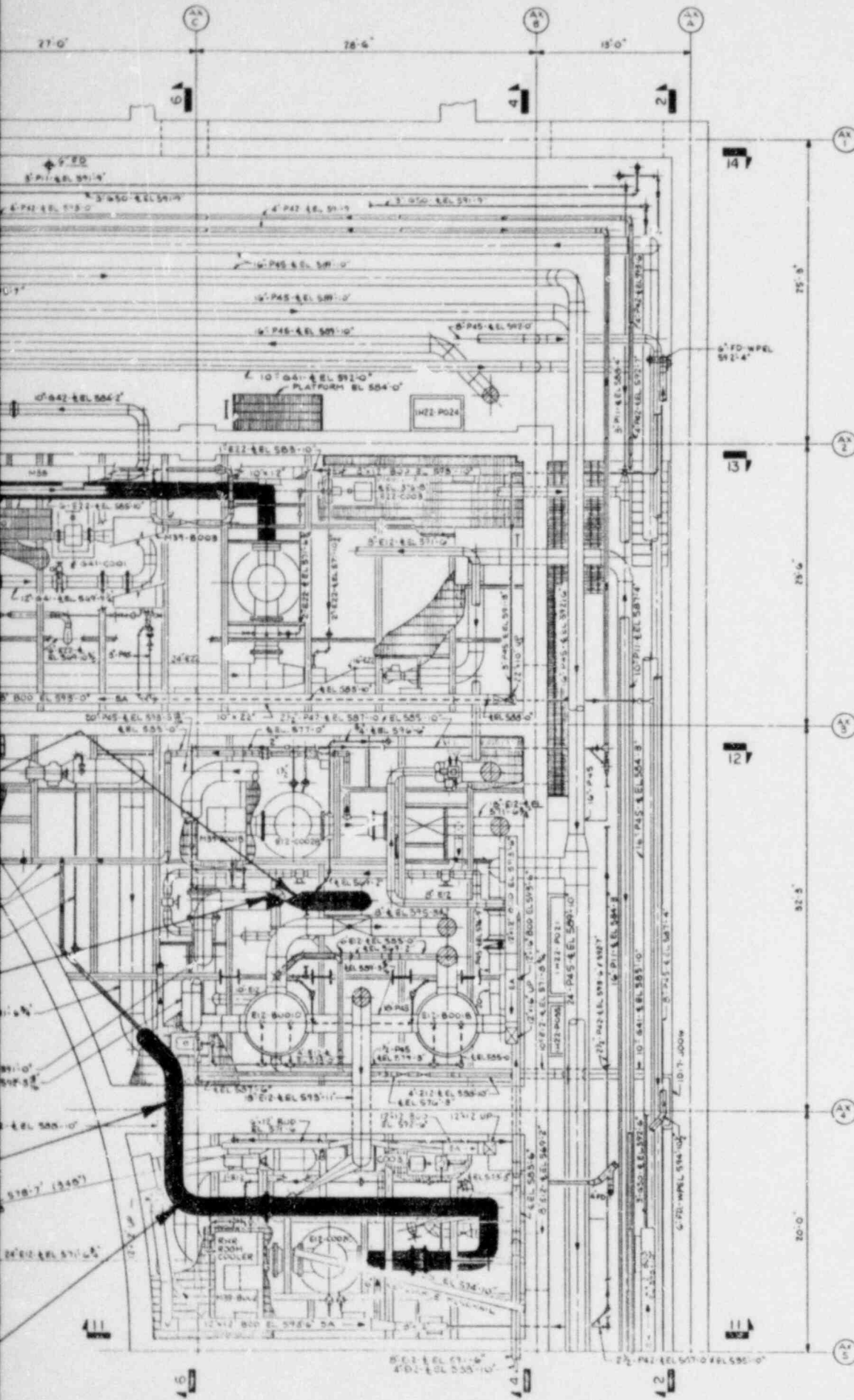
E12
CC

IE12-F006A

REFERENCE:
USE THIS DRAWING
IN CONJUNCTION WITH
DRAWING C-021-001

FOR
CONTROL OF
HEAVY
LOADS ONLY





REFERENCE:
USE THIS DRAWING
IN CONJUNCTION WITH
DRAWING G-021-001

FOR
CONTROL OF
HEAVY
LOADS ONLY

KEY TO DRAWING 021-002

El. 593'-6", 599'-0", 600'-6", 602'-6", 605'-6"

<u>EQUIPMENT</u>	<u>TAG NUMBER</u>
Instrument Air Receiver Tank A	1P57-A001B 2P57-A001B
HVAC Pump Room Control Panel	1H51-P037 2H51-P037
Control Rod Drive Mechanism	1B13-D008 2B13-D008
<u>Valves</u>	
Penetration 421 Inboard Isolation	1E12-F009 2E12-F009
Pump test to suppression Pool	1E12-F024A/B 2E12-F024A/B
RHR to Heat Exchanger Isolation	1E12-F047A/B 2E12-F047A/B
RHR Balancing Valve	1E12-F048A/B 2E12-F048A/B
RCK Turbine Exhaust to Suppression Pool Isolation	1E51-F068 2E51-F068

LIFTING DEVICE Hoist 34-1, 34-2 (1L51-E039, 2L51-E039)

BUILDING: Auxiliary

ELEVATION: 610'-1"

IMPACT AREA: COLUMN LINE AX-4 to AX-6; AX-B to AX-C

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch Cover 10,000 lbs (max)		599-0"	E	There is no safety-related equipment in the impact area on this elevation
1H-AB-2 1H-AB-3 2H-AB-2 2H-AB-3	RHR Pump C 1E12-C002C 2E12-C002C	568'-4"	B	There are two other trains of RHR
	RHR "C" Piping		B	There are two other trains of RHR

002-2

LIFTING DEVICE Hoist 35-1, 35-2 (1L51-E036, 2L51-E036)

BUILDING: Auxiliary

ELEVATION: 618'-1"

IMPACT AREA: COLUMN LINE AX-2 to AX-3; AX-B to AX-C

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch removal and high-pressure core spray	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
28,000 lbs (max) 1H-AB-7 2H-AB-7	High-pressure core spray pump 1E21-C001 2E21-C002 and associated piping	568'-4"	B	If HPCS is damaged, there is LPCS, RCIC, and RHR remaining

002-3

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002 —

LIFTING DEVICE Hoist 42-A, B (L51-E070)

BUILDING: Fuel Handling

PERRY HEAVY LOADS STUDY

ELEVATION: 610'-0"

IMPACT AREA: COLUMN LINE IB-9 to IB-8; IB-CC to Centerline Between Units

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
CRD maintenance equipment				Less than 1048 lbs; therefore, does not require consideration

LIFTING DEVICE Hoist 43 (2L51-E065)

BUILDING: Unit 2 Reactor Building

ELEVATION: 618'-6-1/4"

IMPACT AREA: COLUMN LINE See Dwg. 021-002

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
CRD and cask removal 6000 lbs (max)	None	604-11-1/4"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	Suppression pool floor

002-5

LIFTING DEVICE Hoist 44 (1L51-E040 A, B)

BUILDING: Reactor Building Unit 1

ELEVATION: 619'-3-3/4"

IMPACT AREA: COLUMN LINE See Dwg. 021-002

TO BE USED
IN CONJUNCTION WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Reactor Recirculation Pump Removal 66,000 lbs (max)	None	604'-11-1/4"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	Suppression pool floor

002-6

LIFTING DEVICE Hoist 45-1, 45-2 (1L51-E041 A, B; 2L51-E041 A, B)

BUILDING: Reactor Building Annulus

ELEVATION: 619'-3/4"

IMPACT AREA: COLUMN LINE See Dwg. 021-002

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Reactor Recirculation Pump Motor Removal 66,000 lbs (max)	None	599'-9"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	There is no safety-related equipment at this elevation

LIFTING DEVICE Hoist 49-1, 49-2 (1L51-E043, 2L51-E043)

BUILDING: Reactor Building

ELEVATION: 607'-3"

IMPACT AREA: COLUMN LINE See Dwg. 021-002

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Drywell personnel lock equipment removal 6000 lbs (max)	None	604'-11-1/4"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	There is no safety-related equipment at this elevation in the impact area

002-8

LIFTING DEVICE Hoist 50-1, 50-2 (1L51-E043, 2L51-E043)

BUILDING: Reactor Building and Intermediate Building

ELEVATION: 606'-3"

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (50-1) IB-C to IB-E; (50-2) IB-L to IB-N
IB-5 to IB-2 IB-5 to IB-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
CRD alternate removal through personnel hatch to Intermediate Building	None	604'-11-1/2"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	There is no safety-related equipment in the impact area at this elevation

LIFTING DEVICE Hoist 51-1, 52-2 (1L51-E044, 2L51-E044)

BUILDING: Reactor Building

ELEVATION: 625'-0"

IMPACT AREA: COLUMN LINE See Dwg. 021-002

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
CRD and cask removal to drywell 6000 lbs (max)	None	599'-9"	E, F	There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E, F	There is no safety-related equipment in the impact area at this elevation

002-10

LIFTING DEVICE Hoist 58 (L51-E050)

BUILDING: Control Complex

ELEVATION: 612'-6"

IMPACT AREA: COLUMN LINE CC-D to CC-C; CC-5 to CC-4

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Nuclear Closed Cooling Pump Maintenance 6385 lbs (max)	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
	ECC Heat Exchangers 1P42-B001B 2P42-B001B	574'-10"	B	Train A Heat Exchangers are in an adjacent cubicle and cannot be damaged with this load drop

002-11

LIFTING DEVICE Hoist 59 (L51-E050)

BUILDING: Control Complex

ELEVATION: 612'-6"

IMPACT AREA: COLUMN LINE CC-D to CC-E; CC-5 to CC-4

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Nuclear Closed Cooling Pump Maintenance 6385 lbs (max)	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
	ECC Heat Exchangers 1P42-B001B 2P42-B001B	574'-10"	B	Train A Heat Exchangers are in an adjacent cubicle

002-12

LIFTING DEVICE Hoist 60 (151-E050)

BUILDING: Control Complex

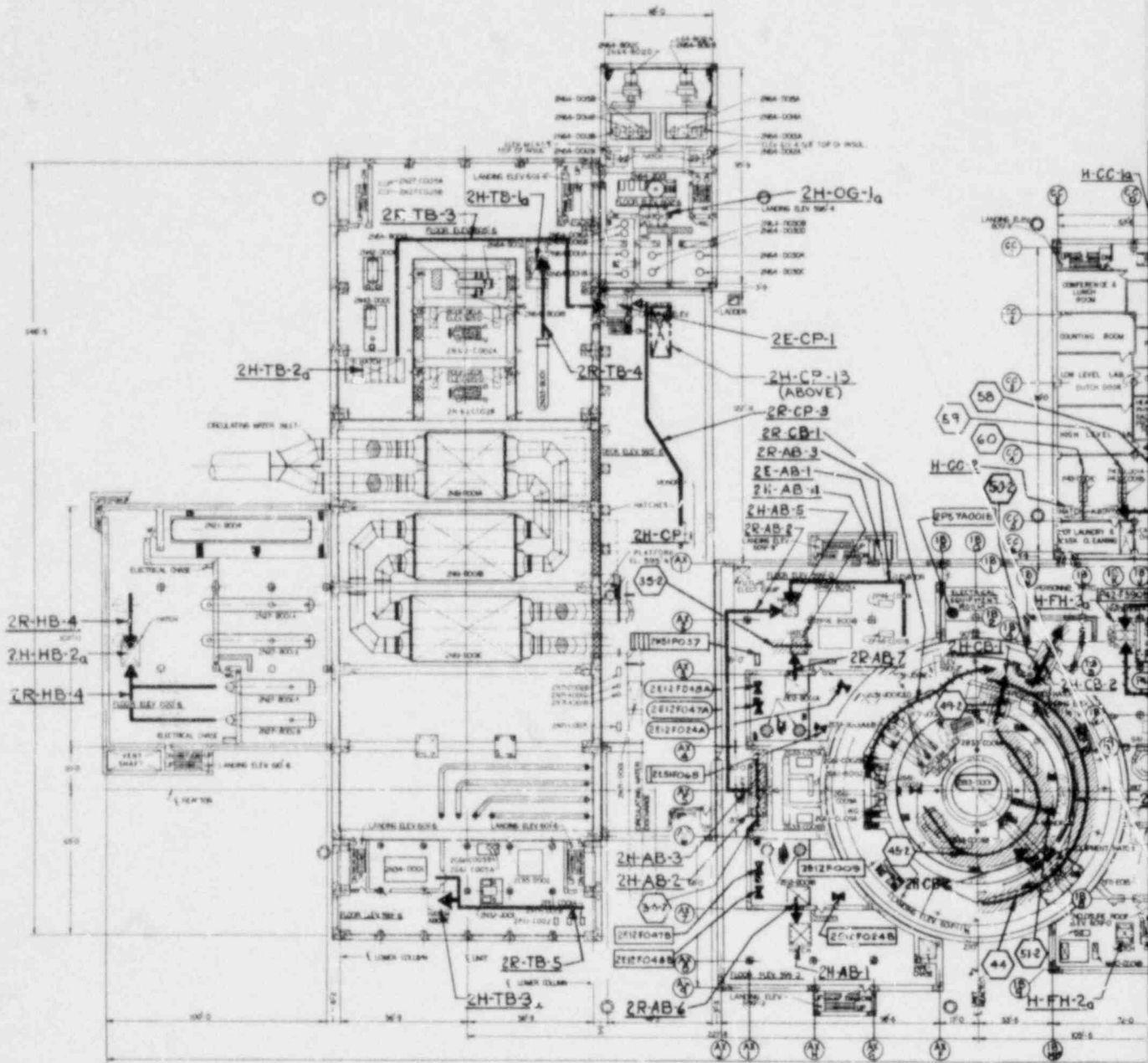
ELEVATION: 612'-6"

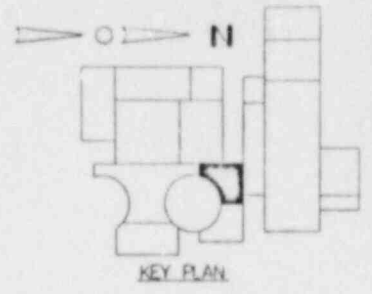
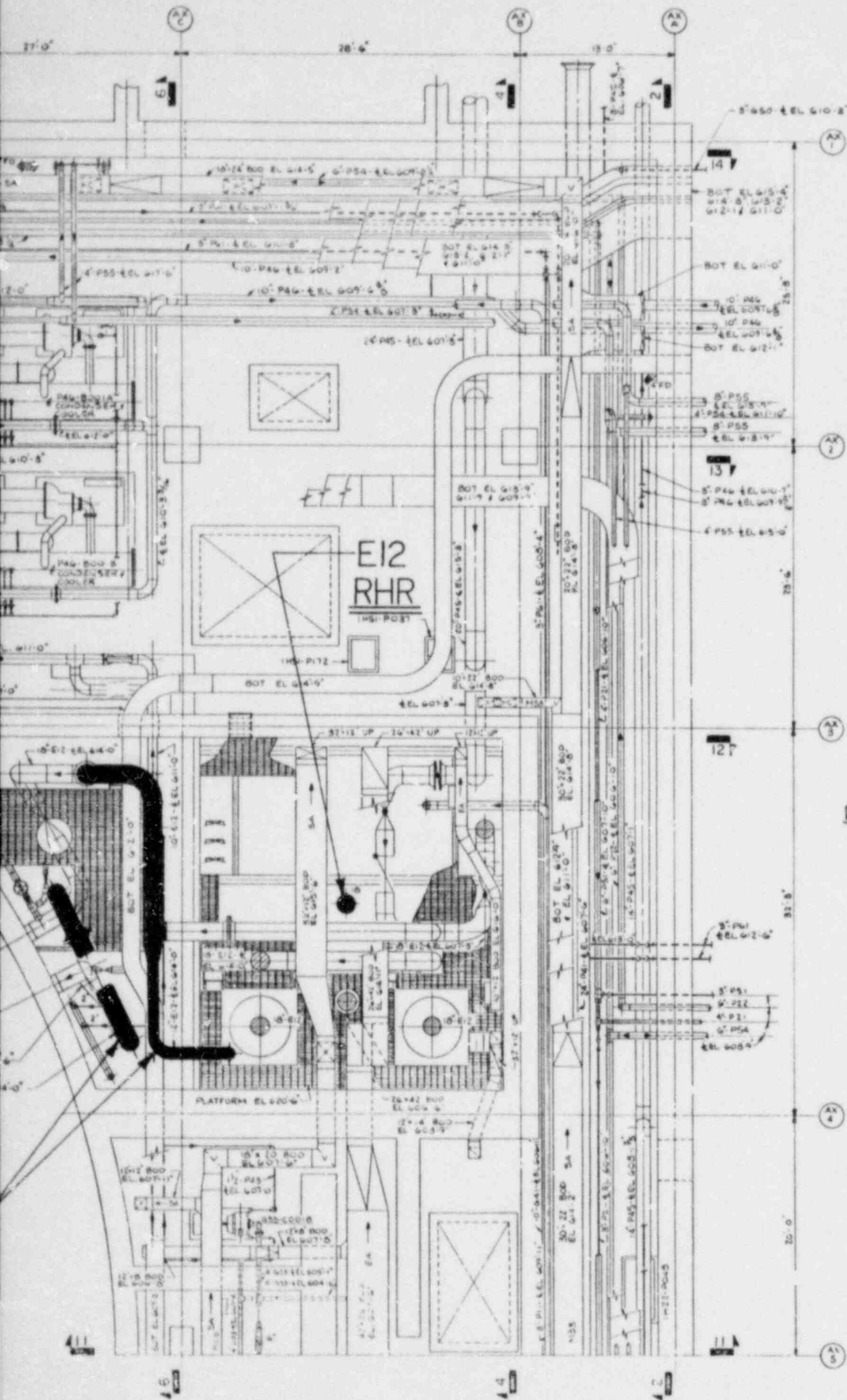
IMPACT AREA: COLUMN LINE CC-D to CC-E; CC-5 to CC-4

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-002

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Nuclear Closed Cooling Pump Maintenance 6385 lbs (max)	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
	ECC Pumps 1P42-C001B 2P42-C001B	574'-10"	B	Train A Pumps are in an adjacent cubicle and cannot be damaged in





REFERENCE:
 USE THIS DRAWING IN
 CONJUNCTION WITH
 DRAWING - C-021-002

FOR
 CONTROL OF
 HEAVY
 LOADS ONLY

KEY TO DRAWING 021-003

El. 620'-6", 623'-6", 624'-6"

<u>CONTROL COMPLEX</u>	<u>TAG NUMBER</u>	<u>TAG NUMBER</u>
Neutron Monitoring Preamp Panels, SRM/IRM Cabinets	1H22-P030	2H22-P030
	1H22-P031	2H22-P031
	1H22-P032	2H22-P032
	1H22-P033	2H22-P033
480V Switchgear Bus	1R23-S009	2R23-S009
	1R23-S010	2R23-S010
	1R23-S011	2R23-S011
	1R23-S012	2R23-S012
Motor Control Centers	1R24-S018	2R24-S018
	1R24-S019	2R24-S019
	1R24-S021	2R24-S021
	1R24-S022	2R24-S022
	1R24-S023	2R24-S023
	1R24-S024	2R24-S024
	1R24-S026	2R24-S026
	1R24-S028	2R24-S028
4.16 KV Switchgear bus	R24-S020	R24-S036
	R24-S035	R24-S037
4.16 KV Switchgear bus	1R22-S006	2R22-S006
	1R22-S007	2R22-S007
Remote Shutdown Panel	1C61-P001	2C61-P001
Emergency diesel Generators	1R43-S001A	
	1R43-S001B	
	2R43-S001A	
	2R43-S001B	
D. G. High Voltage Exciter Cabinet	1R43-S002A	
	1R43-S002B	
	2R43-S002A	
	2R43-S002B	
D. G. Generator Control Panel	1H51-P0055A	
	1H51-P0055B	
	2H51-P0055A	
	2H51-P0055B	
Starting Air Receiver Tanks	1R44-A001A	2R44-A001A
	1R44-A001B	2R44-A001B
	1R44-A002A	2R44-A002A
	1R44-A002B	2R44-A002B

Key
Drawing 021-003 Cont'd.

<u>CONTROL COMPLEX</u>	<u>TAG NUMBER</u>	
Fuel Oil Transfer Pumps	1R45-C001A	2R45-C001A
	1R45-C001B	2R45-C001B
	1R45-C002A	2R45-C002A
	1R45-C002B	2R45-C002B
Fuel Oil Day Tank	1R45-A003A	2R45-A003A
	1R45-A003B	2R45-A003B
Diesel Generator Engine Control Panel	1H51-P0054A	2H51-P0054A
	1H51-P0054B	2H51-P0054B
Diesel Generator Fuel Oil Storage Tanks	1R45-A002A	2R45-A002A
	1R45-A002B	2R45-A002B
<u>Reactor Building</u>		
Instrument Air System Air Receiver Tank (Fuel Handling Bldg.)	2P57-A001A	
Instrument Air System Air Receiver Tank (Aux. Bldg.)	1P57-A001A	
Mainsteam Flow Instrument Racks	1A	1H22-P015
	1B	1H22-P025
	1C	1H22-P042
	1D	1H22-P041
	2A	2H22-P015
	2B	2H22-P025
	2C	2H22-P042
	2D	2H22-P041
Reactor Pressure and Level Instrument Rack	1A	1H22-P004 A,B,C
	1B	1H22-P027
	1C	1H22-P005
	1D	1H22-P026
	2A	2H22-P004A,B,C
	2B	2H22-P027
	2C	2H22-P005
	2D	2H22-P026
Control Rod Drive Hydraulic Control Units	1C11-D001	
	2C11-D001	
<u>Valves</u>		
First Main Steam Isolation Valves	1B21-F022A/B/C/D	
	2B21-F022A/B/C/D	

Key
Drawing 021-003 Cont'd.

Second Main Steam Isolation Valves	1B21-F028A/B/C/D 2B21-F028A/B/C/D
Main Steam Relief Valves	1B21-F041A/B/L/F 2B21-F041A/B/E/F 1B21-F047D/H 2B21-F047D/H 1B21-F051C/G 2B21-F051C/G
Penetration 153 Outboard Isolation	1E51-F013 2E51-F013
Penetration 422 Inboard Isolation	1E51-F063 2E51-F063
Penetration 422 Outboard Isolation	1E51-F064 2E51-F064
E51-F063 Bypass	1E51-076 2E51-076
LPCI Penetration 113 Inboard Isolation	1E12-F042A 2E12-F042A
LPCI Penetration 412 Inboard Isolation	1E12-F042B 2E12-F042B
Penetration 113 Outboard Isolation	1E12-F027A/B 2E12-F027A/B
Mainsteam to RHR Heat Exchanger Isolation	1E12-F052A/B 2E12-F052A/B
RHR to Feedwater Isolation	1E12-F053A/F 1E12-F053A/B 1E12-F008 2E12-F008

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

LIFTING DEVICE Fuel Handling Machine Auxiliary hook

BUILDING: Fuel Handling Building

ELEVATION: 620'-5"

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (Over Spent Fuel Pools)

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Fuel Pool Gates (<1000 lbs in water)	None	620'-6"	E	Fuel gates are not moved unless the pools are flooded (weight of gate in water is <1000 lbs). In addition, path for gates does not go over spent fuel

003-4

LIFTING DEVICE Hoist 36

BUILDING: Intermediate

ELEVATION: 637'-4"

IMPACT AREA: COLUMN LINE IB-L to IB-J; IB-3 to IB-2

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
12,000 lbs. (max)	None	620'-6"	E	There is no safety-related equipment in the impact area at this elevation.
		599'-0"	E	There is no safety-related equipment in the impact area at this elevation.
		574'-10"	E	There is no safety-related equipment in the impact area at this elevation.

003-5

LIFTING DEVICE Hoist 37-1, 37-2 (1L51-E038, 2L51-E038)

BUILDING: Auxiliary Building

ELEVATION: 644'-9"

IMPACT AREA: COLUMN LINE AX-1 to AX-2; AX-H to AX-J
AX-A to AX-C

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch Removal 28,000 lbs (max)	None	620'-6"	E	There is no safety-related equipment in the impact area at this elevation
	High-Pressure Core Spray Piping	599'-0"	B	There are other trains of ECCS available
	None	568'-4"	E	There is no safety-related equipment in the impact area at this elevation
	High-Pressure Core Spray Piping	574'-10"	B	There are other trains of ECCS available

LIFTING DEVICE Hoist 38-1, 38-2 (1L51-E039, 2L51-E039)

BUILDING: Auxiliary

ELEVATION: 638'-6"

IMPACT AREA: COLUMN LINE AX-I to AX-J; AX-7 to AX-8

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Low-Pressure Core Spray Pump 14,500 lbs (max)	None	620'-0"	E	There is no safety-related equipment in the impact area at this elevation
	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
	Low-Pressure Core Spray Piping	599'-0"	B	There are 3 trains of RHR remaining
	None	568'-4"	E	There is no safety-related equipment in the impact area at this elevation
	Low-Pressure Core Spray Piping	574'-10"	B	There are 3 trains of RHR remaining

003-7

LIFTING DEVICE Hoist 39-1, 39-2 (1L51-E035, 2L51-E035)

BUILDING: Auxiliary

ELEVATION: 620'-4"

IMPACT AREA: COLUMN LINE AX-3 to AX-4; AX-I to AX-H

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
RHR Pump A 16,000 lbs (max)	None	620'-6"	E	There is no safety-related equipment in the impact area at this elevation
	RHR A Pump Piping	599'-0"	B	There are 2 other trains of RHR
	RHR A Pump 1E12-C002A 2E12-C002A	568'-4"	B	There are 2 other trains of RHR
	Pump Room Air Handling Units 1M39-B001A 2M39-B001A			
	RHR A Pump Piping			

003-8

LIFTING DEVICE Hoist 40-1, 40-2 (1L51-E035, 2L51-E035)

BUILDING: Auxiliary

ELEVATION: 620'-4-1/2"

IMPACT AREA: COLUMN LINE AX-6 to AX-7; AX-I to AX-H

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
RHR Pump B 16,000 lbs (max)	None	620'-0"	E	There is no safety-related equipment in the impact area at this elevation
	RHR "B" Pump Piping	599'-0"	B	There are two other trains of RHR
	RHR B Pump 1E12-C002B 2E12-C002B	568'-4"	B	There are two other trains of RHR
	Pump Room Air Handling Units 1M39-B001B 2M39-B001C			
	"B" Pump Piping			

003-9

LIFTING DEVICE Hoist 41-1, 41-2 (1L51-E066, 2L51-E066)

BUILDING: Fuel Handling

ELEVATION: 641'-6"

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-C03

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (41-2) IB-J to IB-K (41-1) IB-6 to IB-H
IB-7 to IB-8 IB-7 to IB-8

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch cover removal for fuel transfer tube drain valve compartments	None	620'-6"	E	There is no safety-related equipment in the impact area at this elevation
	None	599'-0"	E	There is no safety-related equipment in the impact area at this elevation
	None	583'-3"	E	There is no safety-related equipment in the impact area at this elevation

003-10

LIFTING DEVICE Hoist 54-1A, B; 54-2A, B (1L51-E047, 2L51-E047)

BUILDING: Diesel Generator

ELEVATION: 644'-4-1/2"

IMPACT AREA: COLUMN LINE (54-1A and B)

DG-D to DG-C (54-2A and B)
 DG-1 to DG-2

TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7000 kW Diesel Generator Maintenance 1500 lbs (max)	7000 kW DG A 1A435001A 2R435001A Fuel Oil Transfer Pumps 1R45-C001A, 2A 2R45-C001A, 2A Fuel Oil Day Tanks 1R45-A003A 2R45-A003A DC Engine Control panel 1H51-P054A 2H52-P054A Exciter Cabinet 1R435-002A 2R435-002A	620'-6"	E	There is a redundant Diesel Generator and accessories

003-11

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

LIFTING DEVICE Hoist 54-1C, D; 54-2C, D (1L51-E047, 2L51-E047)

BUILDING: Diesel Generator

PERRY HEAVY LOADS STUDY

ELEVATION: 644'-4-1/2"

IMPACT AREA: COLUMN LINE (54-1C and D) DG-A to DG-B (54-2C and D) DG-E to DG-D
DG-1 to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7000 kW Diesel Generator Maintenance 1500 lbs (max)	7000 kW "B" Diesel Generator 1R43-5001B 2R43-5001B Fuel Oil Transfer Pumps 1R45-C001B, 2B 2R45-C001B, 2B Fuel Oil Day Tanks 1R45-A003B 2R45-A003B D.G. Engine Control Panel 1H41P054B 2H51P054B Exciter Cabinet 1R435002B 1R435002B	620'-6"	E	There is a redundant Diesel Generator and accessories

003-12

TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-003

LIFTING DEVICE Hoist 55-1A, 55-2A (1L51-E048, 2L51-E048)

BUILDING: Diesel Generator

PERRY HEAVY LOADS STUDY

ELEVATION: 644'-4-1/2"

IMPACT AREA: COLUMN LINE 55-1A DG-C to DG-D 55-2A DG-D to DG-E
 DG-1 to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7000 kW Diesel Generator Rotor 39,000 lbs (max)	Diesel Generator A High Voltage Exciter Cabinet Generator Control Panel	620'-6"	E	There is a redundant Diesel Generator

003-13

TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-003

LIFTING DEVICE Hoist 55-1B, 55-2B (1L51-E048, 2L51-E048)

BUILDING: Diesel Generator

PERRY HEAVY LOADS STUDY

ELEVATION: 644'-4-1/2"

IMPACT AREA: COLUMN LINE 55-1B DG-A to DG-B 55-2B DG-F to DG-G
 DG-1 to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7000 kW Diesel Generator Rotor 39,000 lbs (max)	Diesel Generator A 1R43-5001B 2R43-5001B High Voltage 1R43-5002B 2R43-5002B Generator Control Panel 1H51-P055B 2H51-P055B	620'-6"	B	There is a redundant Diesel Generator

003-14

LIFTING DEVICE Hoist 56-1A, B (1L51-E047)
56-2A, B (2L51-E047)
 BUILDING: Diesel Generator
 ELEVATION: 644'-4-1/2"

TG SE USED
 IN CONJUNCTION
 WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (56-1A and B) DG-B to DG-C (56-2A and B) DG-e to DG-F
 DG-1 to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
2600 kW Diesel Generator Maintenance 2000 lbs (max)	None	620'-6"	E	There is no safety related equipment in the impact area at this elevation

003-15

LIFTING DEVICE 57-1, 57-2 (1L51-E049, 2L51-E049)

BUILDING: Diesel Generator

ELEVATION: 644'-4-1/2"

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE DG-B to DG-C DG-E to DG-F
DG-I to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
2600 kW Diesel Generator Rotor Removal 19,500 lbs (max)	None	620'-6"	E	There is no safety related equipment in the impact area at this elevation.

LIFTING DEVICE Hoist 63 (L51-E053)

BUILDING: Intermediate

ELEVATION: 631'-3"

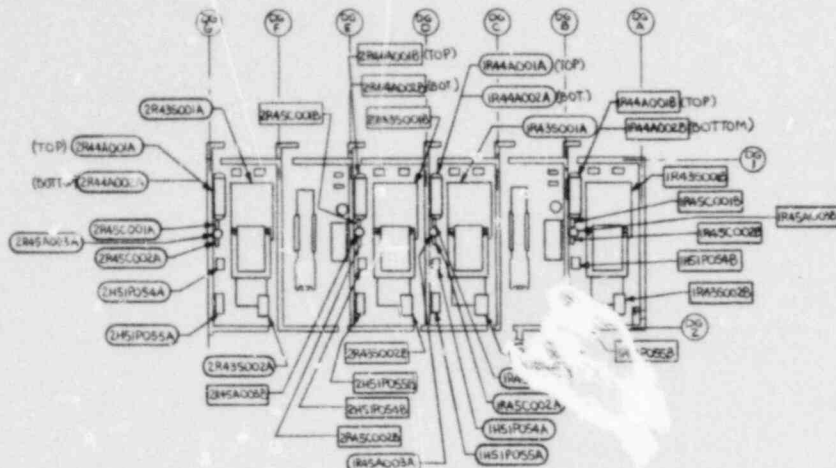
IMPACT AREA: COLUMN LINE IB-E to IB-H
IB-2 to IB-4

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-003

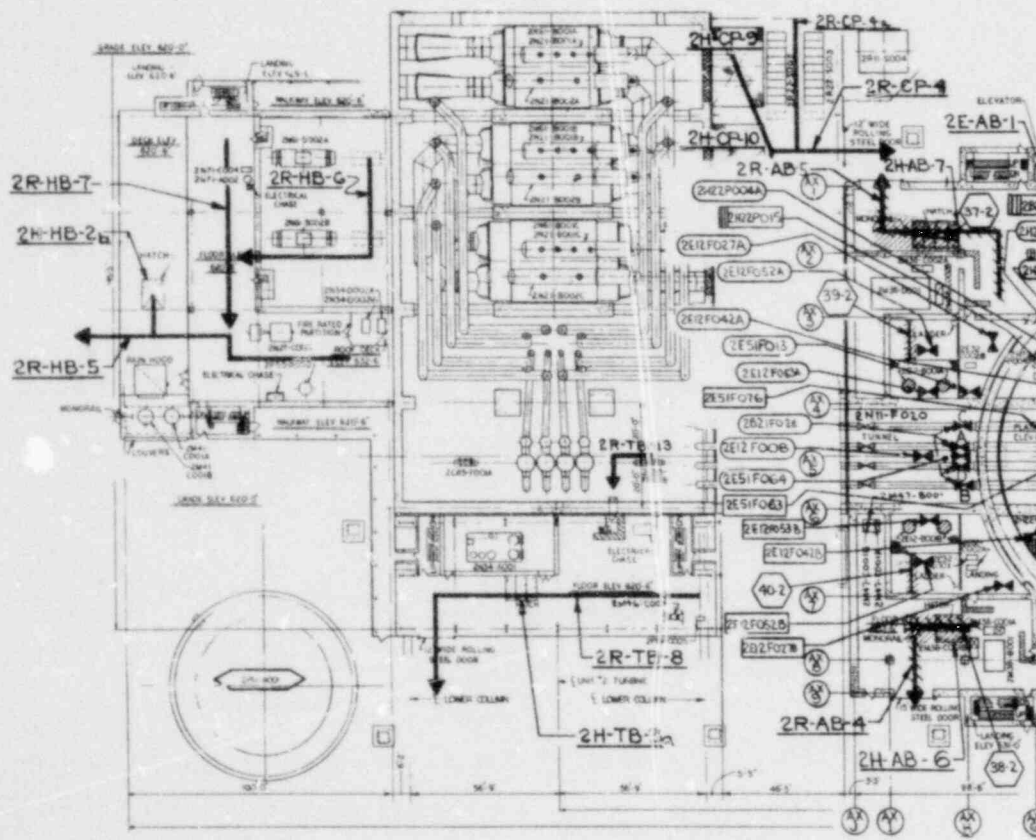
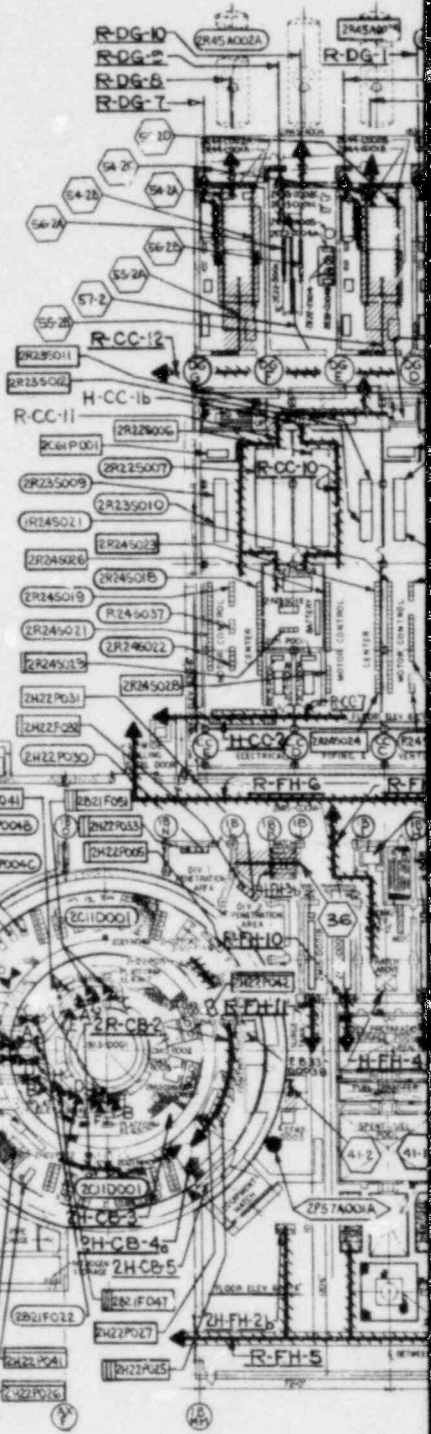
PERRY HEAVY LOADS STUDY

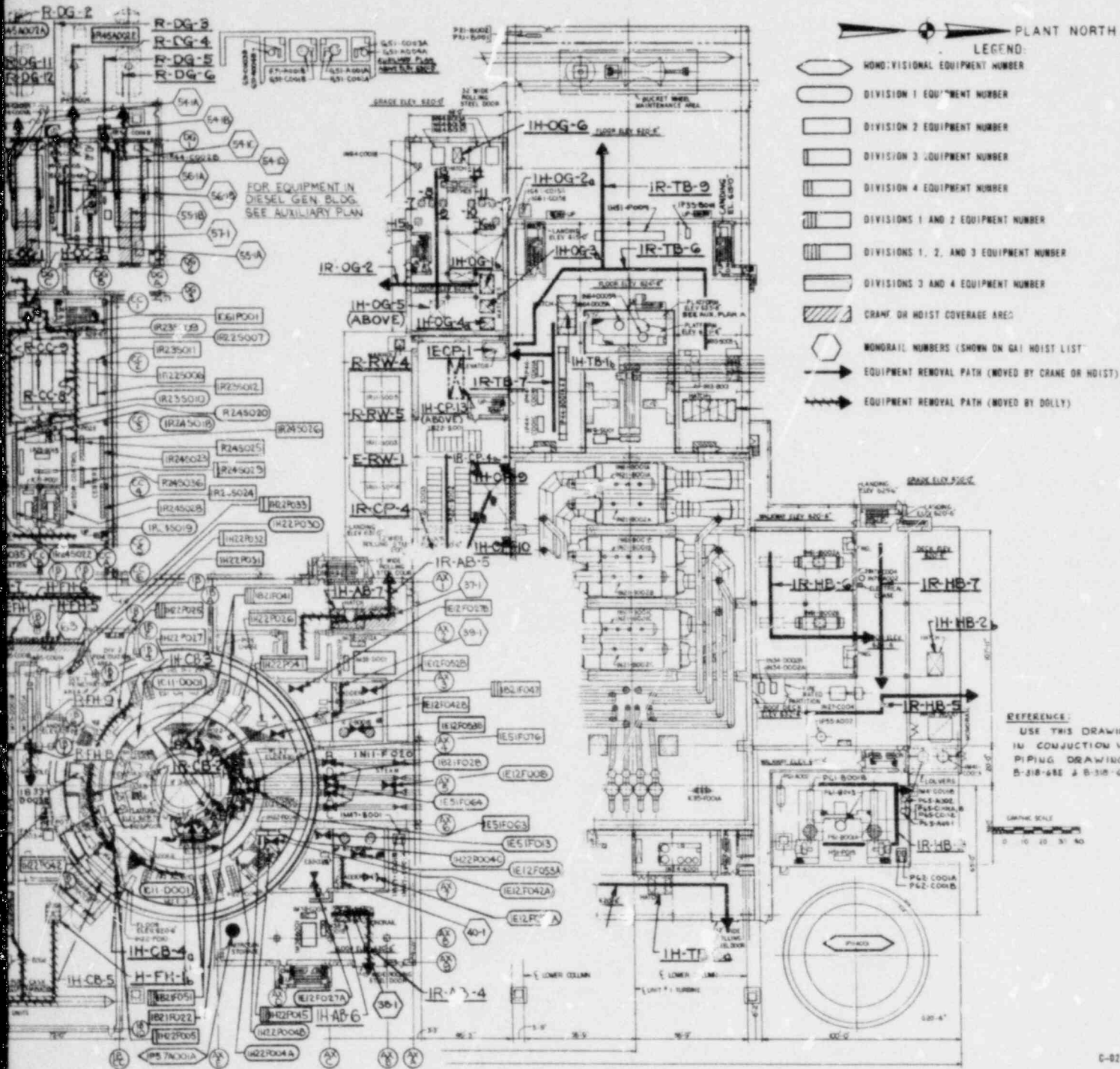
Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Fuel Pool Filter-Demineralizer Hatch Removal and Filter Maintenance 10,000 lbs (max)	None	620'-6"	E	There is no safety related equipment in the impact area at this elevation
		599'-0"	E	There is no safety related equipment in the impact area at this elevation
		574'-10"	E	There is no safety related equipment in the impact area at this elevation

003-17



AUXILIARY PLAN
DIESEL GENERATOR R.C.C.



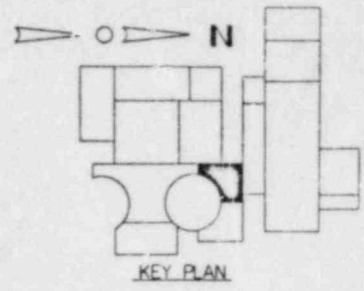
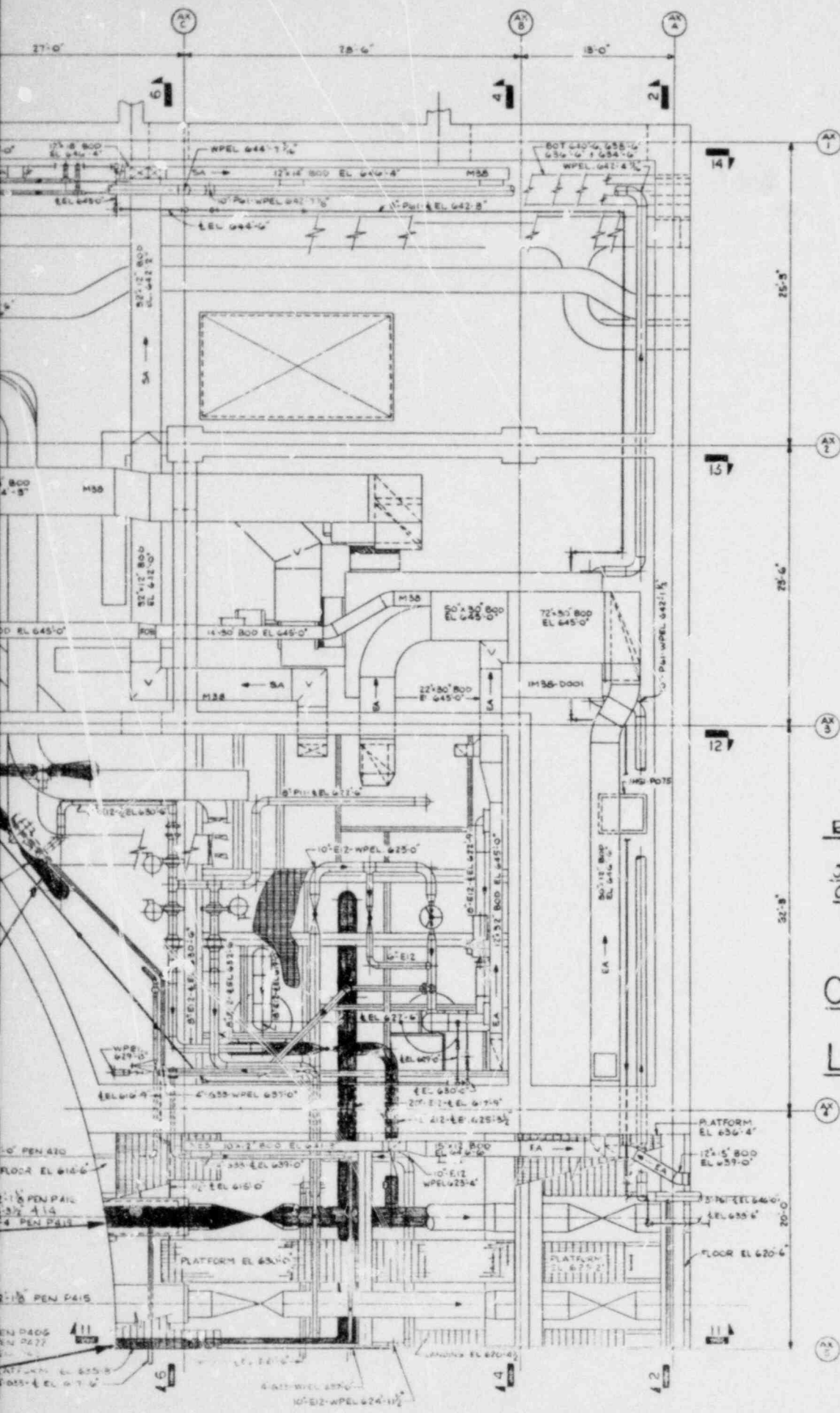


PLANT NORTH

- LEGEND:
- NON-VISUAL EQUIPMENT NUMBER
 - DIVISION 1 EQUIPMENT NUMBER
 - DIVISION 2 EQUIPMENT NUMBER
 - DIVISION 3 EQUIPMENT NUMBER
 - DIVISION 4 EQUIPMENT NUMBER
 - DIVISIONS 1 AND 2 EQUIPMENT NUMBER
 - DIVISIONS 1, 2, AND 3 EQUIPMENT NUMBER
 - DIVISIONS 3 AND 4 EQUIPMENT NUMBER
 - CRANE OR HOIST COVERAGE AREA
 - GONDRAIL NUMBERS (SHOWN ON GAI HOIST LIST)
 - EQUIPMENT REMOVAL PATH (MOVED BY CRANE OR HOIST)
 - EQUIPMENT REMOVAL PATH (MOVED BY DOLLY)

REFERENCE:
USE THIS DRAWING
IN CONJUNCTION WITH
PIPING DRAWINGS
B-218-48E & B-218-45G

GRAPHIC SCALE
0 10 20 30 40



REFERENCE:
 USE THIS DRAWING IN
 CONJUNCTION WITH DRAWING
 C-021-003

FOR
CONTROL OF
HEAVY
LOADS ONLY

KEY TO DRAWING 021-004

El. 538'-6", 642'-0", 647'-6"

<u>CONTROL COMPLEX</u>	<u>TAG NUMBER</u>	
125 VDC Switchgear Bus	1R42-S024 1R42-S025	2R42-S024 2R42-S025
125 VDC Distribution Panels no removal	1R42-S012 1R42-S013 1R42-S014	2R42-S012 2R42-S013 2R42-S014
Batteries		
Div 1	1R42-S002	2R42-S002
Div 2	1R42-S003	2R42-S003
Battery Chargers		
Div 1	1R42-S006	2R42-S006
Div 2	1R42-S008	2R42-S008
125 VDC Motor Control Centers	1R42-S015	2R42-S015
<u>Diesel Generator Area</u>		
Diesel Generator Air Intake Filters	1R48-D002A 1R48-D002B 1R48-D003A 1R48-D003B 2R48-D002A 2R48-D002B 2R48-D003A 2R48-D003B	
Diesel Generator Building Ventilation Fan	1M43-C001A 1M43-C001B 1M43-C002A 1M43-C002B	2M43-C001A 2M43-C001B 2M43-C002A 2M43-C002B
<u>Yard</u>		
Condensate Storage Tanks	1P11-A001 2P11-A001	
<u>Reactor Building</u>		
Safety/Relief ADS Valve Air Accumulators	1B21-A003A-H 2B21-A003A-H	

Key
Drawing 021-004 Cont'd.

<u>CONTROL COMPLEX</u>	<u>TAG NUMBER</u>
Standby Liquid Control Pumps	1C41-C001A 1C41-C001B 2C41-C001A 2C41-C001B
Standby Liquid Control Tanks	1C41-A001 2C41-A001
<u>Valves</u>	
Standby Liquid Control Tank Isolation	1C41-F001A/B 2C41-F001A/B
SLC Initiation Explosion Valve	1C41-F004A/B 2C41-F004A/B
Penetration 113 Inboard Isolation	1E12-F028A/B 2E12-F028A/B
RHR to Containment Pools	1E12-F038 2E12-F038

LIFTING DEVICE Hoist 53 (L51-E046)

BUILDING: Control Complex

ELEVATION: 648'-8-3/4"

IMPACT ARE.: COLUMN LINE CC-1 to CC-2; CC-C to CC-D

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-004

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch and Electrical Equipment Removal 23,000 lbs (max)	None	638'-6"	E	There is no safe shutdown equipment in the impact area at this elevation
	None	620'-6"	E	There is no safe shutdown equipment in the impact area at this elevation
	None	599'-0"	E	There is no safe shutdown equipment in the impact area at this elevation

004-3

LIFTING DEVICE Hoist 65-1A, B
65-2A, B
 BUILDING: Diesel Generator
 ELEVATION: 664'-10"

TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-004

FERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (65-1A, and B) DG-C to DG-D (65-2A, B) DG-F to DG-G
 DG-1 to DG-2 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
D.G. Air Intake Filter Outlet Pipe Removal 4500 lbs (max)	Air Intake Filters 1R48-D002A 1R48-D002B 2R48-D002A 2R48-D002B	646'-6"	B	There is a redundant Diesel Generator and accessories (Air Intake Filters 3A and 3B)
	"A" Diesel Generator 1R43-S001A 2R43-S001A	620'-6"	B	There is a redundant Diesel Generator and accessories
	Fuel Oil Transfer Pumps 1R45-C001A, 2A 2R45-C001A, 2A			
	Fuel Oil Day Tanks 1R45-A003A 2R45-A003A			
	Generator Control Panel 1H51P055A 2H51P055A			

7-700

TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-004

LIFTING DEVICE Hoist 65-1C, D
65-2C, D
 BUILDING: Diesel Generator
 ELEVATION: 644'-10"

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (65-1C, and D)

DG-A to DG-B (65-2C, D)
 DG-1 to DG-2

DG-D to DG-E
 DG-1 to DG-2

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
D.G. Air Intake Filter Outlet Piping Removal 4500 lbs (max)	Air Intake Filters 1R48-D003A, 3B 2R48-D003A, 3B	646'-6"	B	There is a redundant Diesel Generator and accessories (Air Intake Filters 2A, 2B)
	"B" Diesel Generator 1R43-S001B 2R43-S001B	620'-6"	B ~	There is a redundant Diesel Generator and accessories
	Fuel Oil Transfer Pumps 1R45-C001B, 2B 2R45-C001B, 2B			
	Fuel Oil Day Tank 1R45-A003B 2R45-A003B			
	Generator Control Panel 1H51-P055B 2H51-P055B			
	Engine Control Panel 1H51-P054B 2H51-P054B			

024-5

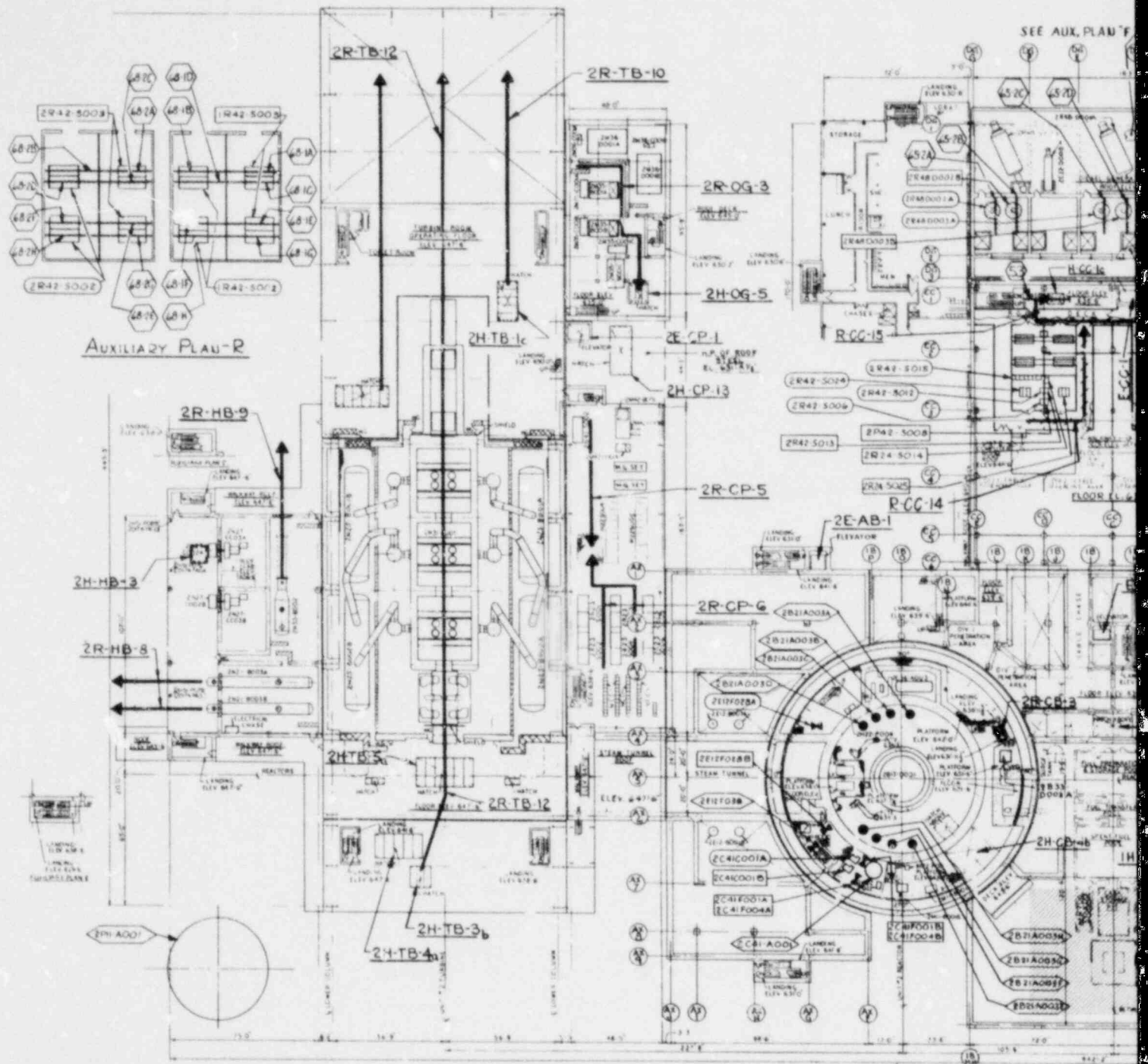
TO BE USED
 IN CONJUNCTION
 WITH DRAWING 021-004

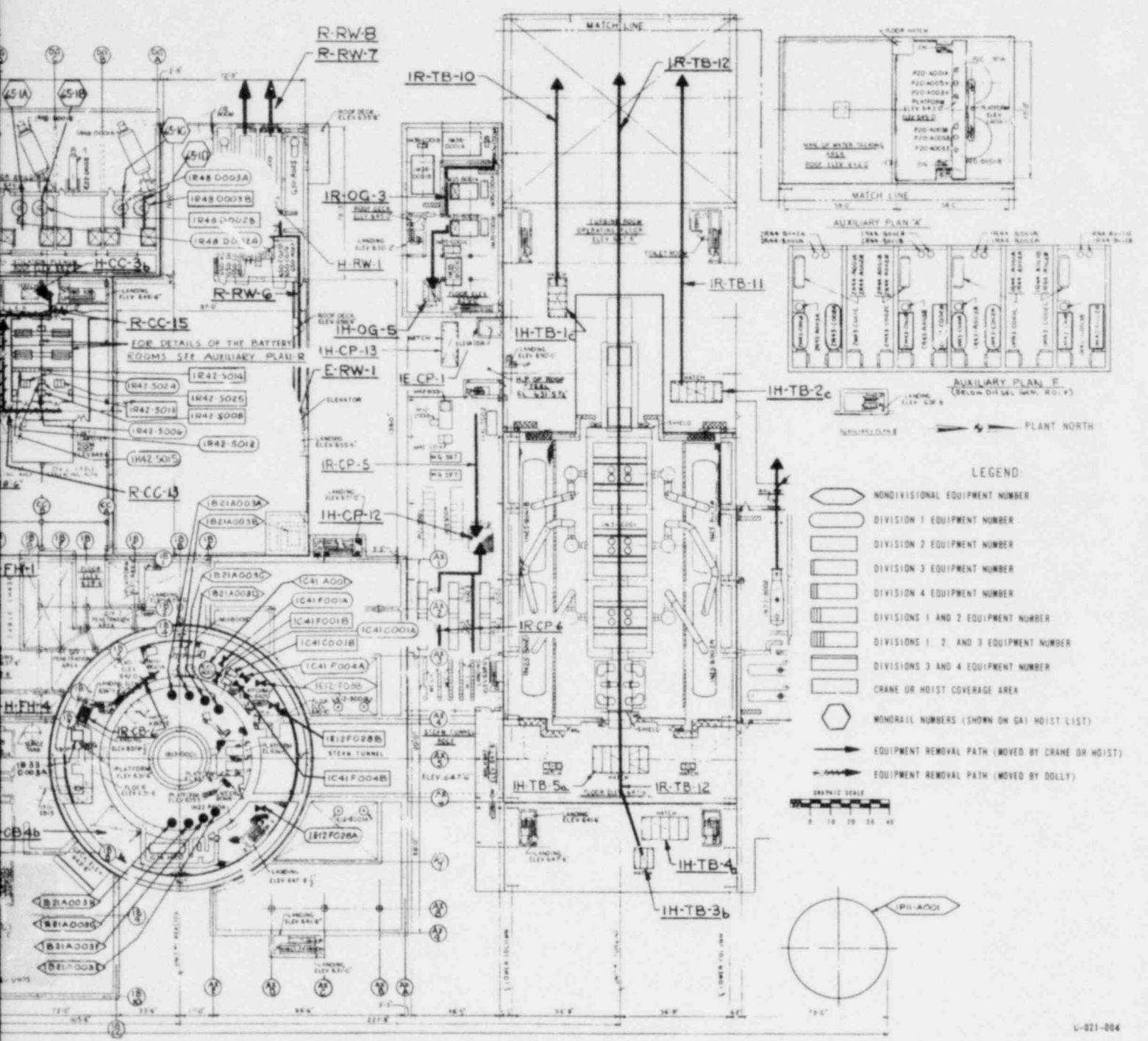
LIFTING DEVICE Hoist 68-1A to H
68-2A to H
 BUILDING: Control Complex
 ELEVATION: 634'-0"

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (68-1A-H) CC-1 to CC-3 (68-2A-H) CC-1 to CC-3
 CC-C to CC-E CC-A to CC-C

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Battery Maintenance 1000 lbs (max)			See Remarks	Load is less than 1048 lbs and does not require further consideration





KEY TO DRAWING 021-005

E1. 652'-0", 654'-6"

CONTROL COMPLEX

TAG NUMBER
NO REMOVAL REQUIRED

ECCS Bench Board	1H13-P0601	2H13-P0601
Auxiliary Relay Panels	1H13-P0618	2H13-P0618
	1H13-P0621	2H13-P0621
	1H13-P0622	2H13-P0622
	1H13-P0623	2H13-P0623
	1H13-P0628	2H13-P0628
	1H13-P0629	2H13-P0629
	1H13-P0631	2H13-P0631
	1H13-P0654	2H13-P0654
	1H13-P0655	2H13-P0655
	1H13-P0871	2H13-P0871
	1H13-P0872	2H13-P0872
1H13-P0873	2H13-P0873	
Leak Detection Monitoring	1H13-P0632	2H13-P0632
	1H13-P0642	2H13-P0642
Control Rod Position Panel	1H13-P0651	2H13-P0651
	1H13-P0652	2H13-P0652
Control Rod Drive Control Instrumentation Panel	1H13-P0653	2H13-P0653
Neutron Power and Radiation Instrumentation Panel	1H13-P0669	2H13-P0669
	1H13-P0670	2H13-P0670
	1H13-P0671	2H13-P0671
	1H13-P0672	2H13-P0672
Unit Control Console	1H13-P0680	2H13-P0680
RPS Instrumentation and Auxiliary Relay Panel	1H13-P0691	2H13-P0680
	1H13-P0692	2H13-P0692
	1H13-P0693	2H13-P0693
	1H13-P0694	2H13-P0694
HVAC Control Panel	1H13-P0800	2H13-P0800
Analog Loop Instrument Panel	1H13-P0868	2H13-P0868
	1H13-P0869	2H13-P0869
Diesel Generator Bench Board	1H13-P0877	2H13-P0877
Containment/Drywell Isolation Valve Pane	1H13-P0881	2H13-P0881
	1H13-P0882	2H13-P0882

Key
Drawing 021-005 Cont'd.

CONTROL COMPLEX

TAG NUMBER
NO REMOVAL REQUIRED

Common Analog Loop Instrumentation
and Auxiliary Relay Panel

H13-P0969

Common Long Response Panel

H13-P0970

Common HVAC Control panel

H13-P0904

LIFTING DEVICE Hoist 64-1, 64-2A, B, C, D (1L51-E054A, B, C, D;
2L51-E054, A, B, C, D)

BUILDING: Steam Tunnel

ELEVATION: 674'-6"

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-005

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE AX-J to AX-H; AX-4 to AX-6

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Main Steam Isolation Valves 30,000 lbs (max)	Main Steam Isolation Valves		F	Lift during cold shutdown will not cause design basis accident
	RHR piping (shutdown cooling mode)		B	The emergency core cooling mode (separate pipe routing) for the RHR can be utilized if the shutdown cooling mode is jeopardized

005-3

LIFTING DEVICE Hoist 71 (L51-E059)

BUILDING: Fuel Handling

ELEVATION: 644'-6"

IMPACT AREA: COLUMN LINE IB-7; IB-G to IB-J

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-005

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Jib Crane 3000 lbs (max)	None	639'-6"	E	There is no safety related equipment in the impact area at this elevation
	None	629'-0"	E	There is no safety related equipment in the impact area at this elevation

005-4

LIFTING DEVICE Hoist 72 (L51-E060)

BUILDING: Fuel Handling

ELEVATION: 644'-6"

IMPACT AREA: COLUMN LINE IB-7; IB-G to IB-J

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-005

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Fuel prep machine maintenance 1000 lbs (max)			less than 1048 lbs	Weighs less than 1048 lbs and does not require further consideration

005-5

LIFTING DEVICE Hoist 75-1, 75-2 (1L51-E063, 2L51-E063)

BUILDING: Reactor Building

ELEVATION: 658'-0"

IMPACT AREA: COLUMN LINE See Drawing 021-005

TO BE
IN CONJUNCTION
WITH DRAWING 021-005

PERRY . WY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
MISV and relief valve maintenance 3500 lbs (max)	None	646'-0"	E	There is no safety related equipment in the impact area at this elevation
	Safety Relief ADS Valve Air Accum 1B21-A003A-H 2B21-A003A-H	631'-6"	F	Operability not required during cold shutdown
	RHR Train A and B piping	631'-6"	B	Train C and RHR via feedwater (N27) is available
	RHR via feedwater (N27) RHR Dropline	620'-6"	B	Trains A, B, and C of RHR are available

005-6

LIFTING DEVICE Hoist 76-1, 76-2 (1L51-E064, 2L51-E064)

BUILDING: Reactor Building

ELEVATION: 658'-0"

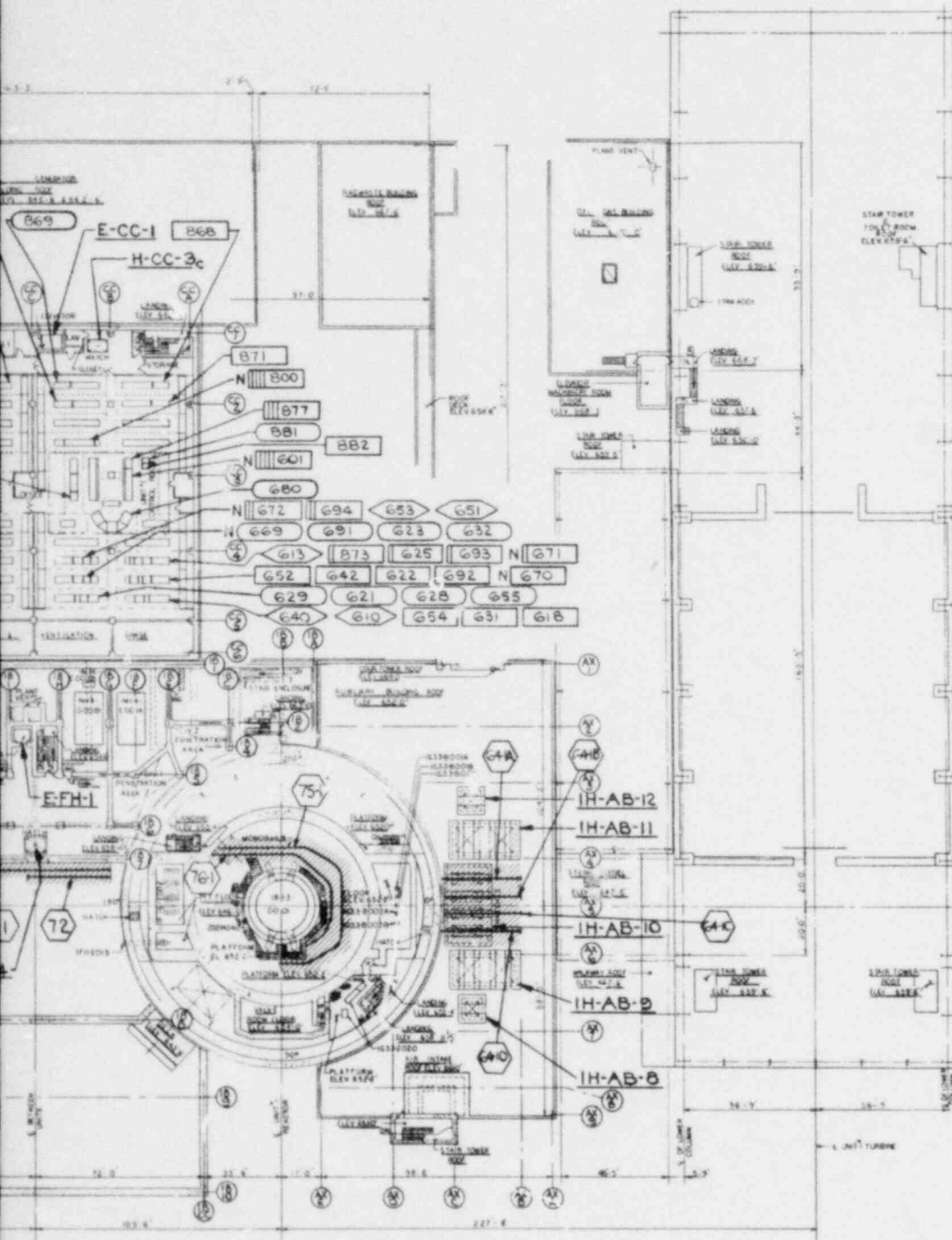
IMPACT AREA: COLUMN LINE See Drawing 021-005

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-005

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
MSIV and relief valve maintenance 3500 lbs (max)	None	646'-0"	E	There is no safety related equipment in the impact area at this elevation
	Safety Relief ADS Valve Air Accumulators 1B21-A003A-H 2B21-A003A-H	631'-6"	F	Operability not required during shutdown
	RHR Train A and B piping	631'-6"	B	Train C and RHR via feedwater (N27) is available
	RHR via feedwater (N27) RHR Dropline	620'-6"	B	Trains A, B, and C of RHR are available

005-7



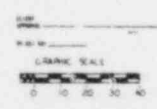
PLANT NORTH

LEGEND:

- NONDIVISIONAL EQUIPMENT NUMBER
- DIVISION 1 EQUIPMENT NUMBER
- DIVISION 2 EQUIPMENT NUMBER
- DIVISION 3 EQUIPMENT NUMBER
- DIVISION 4 EQUIPMENT NUMBER
- DIVISIONS 1 AND 2 EQUIPMENT NUMBER
- DIVISIONS 1, 2, AND 3 EQUIPMENT NUMBER
- DIVISIONS 3 AND 4 EQUIPMENT NUMBER
- CRANE OR HOIST COVERAGE AREA
- NONRAIL NUMBERS (SHOWN ON GAI HOIST LIST)
- EQUIPMENT REMOVAL PATH (MOVED BY CRANE OR HOIST)
- EQUIPMENT REMOVAL PATH (MOVED BY DOLLY)

NOTES:

1. ALL PANEL NUMBERS ARE PRECEDED BY 1H13PD FOR UNIT 1
2H13PD FOR UNIT 2
2. WHEN AN "N" PRECEDES THE EQUIPMENT NUMBER DIVISIONAL SYMBOL IT IS NONDIVISIONAL AS WELL AS THE DIVISIONS SHOWN BY THE SYMBOL.



KEY TO DRAWING 021-006

El. 664'-7", 665'-0", 670'-6"

INTERMEDIATE BUILDING

TAG NUMBER

Emergency Closed Cooling
Surge Tanks

1P42-A001A
1P42-A001B
2P42-A001A
2P42-A001B

LIFTING DEVICE Hoist 46-1, 46-2 (L51-E066, 2L51-E066)

BUILDING: Reacto Annulus

ELEVATION: 662'-0"

IMPACT AREA: COLUMN LINE 180⁰ Azimuth

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-006

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch Removal 8000 lbs (max)	None	634'-0"	E	There is no safety-related equipment in the impact area at this elevation
	None	642'-0"	E	There is no safety-related equipment in the impact area at this elevation
	RHR via Feedwater	625'-3-1/2"	B	There is a redundant feedwater line

006-2

LIFTING DEVICE Hoist 47-1, 47-2 (1L51-E066, 2L51-E066)

BUILDING: Reactor Annulus

ELEVATION: 662'-0"

IMPACT AREA: COLUMN LINE 15⁰ Azimuth

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-006

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch Removal 8000 lbs (max)	None	654'-0"	E	There is no safety-related equipment in the impact area at this elevation
	None	652'-0"	E	There is no safety-related equipment in the impact area at this elevation

006-3

KEY TO DRAWING 021-007

El. 689'-6"

<u>CONTROL COMPLEX</u>	<u>TAG NUMBER</u>
MCC, Switchgear, and Battery Room HVAC instrument Rack	H51-P0164 H51-P0165 H51-P0166 H51-P0167
Control Room HVAC and Emergency Recirculation Instrument Rack	H51-P0152 H51-P0153
Control Room HVAC Supply Plenum	M25-B001A M25-B001B
Control Room HVAC Supply Fan	M25-C001A M25-C001B
Control Room HVAC Return Fan	M25-C002A M25-C002B
MCC, switchgear, and Electrical Equipment Area Supply Plenum	M23-B001A M23-B001B
MCC, Switchgear, and Electrical Equipment Area Supply Fan	M23-C001A M23-C001B
MCC, Switchgear, and Electrical Equipment Area Return Fan	M23-C002A M23-C002B
Battery Room Exhaust Fan	M24-C001A M24-C001B
HVAC System Control Panel	H51-P177A H51-P177B

LIFTING DEVICE Hoist 52 (L51-E045)

BUILDING: Control Complex

ELEVATION: 693'-6"

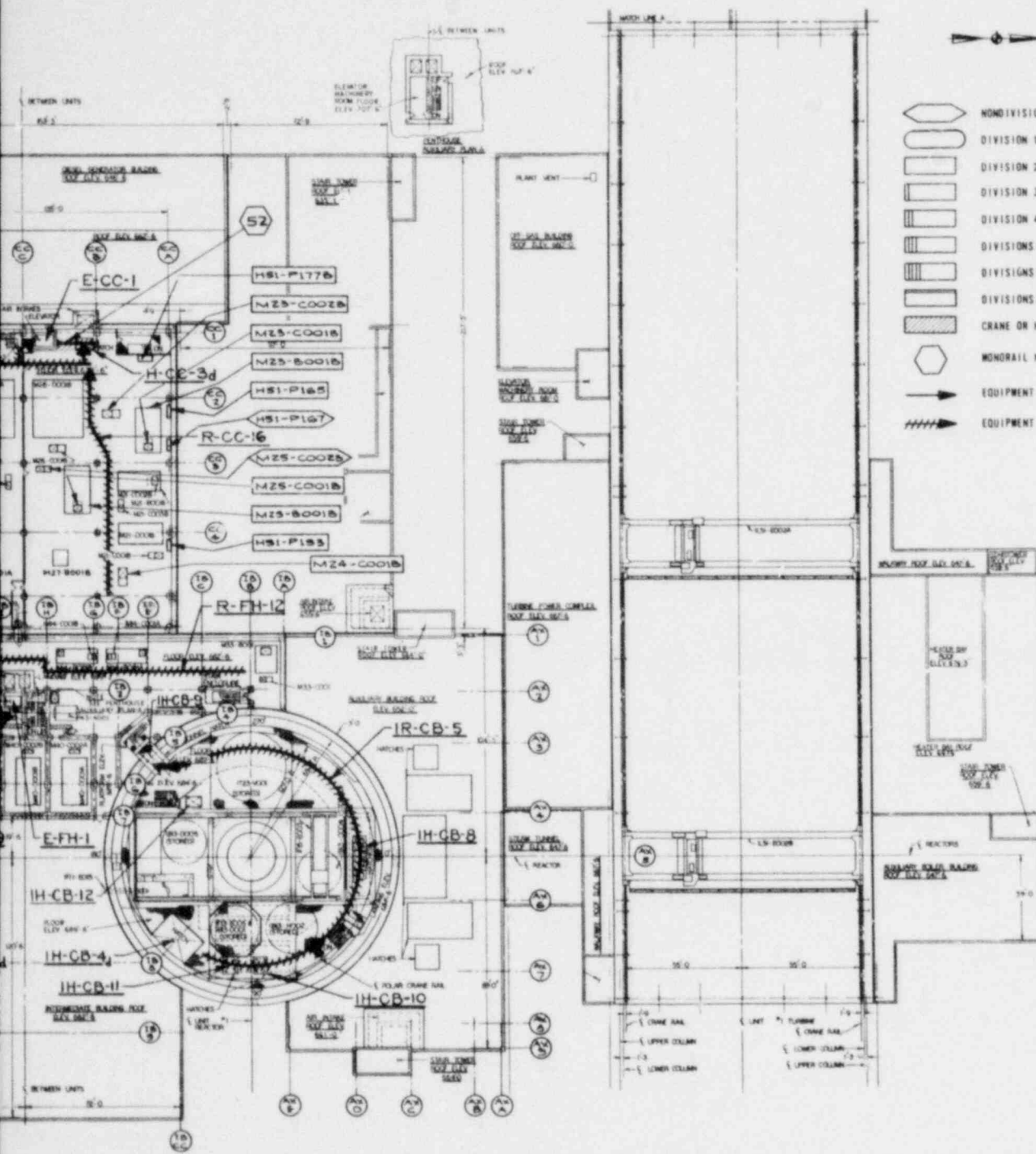
IMPACT AREA: COLUMN LINE CC-B to CC-C; CC-1 to CC-2

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-007

PERRY HEAVY LOADS STUDY













Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Hatch and Ventilation Equipment Removal 6000 lbs (max)	None	679'-6"	E	There is no safety-related equipment in the impact area at this elevation
	None	654'-6"	E	There is no safety-related equipment in the impact area at this elevation
		638'-6"	E	There is no safety-related equipment in the impact area at this elevation

007-2



PLANT NORTH

LEGEND:

-  NONDIVISIONAL EQUIPMENT NUMBER
-  DIVISION 1 EQUIPMENT NUMBER
-  DIVISION 2 EQUIPMENT NUMBER
-  DIVISION 3 EQUIPMENT NUMBER
-  DIVISION 4 EQUIPMENT NUMBER
-  DIVISIONS 1 AND 2 EQUIPMENT NUMBER
-  DIVISIONS 1, 2, AND 3 EQUIPMENT NUMBER
-  DIVISIONS 3 AND 4 EQUIPMENT NUMBER
-  CRANE OR HOIST COVERAGE AREA
-  MONORAIL NUMBERS (SHOWN ON GAI HOIST LIST)
-  EQUIPMENT REMOVAL PATH (MOVED BY CRANE OR HOIST)
-  EQUIPMENT REMOVAL PATH (MOVED BY DOLLY)



KEY TO DRAWING 021-008

Emergency Service Water Pumphouse

	<u>TAG NUMBER</u>	
Emergency Service Water Pump	1P45-C001A 1P45-C001B 1B45-C002	2P45-C001A 2P45-C001B 2P45-C002
Emergency Service Water Pump Discharge Strainer	1P45-D002A 1P45-D002B 1P45-D003	2P45-D002A 2P45-D002B 2P45-D003
Emergency Service Water Screen Wash Pump	P49-C002A P49-C002B	
Emergency Service Water Pumphouse Intake Screen	P49-D001A P49-D001B	
Emergency Service Water Screen Wash Pump Discharge Strainer	P49-D003A P49-D003B	
ESW Ventilation Fan	1M32-C001A 1M32-C001B	2M32-C001A 2M32-C001B
Motor Control Centers	1R24-5030 1R24-5032	2R24-5030 2R24-5032
Instrument Racks	H51-P0077A H51-P0077B	
Control Panels for Intake Screens	H51-P010A H51-P010B	

LIFTING DEVICE Emergency Service Water Pumphouse Crane

BUILDING: ESW Pumphouse

ELEVATION: 631'-0"

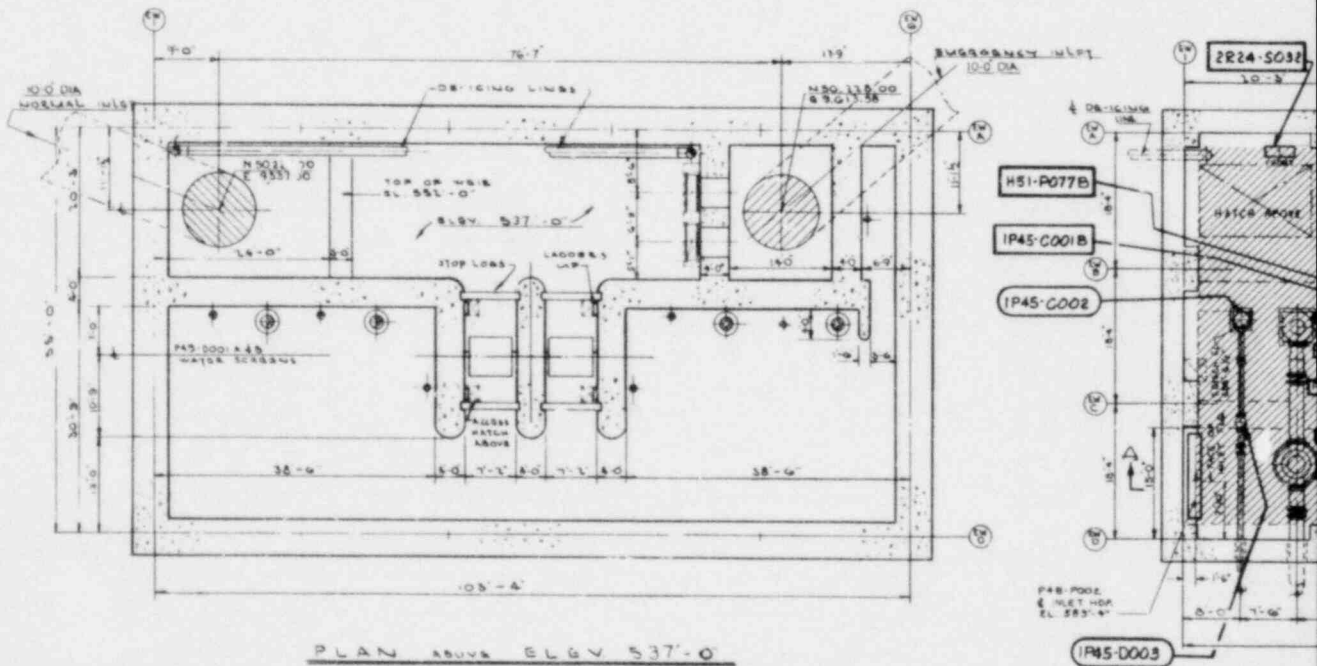
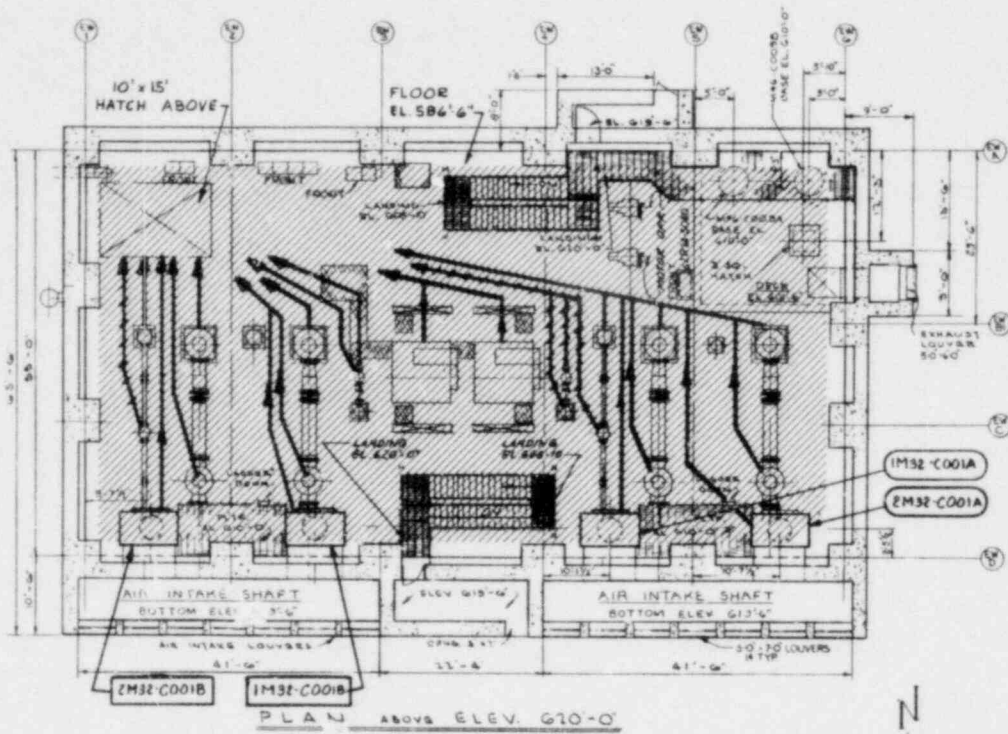
IMPACT AREA: COLUMN LINE EW-1 to EW-6; EW-A to EW-D

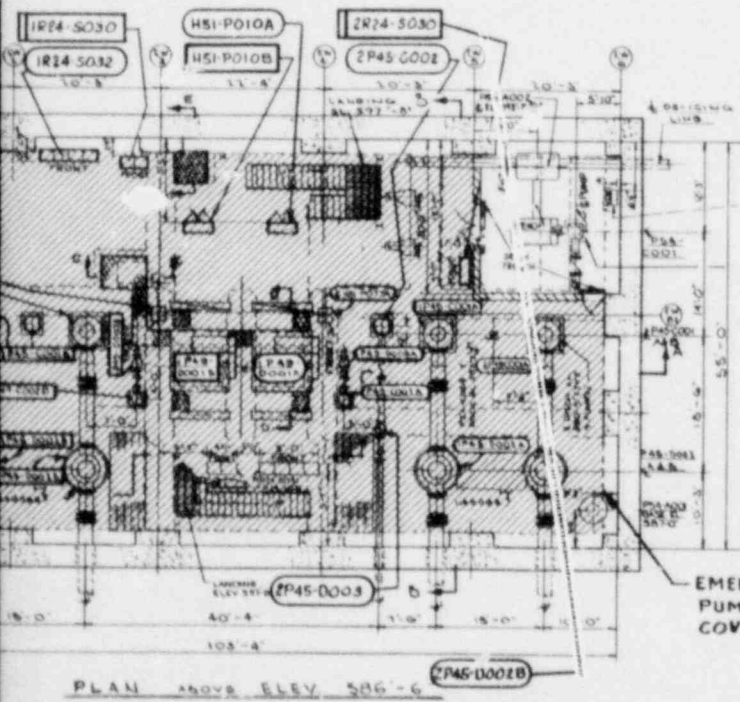
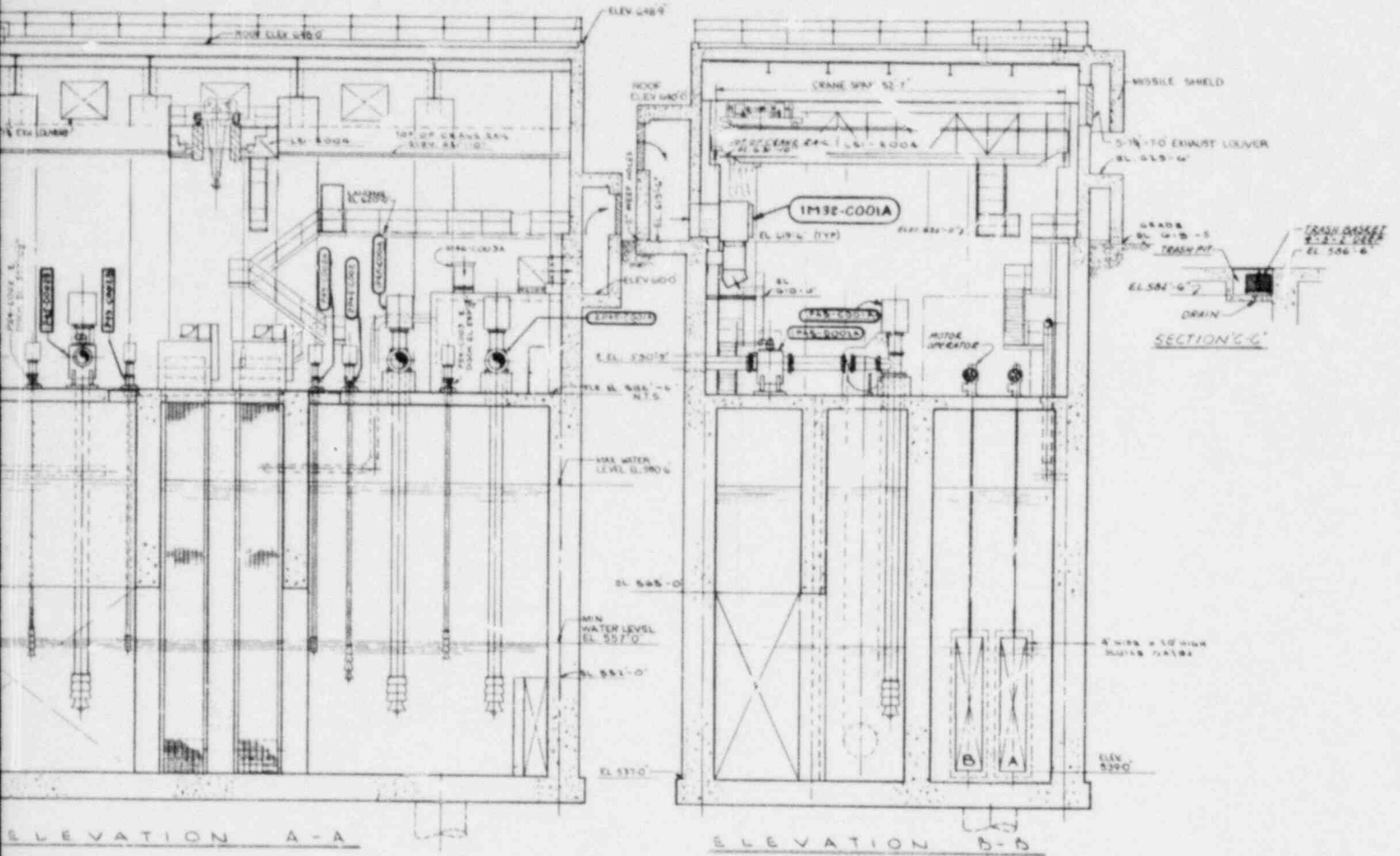
TO BE USED
IN CONJUNCTION
WITH DRAWING 021-008

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
ESW Pumps and Equipment 30,000 lbs (max)	All equipment identified on Dwg. 021-008	586'-6"	See remarks	Procedures are necessary to ensure that any lifts of train "A" equipment will not be made over train "B" equipment and lifts of train "B" equipment will not be made over train "A"

008-2





LEGEND:

- NONDIVISIONAL EQUIPMENT NUMBER
- DIVISION 1 EQUIPMENT NUMBER
- DIVISION 2 EQUIPMENT NUMBER
- DIVISION 3 EQUIPMENT NUMBER
- DIVISION 4 EQUIPMENT NUMBER
- DIVISIONS 1 AND 2 EQUIPMENT NUMBER
- DIVISIONS 1, 2, AND 3 EQUIPMENT NUMBER
- DIVISIONS 3 AND 4 EQUIPMENT NUMBER
- CRANE OR HOIST COVERAGE AREA
- MONORAIL NUMBERS
(SHOWN ON GAI HOIST LIST)
- EQUIPMENT REMOVAL PATH
(MOVED BY CRANE OR HOIST)
- EQUIPMENT REMOVAL PATH
(MOVED BY DOLLY)

EMERGENCY SERVICE WATER
PUMP HOUSE CRANE
COVERAGE AREA

SECTION II
EVALUATION OF REACTOR BUILDING CRANE

INTRODUCTION

The reactor building crane is used extensively during refueling outages. Drawing 021-009 depicts the laydown areas and the transit paths. Since all heavy loads are lifted and transported by the reactor building crane when the reactor is in cold shutdown, damage to the residual heat removal system (in the shutdown cooling mode) is the only active safe shutdown system that must be considered for heavy load drop damage inside containment. In addition to the RHR piping, the potential for damage to fuel due to a heavy load drop must be evaluated. A written description of the refueling procedure is given in Section 9.1.4.2.10.2 of the Perry FSAR.

Since the layout of Unit 2 containment is "opposite hand" to Unit 1, only Unit 1 is discussed; all findings for Unit 1 will apply to Unit 2.

The report summary identifies potentially hazardous lifts within containment as well as the balance of plant.

TO BE USED
IN CCNJUNCTION
WITH DRAWING 021-009

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

PERRY HEAVY LOADS STUDY

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
1. Drywell Head 130,000 lbs	Reactor Vessel and Fuel	689'-6"	See remarks	1. Drop over reactor could possibly cause damage to the vessel and internals, including fuel Further analysis is required to determine the extent of damage
	None	689'-6"	E	2. The load path from the reactor to the storage location does not pass over safety-related equipment at this elevation
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	Standby Liquid Control Tank 1C41-A001 2C41-A001 Standby Liquid Control Pumps 1C41-C001A, B 2C41-C002A, B Safety Relief ADS Valve Air Accumulators	642'-0"	F	4. Systems are not used during cold shutdown

009-1

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
1. Drywell Head 130,000 lbs (cont'd)	Control Rod Drive Hydraulic Control Units 1C11-D001 2C11-D001	620'-6"	F	5. Operability of these units are not required after scram
	RHR (Loop B) Piping - E12 RHR	617'-0" to 630'-0"	F, B	6. The RHR system will be in the shutdown cooling mode during this lift. If Loop A piping is damaged, Loop B system can be used for core cooling
	RHR/Feedwater Piping - N27 FW	625'-0"	B	7. If Loop A piping is damaged, Loop B system can be used for core cooling
	None	599'-0"	E	8. There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E	9. There is no safety-related equipment in the impact area at this elevation

009-2

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
2. Vessel Head Piping Bundle 1300 lbs	Reactor Vessel and Fuel	689'-6"	See remarks	1. Drop over reactor could damage reactor and internals. Further analysis required
	None	689'-6"	E	2. The load path from the reactor to storage area does not pass over any safety-related equipment at this elevation
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	Safety Relief ADS Valve Air Accumulators 1B21-A003 A, B 2B21-A003 A, B	642'-0"	F	4. Operability is not required during cold shutdown
	Control Rod Drive Hydraulic Control Units 1C11-D001 2C11-D001	620'-6"	F	5. Operability is not required after rod insertion.

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
2. Vessel Head Piping Bundle (cont'd)	RHR (loop B) Piping - E12 RHR	617'-0" to 630'-0"	F, B	6. The RHR system will be in the shutdown cooling mode during this lift. If loop A piping is damaged, loop B system can be used for core cooling
	RHR/Feedwater Piping - N27 FW	625'-0"	B	7. If loop A piping is damaged, loop B system can be used for core cooling
	None	599'-0"	E	8. There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E	9. There is no safety-related equipment in the impact area at this elevation
3. Thermal Insulation RPV top Head 10,000 lbs	Reactor Vessel and Fuel	689'-6"	See remarks	1. Drop over reactor could possibly cause damage to fuel and vessel. Further analysis is required
	None	689'-6"	E	2. The load path from the reactor to the storage location does not pass over any safety-related equipment at this elevation

009-4

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

009-5

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
3. Thermal Insulation RPV Top Head 10,000 lbs (cont'd)	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	Safety Relief ADS Valve Air Accumulators 1B21-A003 F,G,H 2B21-A003 F,G,H	642'-0"	F	4. Operability is not required during cold shutdown
	Control Rod Drive Hydraulic Control Units 1C11-D001 2C11-D001	620'-6"	F	5. Operability is not required after rod insertion.
	RHR (Loop B) Piping - E12 RHR	617'-0" to 630'-0"	F,B	6. The RHR system will be in the shutdown cooling mode during this lift. If loop A piping is damaged, loop B system can be used for core cooling
	RHR/Feedwater Piping - H27 FW	625'-0"	B	7. If loop A piping is damaged, loop B system can be used for core cooling

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
3. Thermal Insulation RPV Top Head 10,000 lbs (cont'd)	None	599'-0"	E	8. There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E	9. There is no safety-related equipment in the impact area at this elevation
4. RPV Head and O-Rings, and Head Strong Back 56,000 + 180,000 = 236,000 lbs (total)	Reactor and Fuel	689'-6"	See remarks	1. Drop over reactor could possibly damage vessel and fuel. Further analysis is required
	None	689'-6"	E	2. The load path from the reactor to the storage location does pass over safety-related equipment
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	Safety Relief ADS Valve Air Accumulators 1B21-A003 E,F,G 2B21-A003 E,F,B	642'-0"	F	4. Operability is not required during cold shutdown

9-600

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
4. RPV Head and O-Rings, and Head Strong Back 56,000 + 180,000 = 236,000 lbs (total)	Control Rod Drive Hydraulic Control Units 1C11-D001 2C11-D001	620'-6"	F	5. Operability is not required during cold shutdown
	RHR (Loop A) Piping - E12 RHR	617'-0" to 630'-0"	F, B	6. The RHR system will be in the shutdown cooling mode during this lift. If loop A piping is damaged, loop B system can be used for core cooling
	RHR/Feedwater Piping - N27 FW	625'-0"	B	7. If loop A piping is damaged, loop B system can be used for core cooling
	Reactor Pressure and Level Instrument Rack A 1H22-P004 A,B,C 2H22-P004 A,B,C	620'-6"	B	8. There are 3 other trains of instrumentation
	None	599'-0"	E	9. There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E	10. There is no safety-related equipment in the impact area at this elevation

009-7

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
5. Dryer-Separator Strong Back 8000 lbs	Reactor Vessel and Fuel	689'-6"	See remarks	1. Drop over reactor could possibly damage reactor vessel and fuel. Further analysis is required
	None	689'-6"	E	2. The load path from the storage area to the reactor does not pass over safety-related equipment at this elevation
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	Standby Liquid Control Tank 1C41-A001 2C41-A001	642'-0"	F	4. Operability is not required during cold shutdown
	Standby Liquid Control Pumps, 1C41-C001A, B 2C41-C001A, B			
	Safety Relief ADS Valve Air Accumulators 1B21-A003 B,C,D 2B21-A003 B,C,D			

8-600

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
5. Dryer-Separator Strong Back 8000 lbs (cont'd)	Control Rod Drive Hydraulic Control Units	620'-6"	F	5. Operability is not required during cold shutdown
	RHR (Loop B) Piping - E12 RHR	617'-0" to 630'-0"	F, B	6. The RHR system will be in the shutdown cooling mode during this lift. If loop B piping is damaged, loop A system can be used for core cooling
	RHR/Feedwater Piping - N27 FW	625'-0"	B	7. If loop B piping is damaged, loop A system can be used for core cooling
	None	599'-0"	E	8. There is no safe shutdown equipment in the impact area at this elevation
	None	579'-10"	E	9. There is no safe shutdown equipment in the impact area at this elevation
6. Steam Dryer and Strong Back 8000 + 106,000 = 114,000 lbs	Reactor Vessel and Fuel	689'-6"		1. Drop over the reactor could possibly cause damage to the vessel and fuel. Further analysis is required

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
6. Steam Dryer and Strong Back 8000 + 106,000 = 114,000 lbs (cont'd)	None	689'-6"	E	2. The load path from the reactor to the storage area does not pass over safety-related equipment
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	None	642'-0"	E	4. There is no safety-related equipment in the impact area at this elevation
	Mainsteam Isolation Valves, Relief Valves	620'-6"	F	5. Operability is not required during cold shutdown
	RHR/Feedwater (Loop B) Piping - N27 FW	617'-0" to 630'-0"	B	6. If loop B piping is damaged, loop A system can be used for core cooling
	None	574'-10"	E	7. There is no safety-related equipment in the impact area at this elevation
7. Separator and Strongback 8000 + 68,000 = 76,000 lbs	Reactor Vessel and Fuel	689'-6"	(See remarks)	1. Drop over the reactor could possibly cause damage to the vessel and fuel. Further analysis is required

01-600

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7. Separator and Strongback 8000 + 68,000 = 76,000 lbs (cont'd)	None	689'-6"	E	2. The load path from the reactor to the storage location does not pass over safety-related equipment at this elevation
	None	664'-7"	E	3. There is no safety-related equipment in the impact area at this elevation
	None	642'-0"	E	4. There is no safety-related equipment in the impact area at this elevation
	Mainsteam Flow and Instrument Racks 1H22-P042 2H22-P042	620'-6"	B	5. There are 3 redundant trains of instrumentation
	RHR Common Shutdown Suction Piping - E12 RHR	625'-0"	B	6. If the shutdown cooling mode for the RHR is jeopardized due to piping damage, the core can be cooled by either RHR loop in the emergency core cooling mode

009-11

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
7. Separator and Strongback 8000 + 68,000 = 76,000 lbs (cont'd)	RHR/Feedwater Piping	625'-0"	B	7. If the shutdown cooling mode for the RHR is jeopardized due to piping damage, the core can be cooled by either RHR loop in the emergency core cooling mode
	None	599'-0"	E	8. There is not safety-related equipment in the impact area at this elevation
	None	574'-10"	E	9. There is no safety-related equipment in the impact area at this elevation
8. Refueling Chute 36,000 lbs	Reactor Fuel	689'-6"	C	1. Refueling procedure will preclude load path over reactor
	None	689'-6"	E	2. The load path from the chute to its storage location does not pass over safety-related equipment
	None	642'-0"	E	4. There is no safety-related equipment in the impact area at this elevation

009-12

LIFTING DEVICE Reactor Building Crane

BUILDING: Reactor Building

ELEVATION: 721'-0"

IMPACT AREA: COLUMN LINE (see Drawing 021-009)

TO BE USED
IN CONJUNCTION
WITH DRAWING 021-009

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
8. Refueling Chute 36,000 lbs	None	620'-6"	E	5. There is no safety-related equipment in the impact area at this elevation
	RHR (Loop A) Piping E12 RHR	617'-0" to 630'-0"	F, B	6. The RHR system will be in the shutdown cooling mode during this lift. If loop A piping is damaged, loop B system can be used for core cooling
	RHR/Feedwater Piping - N27 FW	625'-0"	B	7. If loop A piping is damaged, loop B system can be used for core cooling
	None	599'-0"	E	8. There is no safety-related equipment in the impact area at this elevation
	None	574'-10"	E	9. There is no safety-related equipment in the impact area at this elevation
9. Refueling Gates G41-E001A 1670 lbs G41-E001B G41-E002A 1565 lbs G41-E002F	None	689'-6"	E	No safety-related equipment in impact area

009-13

STORAGE CABINETS FOR:
 IF12-E001-3-UTIL. MANIPULATOR - WT. 17 LB.S
 IF12-E003-GENERAL AREA LIGHT - 3 UNITS -
 WT./UNIT 30 LB.S
 IF12-E004 - L.A. UNDERWATER LIGHT - 3 UNITS -
 WT./UNIT 20 LB.S
 IF12-E005 - DROP LIGHT - 3 UNITS - WT./UNIT 20 LB.S
 IF14-E002 - C.R. GRAPPLE - WT. 17 LB.S
 IF14-E007 - INSTR. HNDLG. TOOL - WT. 50 LB.S
 IF14-E004 - C.R. GUIDE TUBE GRAPPLE - WT. 35 LB.S
 IF14-E017 - PERIPHERAL FUEL SUPPORT PLUG - WT. 16 LB.S
 IF11-E011 - GEN. PURPOSE GRAPPLE - WT. 45 LB.S
 IF11-E018 - IFTS INSERT GRAPPLE - WT. LB.S
 (CABINET MIN. SIZE: EACH UNIT - 48" W x 24" D x 87" H
 7 SHELVES)

CONTAMINATED
 TOOL STORAGE
 CABINET

STORAGE LOCATION:
 IF14-E014
 FUEL BUNDLE SAMPLER
 WT. 920 LB.S.

IF12-E009
 LIGHT SUPPORT BRACKET
 2 UNITS WT./UNIT 19 LB.S

IF13-E001 SEAL SURFACE
 PROTECTOR - 4 SEGMENTS
 WT./SEGMENT 77.5 LB.S

IF13-E008 DRYER - SEPAR-
 ATOR STRONGBACK
 WT. 8 KIPS

IF13-E002 STEAM LINE
 PLUG & INSERTION TOOL
 WT. 375 LB.S

IF15-E005
 AUX. PLTF. RAIL
 WT. 2.8 KIPS

DRYWELL HEAD
 FLANGE PROTECTOR
 6 SEGMENTS
 WT. 1.3 KIPS

IF13-E002 - STEAM
 LINE PLUG - 3 UNITS
 WT./UNIT 300 LB.S

VESSEL HEAD
 PIPING BUNDLE
 WT. 1.3 KIPS

STORAGE CABINET FOR:
 IF12-E001 POOL TOOL ACCESSORIES
 ITEMS - 2, 3, 4, 5, 7, 8, 9, 10, 14, & 15

E12
 RHR

DISPOSAL BIN

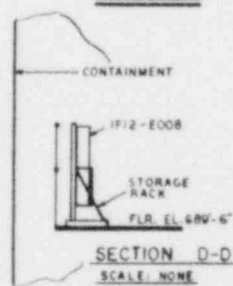
PERSONNEL LOCK

IF12-E013
 VIEWING AID
 WT. 1.5 KIPS

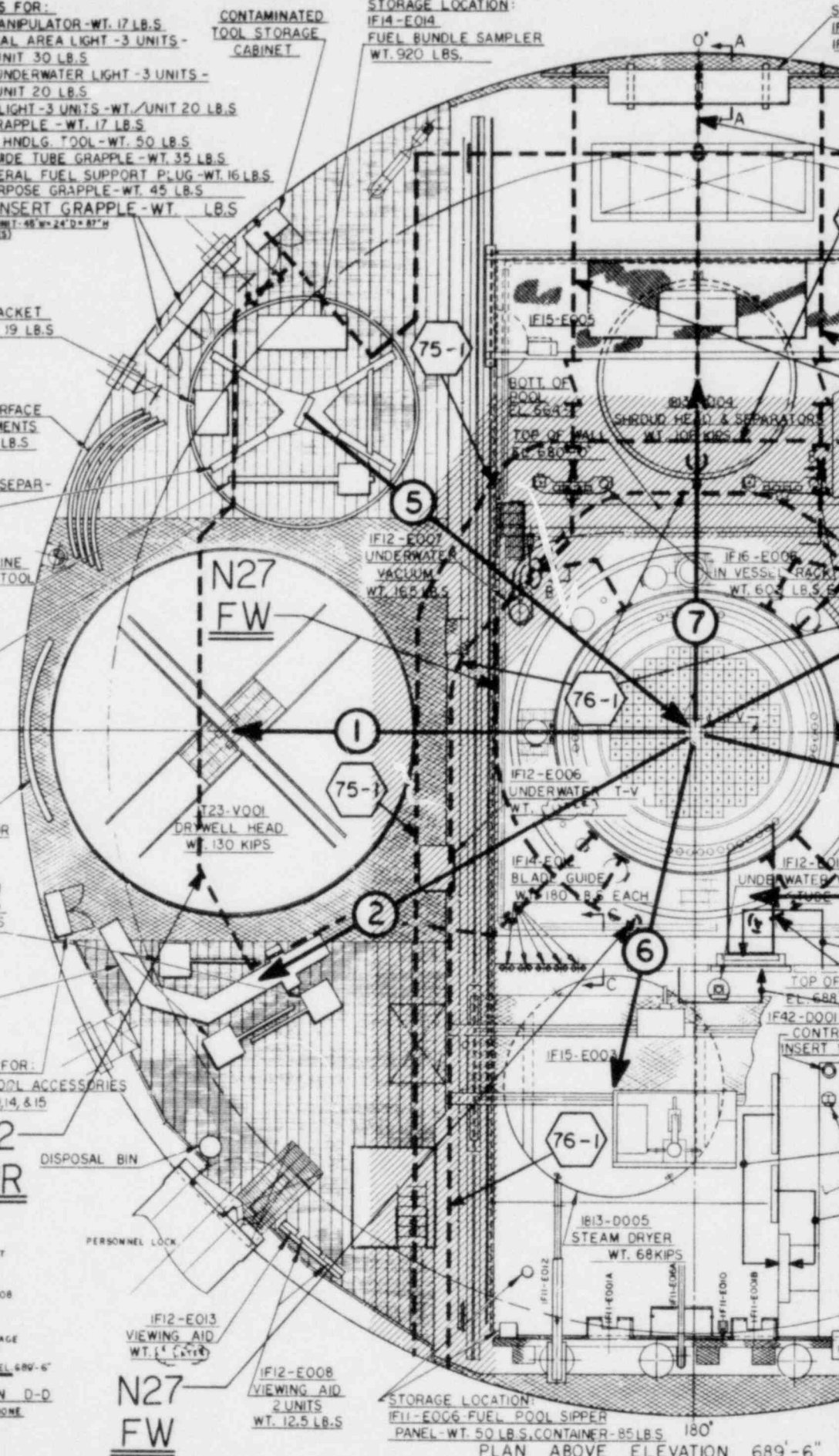
IF12-E008
 VIEWING AID
 2 UNITS
 WT. 12.5 LB.S

STORAGE LOCATION:
 IF11-E006 FUEL POOL SIPPER
 PANEL - WT. 50 LB.S, CONTAINER - 85 LB.S

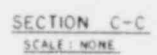
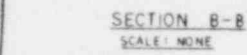
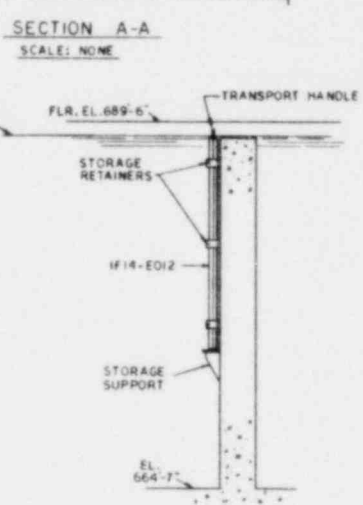
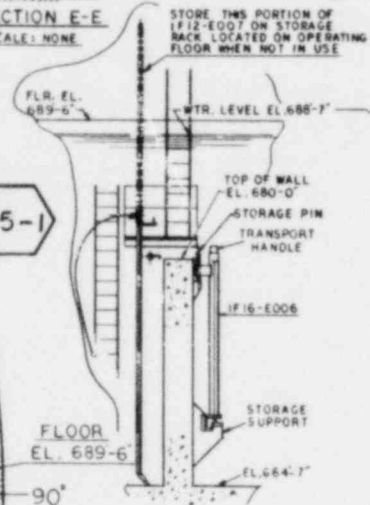
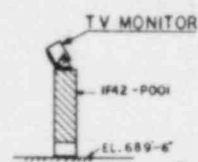
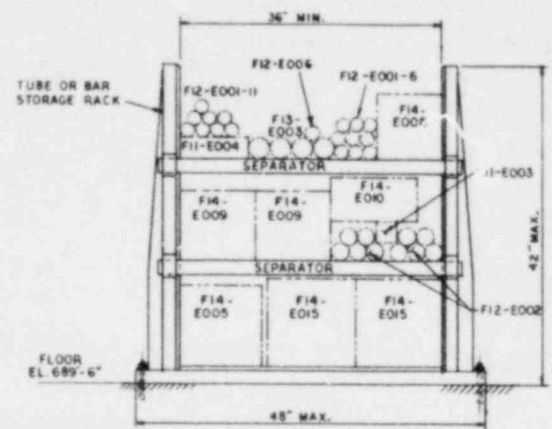
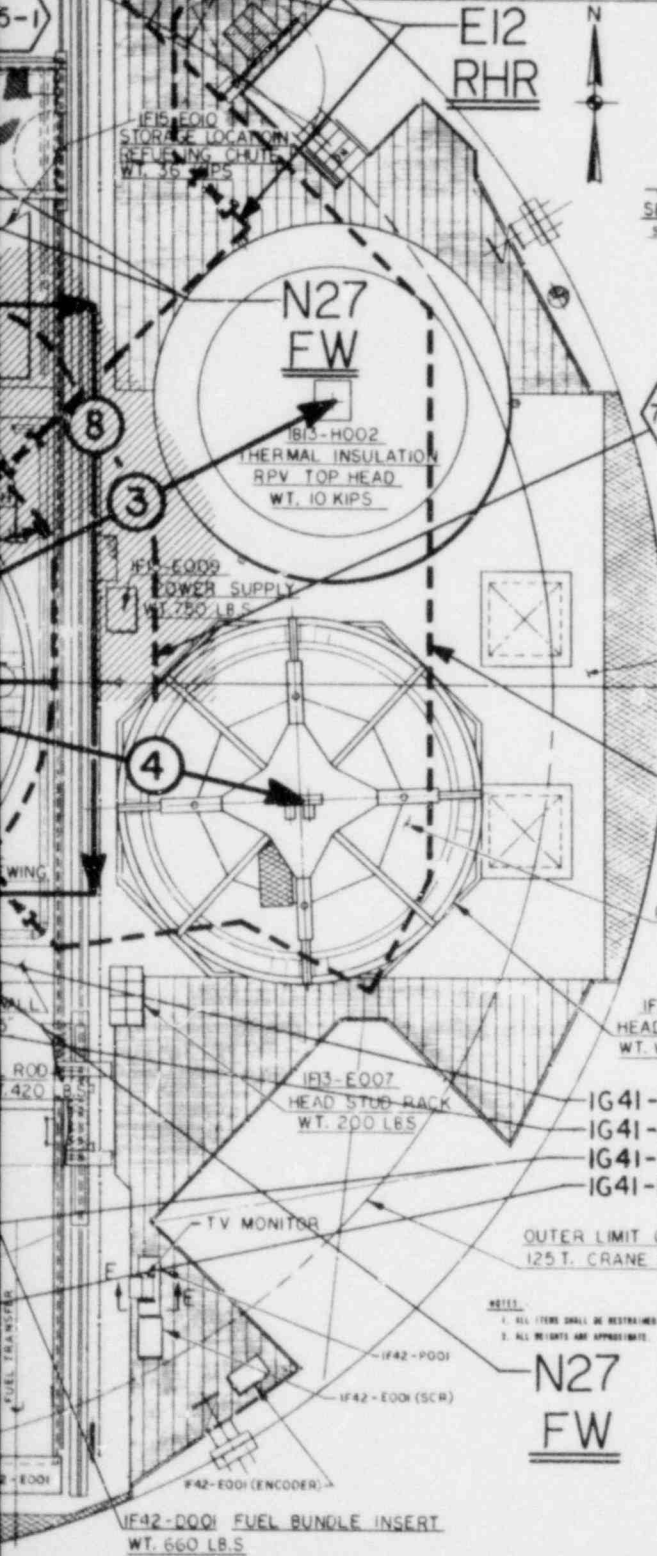
PLAN ABOVE ELEVATION 689'-6"



N27
 FW



- CRANE LOCATION:
- E002-ACTUATING POLE-2 UNITS-WT./UNIT 61 LBS.
 - E003-SHROUD HEAD STUD WRENCH-4 UNITS-WT./UNIT 36 LBS.
 - IF14-E005-FUEL SUPPORT GRAPPLE-WT. 147 LBS.
 - IF14-E006-CONTROL ROD LATCH TOOL-WT. 74 LBS.
 - IF14-E009-C.R. GUIDE TUBE SEAL-2 UNITS-WT./UNIT 55 LBS.
 - IF14-E010-INCORE GUIDE TUBE SEAL-WT. 56 LBS.
 - IF14-E015-GRID GUIDE-2 UNITS-WT./UNIT 32 LBS.
 - IF11-E003-CHANNEL BOLT WRENCH-WT. 14.5 LBS.
 - IF11-E004-CHANNEL HANDLING TOOL-WT. 25 LBS.
 - IF12-E001-6&11 POLE SECTIONS
 - IF12-E007-JETTING PIPE-UPPER SECTION



E12 RHR

IB13-D001
RPV HEAD & O-RINGS
WT. 180 KIPS

IF13-E009
HEAD STRONGBACK - CAROUSEL
WT. WITH NUTS WASHERS, ETC.
54 KIPS

IG41-E002A -WT. 1565 LBS.
IG41-E001A -WT. 1670 LBS.
IG41-E001B -WT. 1670 LBS.
IG41-E002B -WT. 1565 LBS.

OUTER LIMIT OF
125 T. CRANE HOOK

N27 FW

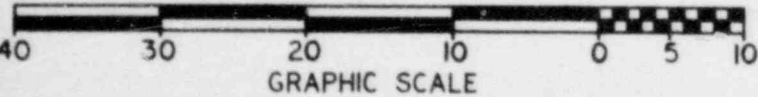
GENERAL ELECTRIC COMPANY

ITEM NUMBER	QTY	DESCRIPTION
F11-E003	11201132	
F11-E004	0000437	
F11-E005	7000370	
F11-E006	1201730	
F11-E007	1120210	
F11-E008	1120210	
F12-E001	SEE LIST THIS DRAWING	
F12-E002	1002011	
F12-E003	1120210	
F12-E004	1120210	
F12-E005	1120100	
F12-E006	1120210	
F12-E007	7000370	
F12-E008	1120210	
F12-E009	1120100	
F12-E010	7000370	
F12-E011	1120210	
F12-E012	1120210	
F12-E013	1120210	
F12-E014	1000020	
F12-E015	1120100	
F12-E016	1120100	
F12-E017	1000301	
F12-E018	1020100	
F12-E019	1000020	
F12-E020	1000020	
F12-E021	1120100	
F12-E022	1000301	
F12-E023	1020100	
F12-E024	1000020	
F12-E025	1000020	
F12-E026	1000020	
F12-E027	1000020	
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F12-E043	1000020	
F12-E044	1000020	
F12-E045	1000020	
F12-E046	1000020	
F12-E047	1000020	
F12-E048	1000020	
F12-E049	1000020	
F12-E050	1000020	

FOR LEGEND SEE DRAWING
C-021-001

POOL TOOL ACCESSORIES

ITEM NO.	DESCRIPTION	QTY.
F12-E01	GRAPPLE	1
F12-E02	GRAPPLE	1
F12-E03	GRAPPLE	1
F12-E04	GRAPPLE	1
F12-E05	GRAPPLE	1
F12-E06	GRAPPLE	1
F12-E07	GRAPPLE	1
F12-E08	GRAPPLE	1
F12-E09	GRAPPLE	1
F12-E10	GRAPPLE	1
F12-E11	GRAPPLE	1
F12-E12	GRAPPLE	1
F12-E13	GRAPPLE	1
F12-E14	GRAPPLE	1
F12-E15	GRAPPLE	1
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F12-E43	GRAPPLE	1
F12-E44	GRAPPLE	1
F12-E45	GRAPPLE	1
F12-E46	GRAPPLE	1
F12-E47	GRAPPLE	1
F12-E48	GRAPPLE	1
F12-E49	GRAPPLE	1
F12-E50	GRAPPLE	1



SECTION III
EVALUATION OF FUEL HANDLING BUILDING CRANE

INTRODUCTION

The fuel handling building crane is used primarily during spent fuel shipping cask operations and new fuel receiving. Drawing 021-010 shows the operating floor elevation of the fuel handling building with the crane coverage area. Since the spent fuel shipping cask is the heaviest load handled in the crane coverage area, the heavy loads evaluation considered only accidental drops of the cask.

No safe shutdown equipment is housed within the crane coverage area and the fuel handling building crane's coverage does not include any of the spent fuel pools.

The report summary identifies potentially hazardous lifts in the fuel handling building as well as the balance of plant.

LIFTING DEVICE Fuel Handling Building Crane

BUILDING: Fuel Handling Building

ELEVATION: 661'-3"

IMPACT AREA: COLUMN LINE IB-8 to IB-10

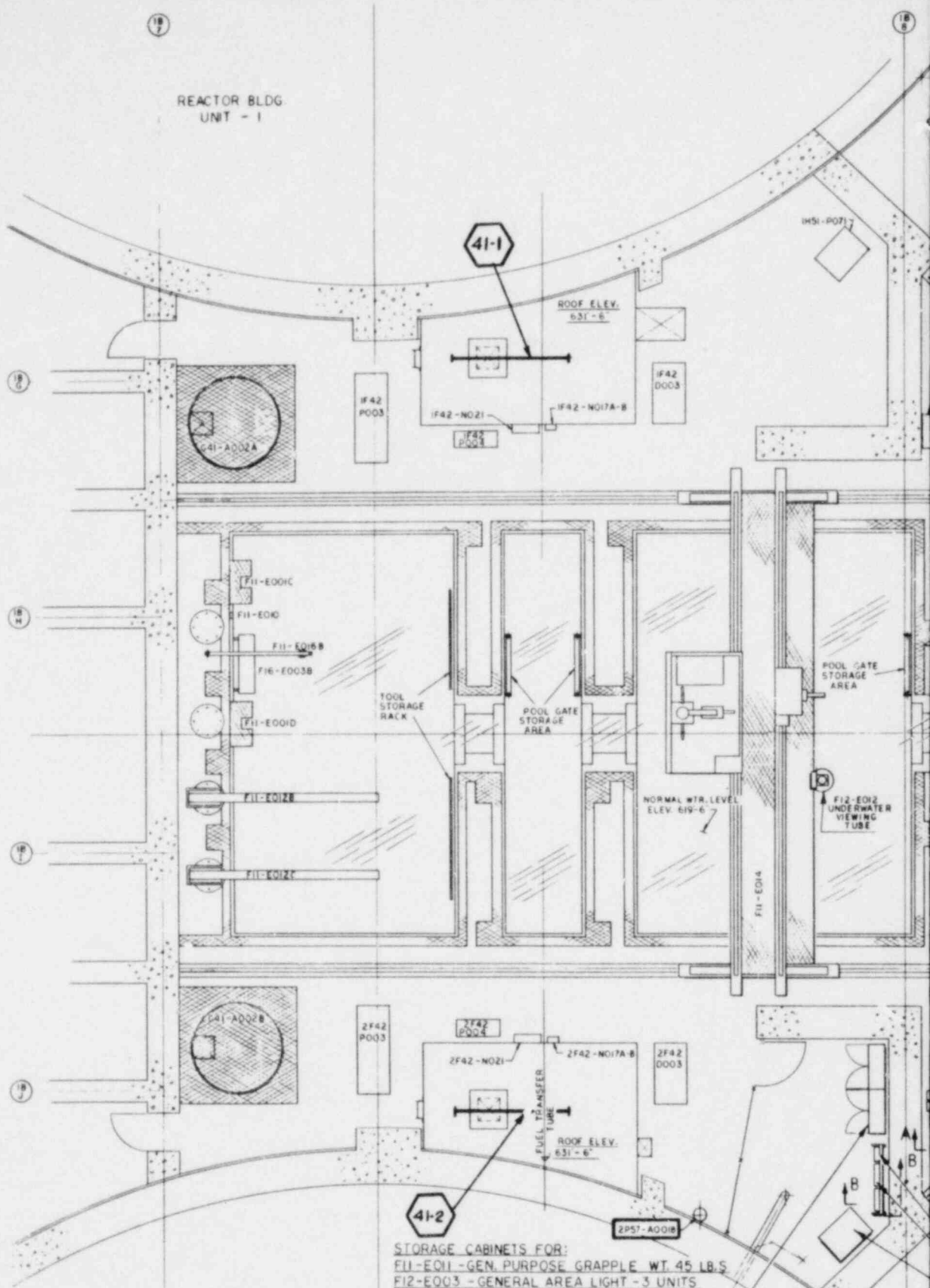
TO BE USED
IN CONJUNCTION
WITH DRAWING 021-010

PERRY HEAVY LOADS STUDY

Load	Safety Related Equipment	Floor Elevation	Hazard Elimination Category	Remarks
Fuel Shipping Cask 250,000 lbs (max)	None	620'-6"	(see remarks)	Note on Dwg. 021-010 that the crane coverage area is not over the spent fuel pool or any area where spent fuel or safety-related equipment is housed
(All other loads handled by the Fuel Handling Building crane weigh less and have less sectional density so that evaluation of other loads is not necessary)	None	599'-0"		1. Analysis is required to determine if a load drop at the west end of the crane coverage area will degradate the spent fuel pool leakage integrity
	None	574'-10"		2. Procedures and design limitations prevent the cask from being dropped more than 30 feet so that the impact design of the cask is not exceeded

010-1

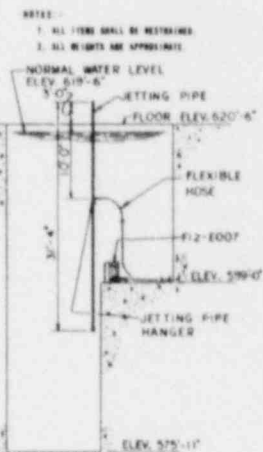
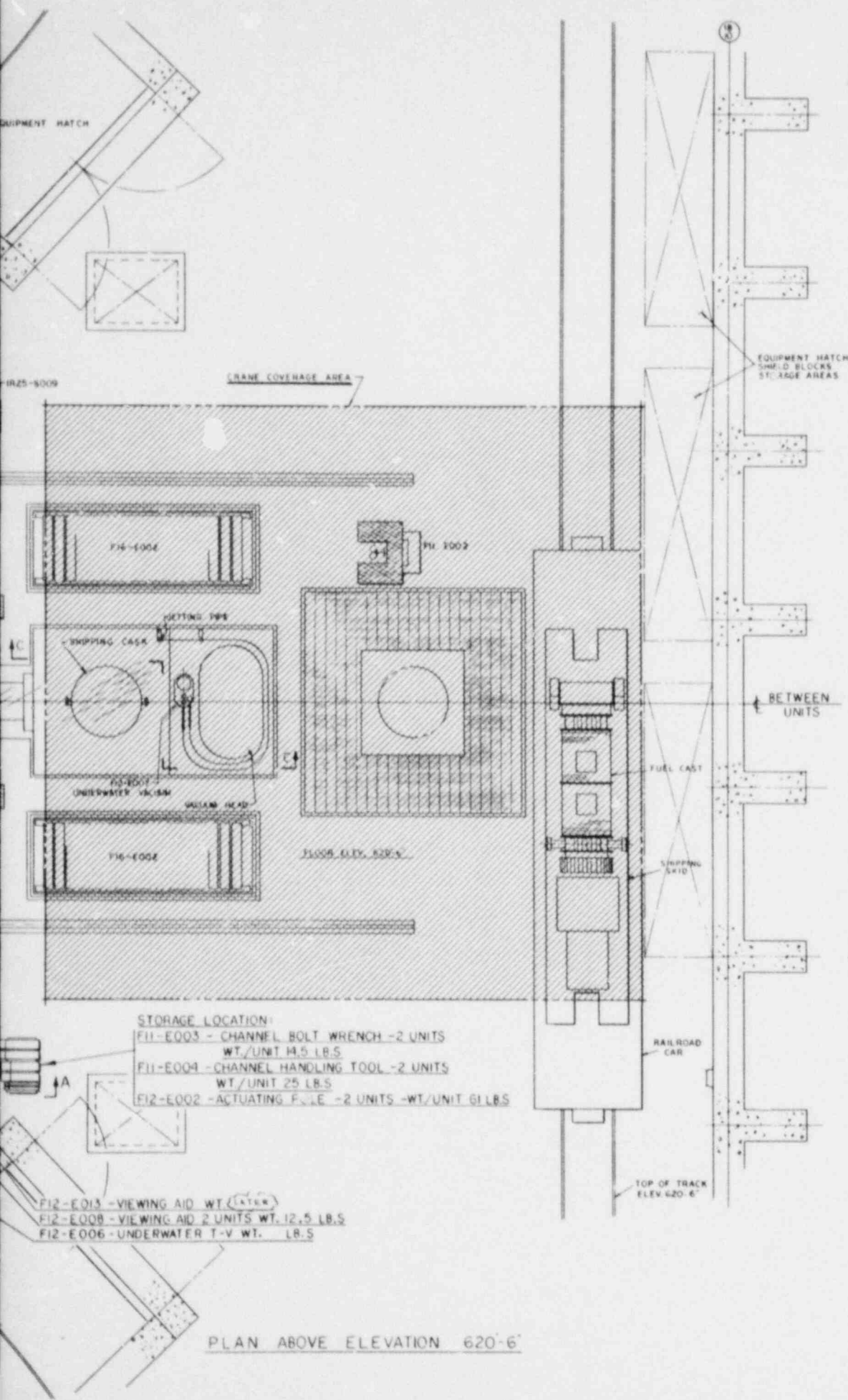
REACTOR BLDG
UNIT - 1



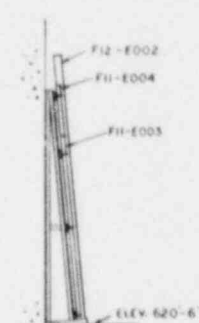
REACTOR BLDG.
UNIT - 2

- STORAGE CABINETS FOR:
- F11-EQ01 - GEN. PURPOSE GRAPPLE - WT. 45 LB.S.
 - F12-EQ03 - GENERAL AREA LIGHT - 3 UNITS
WT./UNIT 30 LB.S.
 - F12-EQ04 - L. A. UNDERWATER LIGHT - 3 UNITS - WT./UNIT 20 LB.S.
 - F12-EQ05 - DROP LIGHT - 3 UNITS - WT./UNIT 20 LB.S.
 - F14-EQ02 - C.R. GRAPPLE - 17 LB.S.
- (CABINET - MIN. SIZE EACH UNIT - 48" W x 18" D x 84" H - 7 SHELVES)

REACTOR
BLDG.S



SECTION C-C



SECTION A-A

NOTE:
FOR LEGEND SEE
DRAWING C-021-001

- STORAGE LOCATION:
- F11-E003 - CHANNEL BOLT WRENCH -2 UNITS
WT./UNIT 14.5 LB.S
 - F11-E004 - CHANNEL HANDLING TOOL -2 UNITS
WT./UNIT 25 LB.S
 - F12-E002 -ACTUATING F. LE -2 UNITS -WT/UNIT 61 LBS

- F12-E013 -VIEWING AID WT. (LATER)
- F12-E008 -VIEWING AID 2 UNITS WT. 12.5 LB.S
- F12-E006 -UNDERWATER T-V WT. LB.S

PLAN ABOVE ELEVATION 620'-6"