

NINE MONTH RESPONSE  
TO THE  
NRC LETTER DATED DECEMBER 22, 1980  
ON  
THE CONTROL OF HEAVY LOADS  
FOR  
VEPCO  
NORTH ANNA UNITS 1 and 2  
DOCKET NOS. 50-338 and 50-339

MARCH, 1982

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## TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
I	Introduction	1
II	Definition of Heavy Loads	1
III	Specific Requirements For Overhead Handling Systems Operating in the Vicinity of Fuel Storage Pools	1
IV	Specific Requirements For Overhead Handling Systems Operating in the Containment	5
V	Specific Requirements For Overhead Handling Systems Operating in Plant Areas Containing Equipment Required for Reactor Shutdown, Core Decay Heat Removal, or Spent Fuel Pool Cooling	8
VI	Analysis of Plant Structures	14
VII	Summary	17
VIII	References	17

### APPENDICES

#### A. TABLES

TABLE 1 - LOAD/IMPACT AREA DATA

#### B. SAFE LOAD PATH SKETCHES

## I. Introduction

This report addresses the nine-month response to the December 22, 1980 NRC letter: Control of Heavy Loads.

This is the second portion of the North Anna Power Station heavy loads evaluation. The first portion, concerning the general requirements for heavy load handling systems was submitted to the NRC on December 22, 1981. This report provides the information on the specific requirements for heavy load handling systems corresponding to Sections 2.2, 2.3 and 2.4 of the NRC letter.

## II. Definition of Heavy Loads

A heavy load is defined in NUREG 0612 as any load whose weight is greater than the combined weight of a single spent fuel assembly and its handling tool. The heavy load was incorrectly defined as 2,500 pounds in the six-month response to the December 22, 1980 NRC letter. The correct combined weight of a single spent fuel assembly and its associated handling tool is 2,000 pounds for North Anna Units 1 and 2. This correction does not alter any of the results in the six-month report.

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

Section 2.2-1 requests the name, type, capacity, and equipment designator of any cranes physically capable (i.e., ignoring interlocks, movable mechanical stops, or operating procedures) of carrying loads which, if dropped, could land or fall into the spent fuel pool.

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

<u>Name</u>	<u>Capacity</u> (Tons)	<u>Equipment</u> <u>Designator</u>
Fuel Bldg. Movable Platform with Hoists	4	1-MH-FH-13

Section 2.2-2 requests information to justify the exclusion of any cranes in this area from the above category by verifying that they are incapable of carrying heavy loads or are permanently prevented from movement of the hook centerline closer than 15 feet to the pool boundary, or by providing a suitable analysis demonstrating that for any failure mode, no heavy load can fall into the fuel-storage pool.

The fuel building trolley (1-MH-CR-15) which is used for moving spent fuel casks does not move over stored fuel, and therefore, is not included in 2.2-1 above. The hook centerline is capable of movement to 5 feet 4 inches from the edge of the fuel pool. The west wall of the fuel pool separates the spent fuel cask storage area from the fuel pool. Only during the movement of spent fuel casks into and out of the fuel building are the casks raised above the top of the fuel pool wall. The centerline of the cask during this movement can be no closer than 1 foot 10 inches from the outside edge of the pool wall. To guard against the possibility of the cask falling from the trolley, the trolley is equipped with eddy current brakes, dual load holding brakes and "dead man" controls. In addition, as analyzed by the FSAR, the lift height is limited to one foot.

The new fuel bridge crane (1-MH-CR-20) does not operate within 15 feet of the spent fuel pit, and therefore, is not included in 2.2-1 above.

The fuel elevator hoist (1-MH-FH-2) is not included in 2.2-1 above since this device does not handle "heavy loads".

Section 2.2-3 requests information for cranes listed in 2.2-1, above, which have been evaluated as having sufficient design features to make the likelihood of a load drop extremely small for all loads to be carried and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6 or partial compliance supplemented by suitable alternative or additional design features).

The heavy load handling equipment identified in 2.2-1 does not meet the single failure proof criteria as outlined in NUREG 0612, Section 5.1.6. No credit is taken for partial compliance.

Section 2.2-4-a requests which alternatives (e.g., 2, 3, or 4) from those identified in NUREG 0612, Section 5.1.2, have been selected for the cranes identified in 2.2-1 above.

No alternative was selected for the heavy load handling equipment identified in 2.2-1. The fuel building movable platform will not handle "heavy loads" over the spent fuel pool.

Section 2.2-4-b requests a discussion of the crane motion limitations imposed by electrical interlocks or mechanical stops and the circumstances, if any, under which these protective devices may be by-passed or removed.

The movable platform with hoists that is identified in 2.2-1 above is a wheel-mounted motor driven platform with two overhead electric hoists. The movable platform spans the spent fuel pit and is

designed to be maneuvered over the spent fuel pool, the fuel transfer canals, and the new fuel handling and storage area as required during fuel handling operations. The spent fuel storage pit and the movable platform with hoists are shared by both Unit 1 and Unit 2.

The movement of the movable platform is not restricted by electrical interlocks or mechanical stops, however, the hoists that are used to lift spent fuel have a limited maximum lift height so that the maximum required depth of water shielding is maintained.

The Technical Specifications prohibit the movement of loads in excess of 2,500 pounds from travel over irradiated fuel assemblies in the spent fuel pit. Plant procedures will be revised to prohibit the handling of loads in excess of 2,000 pounds over spent fuel.

Section 2.2-4-c requests a discussion of any administrative or physical controls that are provided to ensure the validity of crane operational limitations with respect to the time of the storage of certain quantities of spent fuel at specific post-irradiation decay times.

No reliance is placed on operational limitations with respect to time of fuel storage for the heavy load handling equipment considered in 2.2-1 above.

Section 2.2-4-d requests a discussion of any administrative or physical controls that are provided to ensure the validity of the physical location of specific fuel modules at certain post-irradiation decay times.

No reliance is placed on the physical location of specific fuel modules at certain post-irradiation decay times for the heavy load handling equipment considered in 2.2-1 above.

Section 2.2-4-e requests information to justify any exceptions taken to Criteria I through III of NUREG 0612, Section 5.1.

No heavy loads can be dropped into the spent fuel pool as discussed in this section. No load drop event associated with bringing a heavy load within 15 feet of the spent fuel pool results in the tumbling of the load into the pool or violation of the fuel pool's integrity. Therefore, no postulated load handling event has radiological consequences.

IV. Specific Requirements of Overhead Handling Systems Operating in the Containment

Section 2.3-1 requests the name, type, capacity, and equipment designator of any cranes physically capable (i.e., taking no credit for any interlocks or operating procedures) of carrying heavy loads over the reactor vessel.

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

<u>Name</u>	<u>Capacity</u>	<u>Equipment Designator</u>
Polar Crane	2-140 Ton Trolleys and 1-50 Ton Auxiliary Hoist	1-MH-CR-1 (Unit 1) 2-MH-CR-1 (Unit 2)

Section 2.3-2 requests information to justify the exclusion of any cranes in this area from the above category by verifying that they are incapable of carrying heavy loads, or are permanently prevented from the movement of any load either directly over the reactor vessel or to such a location where in the event of any load-handling-system failure, the load may land in or on the reactor vessel.

The manipulator crane (1-MH-CR-5) and the containment dome monorails are not included in 2.3-1 above, since these devices do not handle "heavy loads".

The containment annulus hoist (1-MH-CR-19), recirculation spray pump hoists (1-MH-CR-39 A and B), and RHR pump monorails do not handle loads over the reactor vessel, and therefore, are not included in 2.3-1 above.

Section 2.3-3 requests information for cranes listed in 2.3-1, above, which have been evaluated as having sufficient design features to make the likelihood of a load drop extremely small for all loads to be carried and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6, or partial compliance supplemented by suitable alternative or additional design features).

The crane identified in 2.3-1 does not meet the single failure proof criteria as outlined in NUREG 0612, Section 5.1.6. No credit is taken for partial compliance.

Section 2.3-4-a requests a discussion of the crane motion limitations imposed by electrical interlocks or mechanical stops and the circumstances, if any, under which these protective devices can be removed or bypassed.

The crane identified in 2.3-1 is of the polar configuration and is supported on the circular crane wall in the containment. The crane has two main hooks. One of the two main hook trolleys also has an auxiliary hook. The polar crane has access to the entire area within the crane wall. The auxiliary hook has access to the area inside and outside the crane wall.

The movement of the polar crane is not restricted by electrical interlocks or mechanical stops.



Section 2.3-4-b requests a discussion of any administrative controls that are provided to ensure the validity of site-specific considerations (e.g., refueling sequencing).

The operation of the crane is administratively controlled by VEPCO Administrative procedure M.D. ADM-9.1, "Control of Heavy Loads in Reactor Containment - 291 Level" to prevent handling loads over the reactor vessel when there is fuel in the vessel unless the load lift is specifically required for reactor disassembly, reassembly, or vessel inspection. Administrative Procedure M.D. ADM-9.1 defines safe load paths and requires that deviation requests be submitted "prior to use" for those loads which are handled during maintenance operations that require deviation from routine safe load paths. These deviation requests identify the equipment to be handled and include the load weight, the reason for the deviation, and a sketch of the requested load path. Any load lifts that are not covered by a deviation request are controlled by administrative procedure M.D. ADM-9.1 previously mentioned.

A discussion of other site-specific considerations for the containment polar crane is presented in the response to Section 2.4-2-b(3).

Section 2.3-4-c requests information justifying any exceptions taken to Criteria I through III of NUREG 0612, Section 5.1 and Appendix A, or analyses demonstrating compliance with these guidelines.

Analyses of reactor vessel head drop per Appendix A, Section 2, taking into account subsections (2)a, (2)b, (3), (4), and (5) will be performed by Westinghouse. Reactor vessel head drop analyses outside the envelope of the reactor vessel are presented in Section V of this report. Drops outside the reactor vessel envelope have no radiological consequences and therefore, do not involve criteria I, II or III of Section 5.1, NUREG-0612.

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

Section 2.4-1 requests information for cranes identified in the response to Section 2.1-1, which have been evaluated as having sufficient design features to make the likelihood of a load drop extremely small for all loads to be carried and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6, or partial compliance supplemented by suitable alternative or additional design features).

None of the cranes identified in the response to Section 2.1-1 meet the single failure proof criteria as outlined in NUREG 0612, Section 5.1.6. (These cranes are listed in Tables 1 and 2, in Appendix A of the six-month response to the December 22, 1980 NRC letter, "Control of Heavy Loads", that has been previously submitted.) No credit is taken for partial compliance.

Section 2.4-2-a requests that a comprehensive hazard evaluation be provided for the cranes identified in the response to Section 2.1-1, including a presentation of all heavy loads and potential impact areas where damage might occur to safety-related equipment.

The following is a list of the cranes from which a load drop may result in damage to a system required for plant shutdown or decay heat removal, taking no credit for any interlocks, technical specifications, operating procedures or detailed structural analysis.

<u>Name</u>	<u>Capacity (tons)</u>	<u>Equipment Designator</u>
Containment Polar Cranes	2-140 Ton Trolleys and 1-50 Ton Auxiliary Hoist	1-MH-CR-1 (Unit 1) 2-MH-CR-1 (Unit 2)
Containment Annulus Hoists	5	1-MH-CR-19 (Unit 1) 2-MH-CR-19 (Unit 2)
RHR Pump Monorails	3	-
Auxiliary Building Material Handling System Monorails	12	1-MH-CR-8A & B
Auxiliary Building Material Handling System Monorail	12	1-MH-CR-9B
New Fuel Bridge Crane	5	1-MH-CR-20
Fuel Building Movable Platform	4	1-MH-FH-13

Table 1 in Appendix A provides information on heavy loads and potential impact areas where a load drop from the above overhead load handling systems could result in damage to equipment required for safe shutdown or decay heat removal.

Section 2.4-2-b requests which of the load and impact area combinations can be eliminated because of separation and redundancy of safety-related equipment, mechanical stops and/or electrical interlocks, or other site-specific considerations.

The hazard elimination categories utilized in Table 1 of Appendix A are identified 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 considerations (e.g., administrative procedures) eliminate the need to consider load/equipment combination.
- D. Analysis demonstrates that crane failure and load drop will not damage safety-related equipment.
- E. Likelihood of handling system failure for this load is extremely small (i.e. Section 5.1.6 NUREG 0612 satisfied).
- F. Analyses to demonstrate that Criteria I, II and III of NUREG 0612 are satisfied will be done by Westinghouse.

Section 2.4-2-b(1) requests a discussion of the basis for determining that load drops will not affect continued system operation (i.e., the ability of the system to perform its safety-related function) for the load/target combinations eliminated because of separation and redundancy of safety-related equipment.

Loads carried by the Polar Crane during refueling which originate in the reactor pressure boundary area can be eliminated from further consideration based on separation and redundancy.

The hazard being considered is a drop in this area that causes a break in the Reactor Pressure Boundary, and damaging or disabling the Reactor Coolant System. This event will not have unacceptable consequences since the Safety Injection System will be functional to provide cooling to the core. These loads will not be lifted unless one train of the Safety Injection System is operational. In this manner, the Safety Injection System provides redundancy for the Reactor Coolant System, one train of which could be disabled by drops from the Polar Crane.

The RHR Pump Monorail Hoist has been eliminated from further consideration based on separation and redundancy of the equipment that could be damaged by a heavy load drop.

The hazard being considered is that one RHR train is unavailable due to maintenance and that as part of those maintenance activities, the monorail fails, causing damage and disabling the remaining RHR train. Although this is unlikely, the event will not have unacceptable consequences since the Safety Injection System will be functional to provide cooling to the core. These loads will not be lifted unless one train of the Safety Injection System is operational.

Section 2.4-2-b(2) requests details showing the areas where crane travel will be prohibited by mechanical stops or electrical interlocks; and a discussion concerning the procedures that are to be used for authorizing the bypassing of interlocks or removable stops, for verifying that interlocks are functional prior to crane use, and for verifying that interlocks are restored to operability after operations which require bypassing have been completed.

Mechanical stops or electrical interlocks to limit crane travel in areas containing equipment required for reactor shutdown, or core decay heat removal are not needed.

Section 2.4-2-b(3) requests a discussion of any administrative procedures or physical constraints invoked to ensure the continued validity of load/target combinations that are eliminated on the basis of other site-specific considerations (e.g., maintenance sequencing).

The following discussion provides information concerning the load/target combinations that are eliminated on the basis of site-specific considerations. Additional procedures and changes to existing procedures will be prepared as necessary to reflect the load paths and lift height limitations that are imposed.

#### Containment Polar Crane (1-MH-CR-1)

Administration procedures will require that the safe load path and lift height limitations for the CRD Missile Shield are observed. The lift height limitations and physical geometry of the reactor cavity prevents a load drop on the reactor vessel.

Plant procedures will require that the reactor vessel head be lifted vertically until it is above the operating floor. Any impact with the fueling cavity wall due to a load swing is not considered credible.

#### Containment Annulus Hoist (1-MH-CR-19)

The containment annulus hoist will be prohibited from carrying heavy loads over the main steam and feedwater piping, therefore, this piping will not be subject to damage resulting from a load drop.

#### Auxiliary Building Material Handling System Monorails (1-MH-CR-8A and B and 1-MH-CR-9B)

Administrative procedures will require that the designated safe load paths and lift height limitations be observed in areas containing equipment required for reactor shutdown or decay heat removal in order to ensure that potential damage that could result from a load drop is prevented.

#### Fuel Building Movable Platform with Hoists (1-MH-FH-13)

Administrative procedures will require that the top of the fuel cavity gates be secured to the top of the fuel pool wall by chains during movement of the gates to ensure that the gates, if dropped, will be prevented from tumbling into the fuel pool and damaging the spent fuel racks.

Section 2.4-2-c requests information for the handling systems not eliminated by the analysis of 2.4-2-b above which have been evaluated as having sufficient design features to make the likelihood of a load drop extremely small and the basis for this evaluation (i.e., complete compliance with NUREG 0612, Section 5.1.6, or partial compliance supplemented by suitable alternative or additional design features).

None of the handling systems identified in 2.1-1 and not eliminated in 2.4-2-b meet the single failure proof criteria. No credit is taken for partial compliance.

Section 2.4-2-d requests information to demonstrate that damage would not preclude operation of sufficient equipment to allow the system to perform its safety function following a load drop (NUREG 0612, Section 5.1, Criterion IV) for interactions not eliminated in 2.4-2-b or 2.4-2-c above.

The following heavy load/impact area combinations can be eliminated by analysis showing that damage would not preclude operation of sufficient equipment to allow the system to perform its safety function following a load drop:

- a. Drops on the reactor coolant pump without the motor in place.
- b. Drops on the reactor vessel piping
- c. Drop of the reactor vessel head to the containment operating floor

These events will not have unacceptable consequences since the Safety Injection System will be functional to provide cooling to the core. These loads will not be lifted unless one train of the Safety Injection System is operational. In this manner, the Safety Injection System provides redundancy for the Reactor Coolant System, one train of which could be disabled by drops from the Polar Crane. As the drop is not postulated to occur until at least 100 hours after reactor shutdown (NUREG 0612), the Safety Injection

System will provide adequate cooling since it has capacity to remove decay heat from a LOCA occurring at power.

Section 2.4-2-d(1) requests an indication of whether or not, for the specific load being investigated, the overhead crane-handling system is designed and constructed such that the hoisting system will retain its load in the event of seismic accelerations equivalent to those of a safe shutdown earthquake (SSE).

The containment polar crane is designed and constructed such that the hoisting system will retain its load in the event of seismic accelerations equivalent to a design basis earthquake.

Section 2.4-2-d(2) requests the basis for any exceptions taken to the guidelines of NUREG 0612, Appendix A.

No exceptions were taken to the guidelines of NUREG 0612, Appendix A.

Section 2.4-2-d(3) requests the information requested in Attachment 4.

Table 1 in Appendix A provides information for heavy loads handled by the containment polar crane. The evaluation described in 2.4-2-d, above, assumed that any drop would rupture the Reactor Coolant System. As the results of the evaluation are satisfactory, no mitigation credits were assumed.

## VI. Analysis of Plant Structures

This part of the report provides information concerning the analysis of plant structures for heavy load drops corresponding to Attachment (4) of the NRC letter.

Section 1a. requests the weights of the heavy loads. Appendix A of this report gives the weights of the heavy loads considered.



Section 1b. requests the impact area of the loads. The actual areas of the specific items, identified as heavy loads, were used in the analysis. If specific items could not be identified, then the area was based on that computed for a solid cube of steel for a given load magnitude.

Section 1c. requests the drop heights. Specific drop heights were not used in the analysis. However, for a given load and a given structural system an allowable lift height was computed. The safe load path sketches have been revised to indicate the allowable lift heights.

Section 1d. requests the drop locations. The drop was assumed to occur at the center of the structural system under consideration.

Section 1e. requests the assumptions regarding credit taken in the analysis for the action of impact limiters. The analysis took no credit for impact limiters.

Section 1f. requests the thickness of walls or floor slabs impacted. The analysis used the actual slab thickness or the minimum slab thickness to be impacted for a given heavy load drop.

Section 1g. requests the assumptions regarding drag forces caused by the environment. The analysis neglected all drag forces.

Section 1h. requests the load combinations considered. The analysis assumed that the heavy load drop occurred concurrently with the original design dead and service live loads.

Section 1i. requests the material properties of steel and concrete. The analysis used the same material properties that were used for the original design.

Section 2. requests the method of analysis used to demonstrate that sufficient load carrying capability exists within the wall(s) or

floor slab(s), the identification of any computer codes employed, and a description of their capabilities.

The method of analysis employed is described in Bechtel Power Corporation's Topical Report "Design of Structures for Missile Impact" BC-TOP-9A, Revision 2, September 1974. The analysis considered two types of impact effects: local effects (damage that occurs in the immediate vicinity of the impact area) such as perforation and spalling; and structural response using an elasto-plastic energy balance approach with an allowable ductility ratio of ten. The theory used for evaluating depth of penetration and spalling was developed by the National Defense Research Committee (NDRC). Computer codes and test data were not employed in the analysis.

Section 3. requests an evaluation comparing the results of this analysis with Criteria III and IV of NUREG 0612, Section 5.1. Where safe shutdown equipment has a ceiling or wall separating it from an overhead handling system, an evaluation to demonstrate that postulated load drops do not penetrate the ceiling or cause secondary missiles that could prevent a safe-shutdown system from performing its safety function is to be provided.

Criteria III and IV of NUREG 0612, Section 5.1 are discussed in Sections III, IV, and V of this report.

The analysis determined the maximum allowable lift heights. The allowable lift heights were determined based on the smaller of the two heights computed from the structural response part of the analysis and from the local effects part. To minimize the possibility of forming secondary missiles, lift heights were limited (based on the NDRC's minimum slab scabbing thickness) to a value that would prevent spalling.

## VII. Summary

This report documents the final phase of VEPCO's heavy loads evaluation for North Anna Units 1 and 2, with the exception of the analyses for drops on the reactor vessel, which will be performed by Westinghouse.

The safe load path sketches presented in the six-month response have been revised to indicate allowable lift heights and restricted areas over the steam generators. A complete set of the revised safe load path sketches are presented in Appendix B.

The results of Virginia Electric and Power Company's review of NUREG 0612 finds that no equipment modifications are required to meet the NUREG 0612 requirements.

## VIII. References

1. NUREG 0612 - "Control of Heavy Loads at Nuclear Power Plants"
2. NRC Generic Letter - "Control of Heavy Loads" dated December 22, 1980
3. Enclosure 2 of Generic Letter - "Staff Position - Interim Actions for Control of Heavy Loads"
4. Enclosure 3 of Generic Letter - "Request for Additional Information on Control of Heavy Loads"
5. VEPCO letter to Mr. Eisenhut of NRC dated December 22, 1981 "Control of Heavy Loads"

APPENDIX A

TABLES

TABLE 1

## LOAD/IMPACT AREA DATA

CRANE		CONTAINMENT POLAR CRANE (1-MH-CR-1)		
LOCATION		UNIT 1 REACTOR BLDG., EL. 343' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Lifting Rig for Reactor Vessel Head	12,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	F B
Reactor Vessel Head with Lifting Rig	266,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	F C
Lifting Rig for Reactor Vessel Internals	14,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	F B
Reactor Vessel Upper Internals with Lifting Rig	107,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	F B
Reactor Vessel Lower Internals with Lifting Rig	263,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	F B
CRD Missile Shield	66,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #4)	C B
Reactor Vessel Seal Ring	15,000	Reactor Pressure Boundary	Containment (See Sketch #5)	B
Reactor Coolant Pump Motor	70,900	Reactor Coolant Pump Reactor Coolant Piping	Containment (See Sketch #5)	B B
Reactor Coolant Pump Stand	7,100	Reactor Coolant Pump Reactor Coolant Piping	Containment (See Sketch #5)	B B

TABLE 1  
Page 2 of 13

CRANE				
CONTAINMENT POLAR CRANE (1-MH-CR-1) - Continued				
LOCATION				
UNIT 1 REACTOR BLDG., EL. 343' RAIL HEIGHT				
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Containment Laydown Floor Concrete Hatches	2,000 to 40,000	Reactor Pressure Boundary	Containment (See Sketch #6)	B
Reactor Vessel Inspection Tool	10,000	Reactor Pressure Boundary	Containment (See Sketch #7)	B
Reactor Containment Recirculation Fan	5,600	Reactor Pressure Boundary	Containment (See Sketch #8)	B

TABLE 1  
Page 3 of 13

CRANE		CONTAINMENT ANNULUS HOIST (1-MH-CR-19)		
LOCATION		UNIT 1 REACTOR BLDG., EL. 324' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Various loads (Containment Maintenance)	2,000 to 10,000	Main steam and feedwater piping	Containment (See Sketch #8)	C

TABLE 1  
Page 4 of 13

CRANE		RHR PUMP MONORAILS		
LOCATION		UNIT 1 REACTOR BLDG., EL. 235' FLOOR LEVEL		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
RHR Pump Motors	6,000	RHR (Residual Heat Removal) Pumps RHR Exchangers RHR Piping	Containment (See Sketch #8)	B B B



TABLE 1  
Page 5 of 13

CRANE		AUXILIARY BLDG. MATERIAL HANDLING SYSTEM MONORAIL (1-MH-CR-8A & B)		
LOCATION		AUXILIARY BLDG., EL. 259' FLOOR LEVEL		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Filter Casks	8,000	Radioactive Pipe Tunnel (Located below floor along Column Row K between Columns 10 1/2 and 7 5/8)	Auxiliary Bldg. (See Sketch #1)	D
Various Loads	2,000 to 8,000	HVAC Ductwork (Located 5 ft. north of Column Row J between Columns 10 and 8)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Vertical Cable Trays (Located 5 ft. north of Column Row J, 2 ft. east of Column Row 9 5/8, and 8 ft east of Column Row 9)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Electrical Conduit (located south of shipping hatch at Column Row 8)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Electrical Conduit (Located on south face of wall 4 ft. north of Column Row H between Columns 10 1/2 and 10)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Effluent Filters (Located below floor at Column J-8)	Auxiliary Bldg. (See Sketch #1)	D
Various Loads	2,000 to 8,000	Electrical Conduit (Located on east face of wall at Column Row H, 4 ft. east of Column Row 10 1/2.	Auxiliary Bldg. (See Sketch #1)	C

TABLE 1  
Page 6 of 13

CRANE		AUXILIARY BLDG. MATERIAL HANDLING SYSTEM MONORAIL (1-MH-CR-8A & B) - Continued		
LOCATION		AUXILIARY BLDG., EL. 259' FLOOR LEVEL		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Various Loads	2,000 to 8,000	Electrical Conduit (Located along Column Row 7 5/8 between Columns H and K)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Piping and Valves (Located 16 ft. east of column Row 9 and 2 ft. south of Column Row H)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Hydro Test Pump (Located 2 ft. west of Column 7 5/8 and 5 ft. south of Column L)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Electrical Conduit (Located North of Column Row J between Columns 8 and 10)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Electrical Conduit and Piping (Located at Column Row 10 1/2, south of Column Row K)	Auxiliary Bldg. (See Sketch #1)	C
Various Loads	2,000 to 8,000	Pipe and Pipe Support (Located south of Column Row H between Columns 9 5/8 and 9)	Auxiliary Bldg. (See Sketch #1)	C

TABLE 1  
Page 7 of 13

CRANE		AUXILIARY BLDG. MATERIAL HANDLING SYSTEM MONORAIL (1-MH-CR-9B)		
LOCATION		AUXILIARY BLDG., EL. 274' FLOOR LEVEL		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Various Loads	2,000 to 8,000	HVAC Ductwork (Located at Column Row 8 1/8, between Columns J and K)	Auxiliary Bldg. (See Sketch #2)	C
Various Loads	2,000 to 8,000	Process Vent Blower and Piping (Located 3 ft. north of Column K and 8 ft. east of Column 7 5/8)	Auxiliary Bldg. (See Sketch #2)	C
Various Loads	2,000 to 8,000	Steam Generator Blow Down Panels (Located on south face of wall 4 ft. north of Column L, west of Column 9)	Auxiliary Bldg. (See Sketch #2)	C
Various Loads	2,000 to 8,000	Meter Panel (Located at Column Row 9 5/8, 2 ft. north of Column L)	Auxiliary Bldg. (See Sketch #2)	C
Various Loads	2,000 to 8,000	Seal Water Heat Exchangers and Non-Regen. Heat Exchangers (Located at Column Row L between Columns 9 5/8 and 8 5/8)	Auxiliary Bldg. (See Sketch #2)	C

TABLE 1  
Page 8 of 13

CRANE		NEW FUEL BRIDGE CRANE (1-MH-CR-20)		
LOCATION		FUEL BLDG., EL. 288' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Various Loads	2,000 to 10,000	Motor Control Centers (Located below floor north of Column Row Q between Columns 7 7/8 and 6 7/8)	Fuel Bldg. (See Sketch #3)	D
Various Loads	2,000 to 10,000	Electric Cable Trays (Located below floor north of Column Row Q between Columns 7 7/8 and 6 7/8)	Fuel Bldg. (See Sketch #3)	D
Various Loads	2,000 to 10,000	Waste Gas Diaphragm Compressors, Surge Tank, and Associated Piping and Instrumentation (Located below floor north of Column Row Q between Columns 7 7/8 and 6 7/8)	Fuel Bldg. (See Sketch #3)	D

TABLE 1  
Page 9 of 13

CRANE		FUEL BLDG. MOVABLE PLATFORM WITH HOISTS (1-MH-FH-13)		
LOCATION		FUEL BLDG., EL. 292' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Spent Fuel Cavity Gates	3,700	Spent Fuel Storage Racks	Fuel Bldg. (See Sketch #3)	C

NOTE: The spent fuel cavity gates will be secured to prevent them from tipping onto the spent fuel.

TABLE 1  
Page 10 of 13

CRANE		CONTAINMENT POLAR CRANE (2-MH-CR-1)		
LOCATION		UNIT 2 REACTOR BLDG. EL. 343' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Lifting Rig for Reactor Vessel Head	12,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	F B
Reactor Vessel Head with Lifting Rig	266,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	F C
Lifting Rig for Reactor Vessel Internals	14,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	F B
Reactor Vessel Upper Internals with Lifting Rig	107,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	F B
Reactor Vessel Lower Internals with Lifting Rig	263,000	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	F B
CRD Missile Shield	66,500	Reactor Vessel Reactor Pressure Boundary	Containment (See Sketch #9)	C B
Reactor Vessel Seal Ring	15,000	Reactor Pressure Boundary	Containment (See Sketch #10)	B
Reactor Coolant Pump Motor	70,900	Reactor Coolant Pump Reactor Coolant Piping	Containment (See Sketch #10)	B B
Reactor Coolant Pump Stand	7,100	Reactor Coolant Pump Reactor Coolant Piping	Containment (See Sketch #10)	B B

TABLE 1  
Page 11 of 13

CRANE				
CONTAINMENT POLAR CRANE (2-MH-CR-1) - Continued				
LOCATION				
UNIT 2 REACTOR BLDG. EL. 343' RAIL HEIGHT				
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Containment Laydown Floor Concrete Hatches	2,000 to 40,000	Reactor Pressure Boundary	Containment (See Sketch #11)	B
Reactor Vessel Inspection Tool	10,000	Reactor Pressure Boundary	Containment (See Sketch #12)	B
Reactor Containment Recirculation Fan	5,600	Reactor Pressure Boundary	Containment (See Sketch #13)	B

TABLE 1  
Page 12 of 13

CRANE		CONTAINMENT ANNULUS HOIST (2-MH-CR-19)		
LOCATION		UNIT 2 REACTOR BLDG. EL. 324' RAIL HEIGHT		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
Various Loads (Containment Maintenance)	2,000 to 10,000	Main Steam and Feedwater Piping	Containment (See Sketch #13)	C



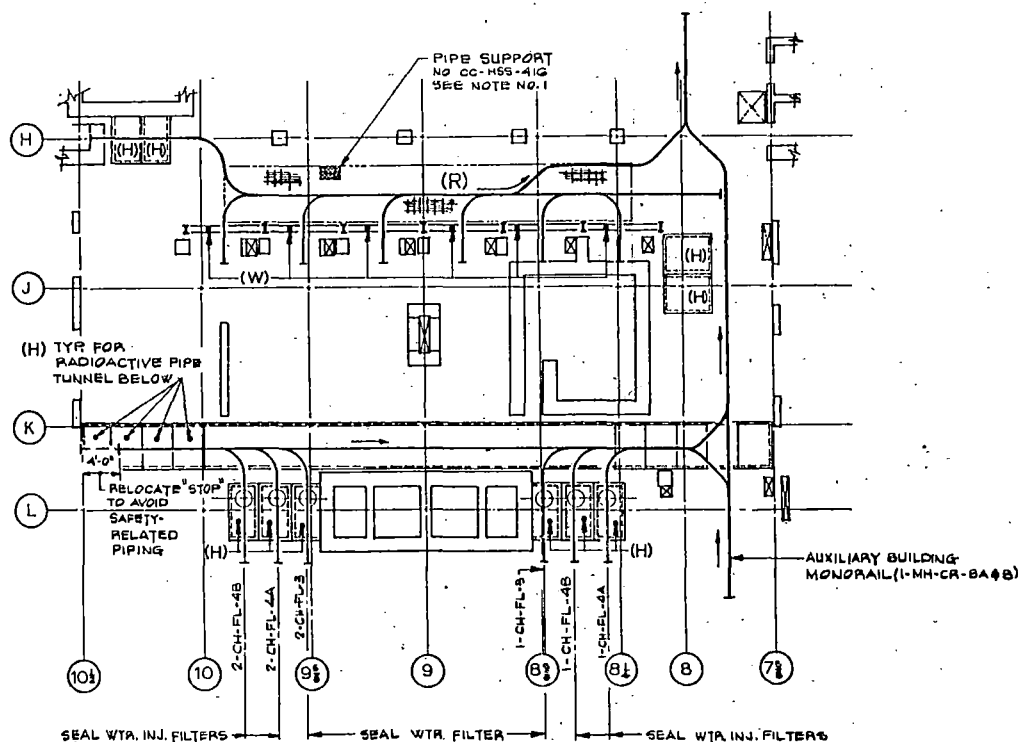
TABLE 1  
Page 13 of 13

CRANE		RHR PUMP MONORAILS		
LOCATION		UNIT 2 REACTOR BLDG., EL 235' FLOOR LEVEL		
LOADS	LOAD WEIGHT (LBS)	EQUIPMENT IMPACTED BY A LOAD DROP	LOCATION	HAZARD ELIMINATION CATEGORY
RHR Pump Motors	6,000	RHR (Residual Heat Removal) Pumps RHR Exchangers RHR Piping	Containment (See Sketch #13)	B B B

APPENDIX B

SAFE LOAD PATH SKETCHES

- Sketch No. 1 - Auxiliary Building Units No. 1 & 2, Plan El. 259'-6"
- Sketch No. 2 - Auxiliary Building Units No. 1 & 2, Plan El. 274'-0"
- Sketch No. 3 - Fuel Building Units No. 1 & 2, Plan El. 291'-10"
- Sketch No. 4 - Reactor Containment Unit No. 1, Plan El. 291'-10", Reactor Vessel Head, Upper Internals, Rigs and Missile Shield
- Sketch No. 5 - Reactor Containment Unit No. 1, Plan El. 291'-10", Reactor Vessel Seal Ring and Reactor Coolant Pump Motors
- Sketch No. 6 - Reactor Containment Unit No. 1, Plan El. 291'-10", Removable Floor Plugs, Hatches and Grating
- Sketch No. 7 - Reactor Containment Unit No. 1, Plan El. 291'-10", Reactor Vessel Inspection Tool
- Sketch No. 8 - Reactor Containment Unit No. 1, Plans El. 291'-10" and El. 235'-10" Containment Recirc. Fans and Miscellaneous Equipment
- Sketch No. 9 - Reactor Containment Unit No. 2, Plan El. 291'-10", Reactor Vessel Head, Upper Internals, Rigs and Missile Shield
- Sketch No. 10 - Reactor Containment Unit No. 2, Plan El. 291'-10", Reactor Vessel Seal Ring and Reactor Coolant Pump Motor
- Sketch No. 11 - Reactor Containment Unit No. 2, Plan El. 291'-10", Removable Floor Plugs, Hatches and Grating
- Sketch No. 12 - Reactor Containment Unit No. 2, Plan El. 291'-10", Reactor Vessel Inspection Tool
- Sketch No. 13 - Reactor Containment Unit No. 2, Plans El. 291'-10" and El. 235'-7" Containment Recirc. Fans & Miscellaneous Equipment



PLAN EL. 259'-6"

#### LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- SAFE LOAD PATHS
- (W) WALL PANEL (REMOVABLE)

#### NOTES:

1. THE RESTRICTION APPLIES TO VERTICAL LOAD LIFTS AND HORIZONTAL LOADS THAT ARE NOT ADEQUATELY RESTRAINED TO PREVENT A HEAVY LOAD DROP

REVISED FOR 9-MON. REPORT	CO	10/1/77
ISSUED FOR 9-MON. REPORT	LO	10/1/77
ISSUED FOR 6-MON. REPORT	HI	10/1/77
NO. DATE	REVISED BY	CHK'D BY
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V/L)		
GAITHERSBURG, MARYLAND		

VEPCO  
NORTH ANNA POWER STATION

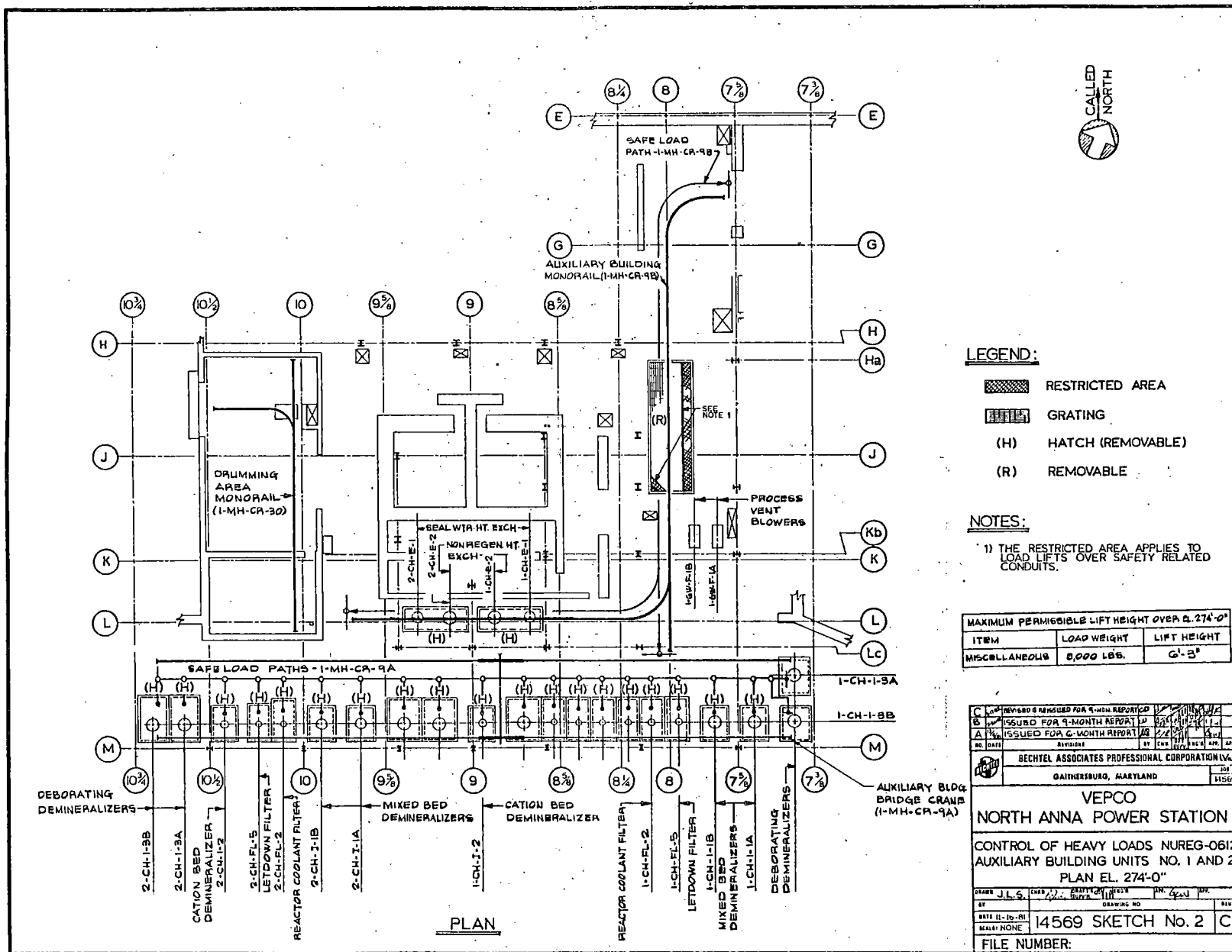
CONTROL OF HEAVY LOADS NUREG-0612

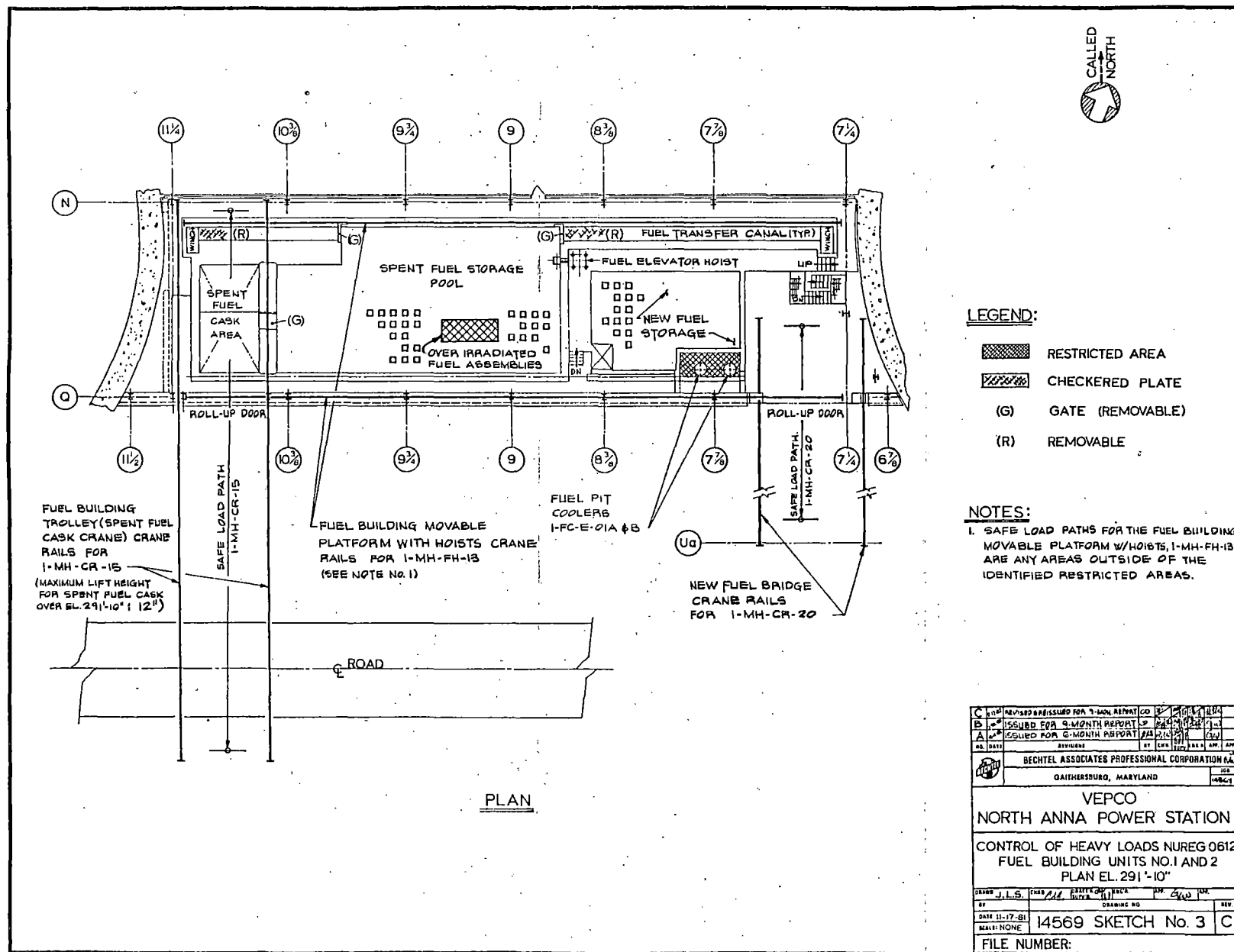
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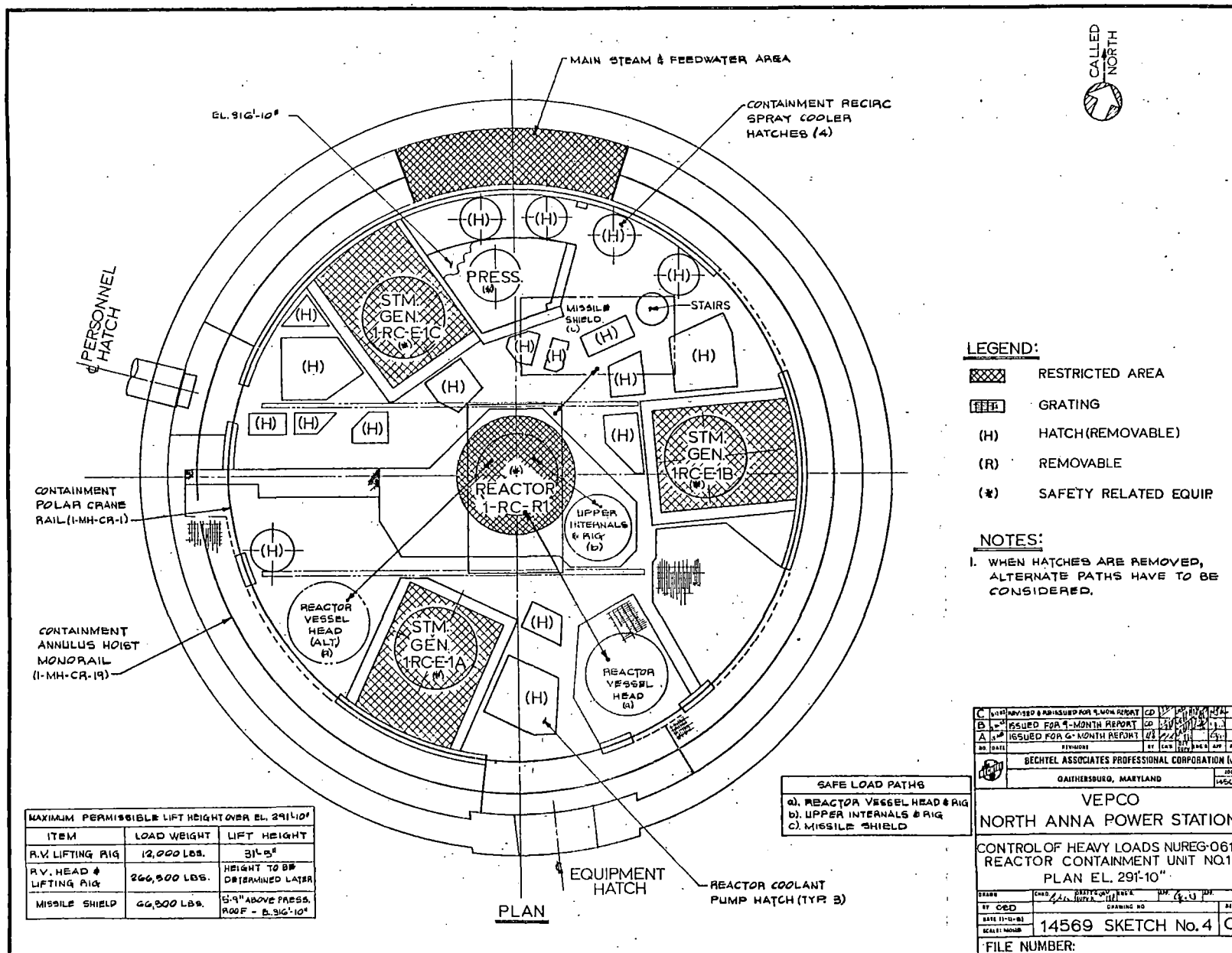
PLAN EL. 259'-6"

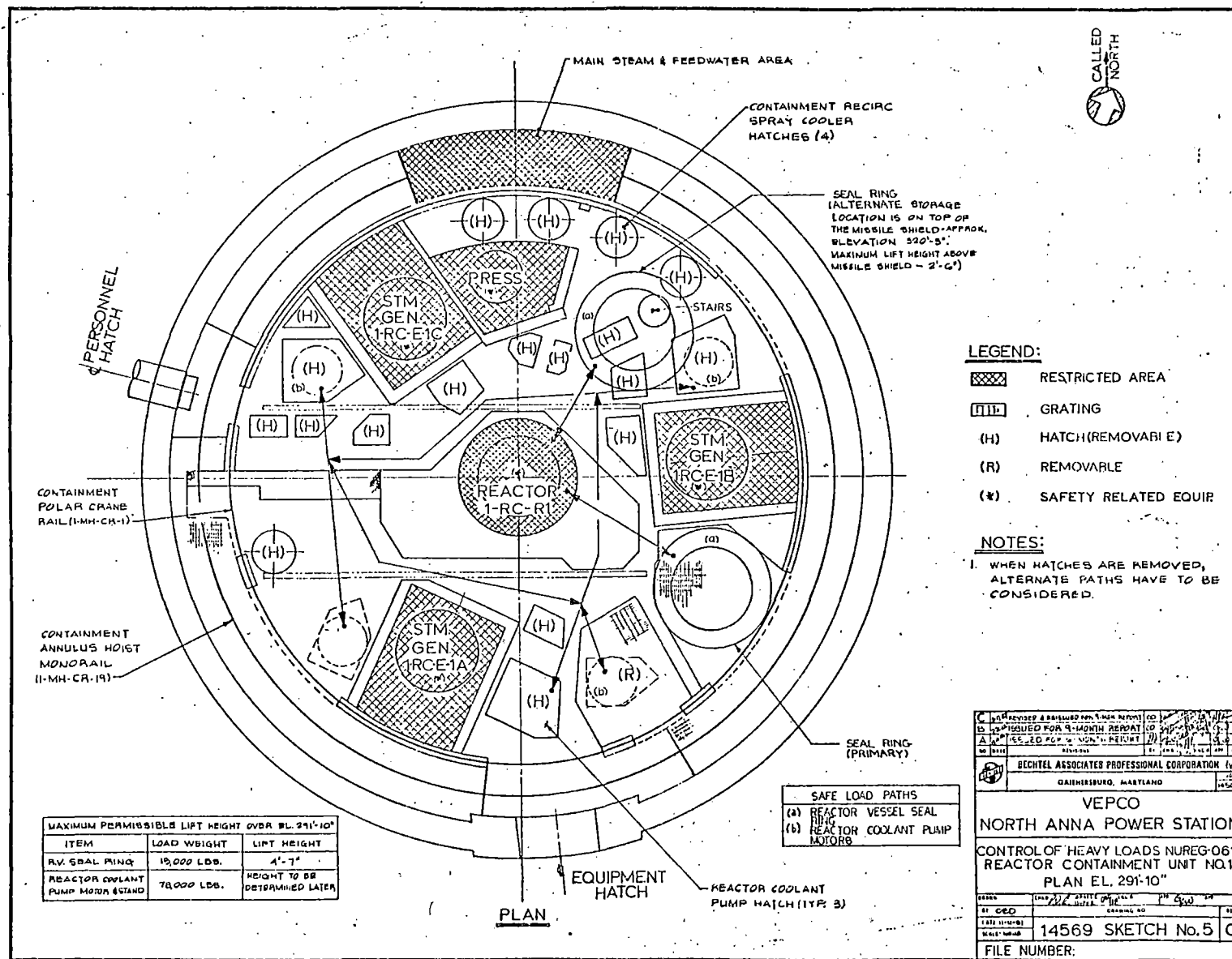
MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 259'-6"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
MISCELLANEOUS	8,000 LBS.	12"

DESIGN (C/D)	CHK'D BY	DATE	REV
BY	DATE	REV	
DATE 11-17-81	14569 SKETCH No. 1	C	
MALE: NONE	FILE NUMBER:		

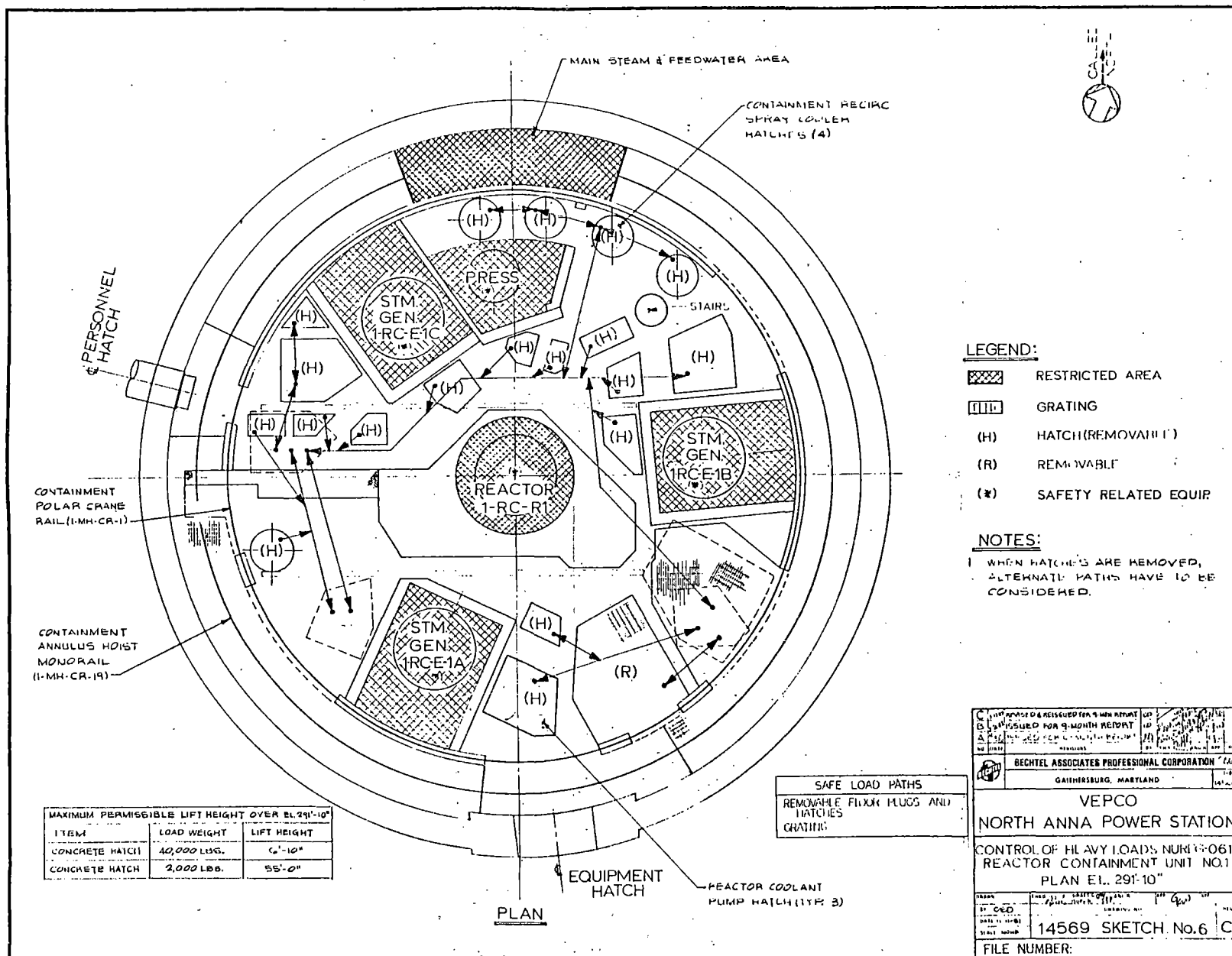


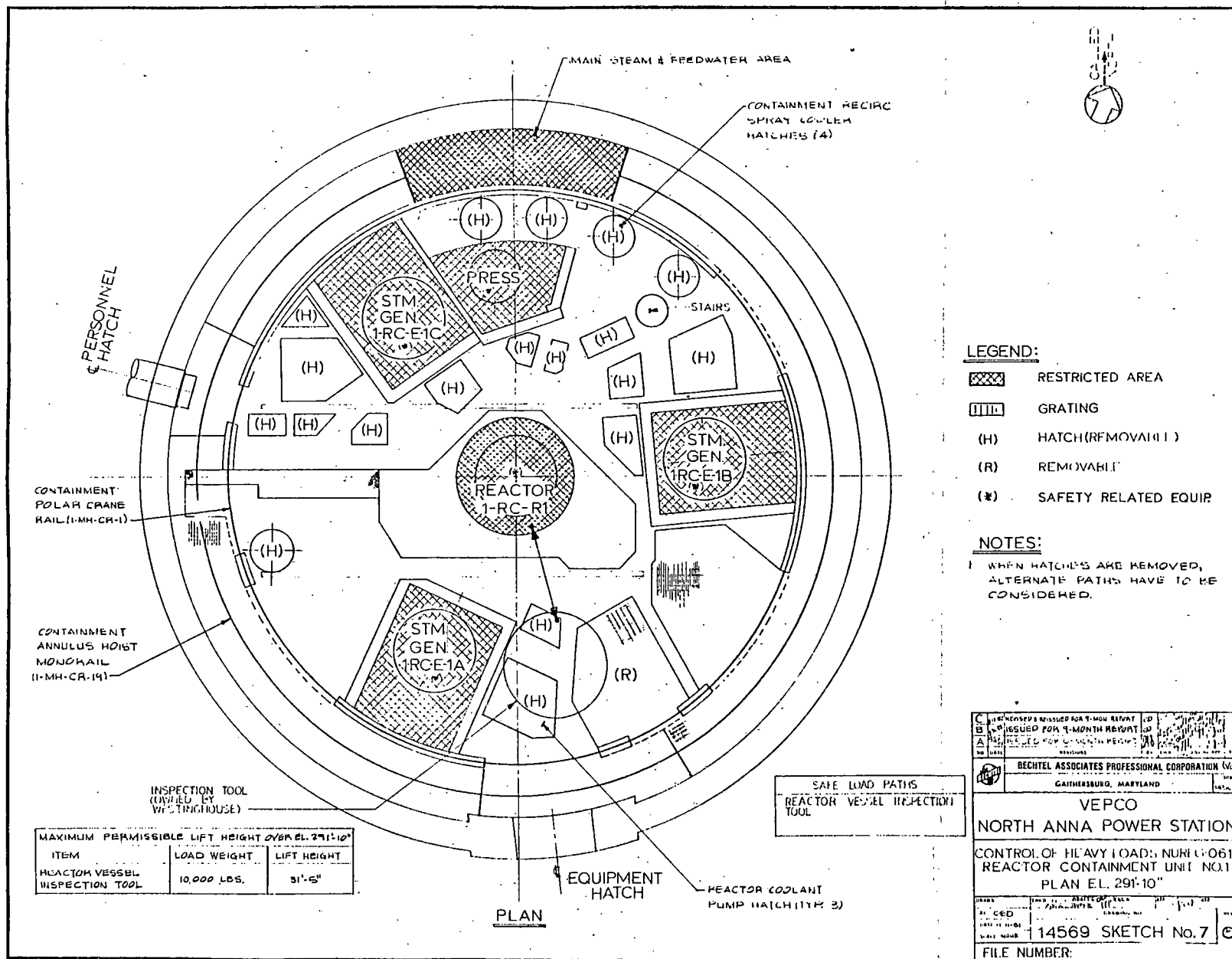




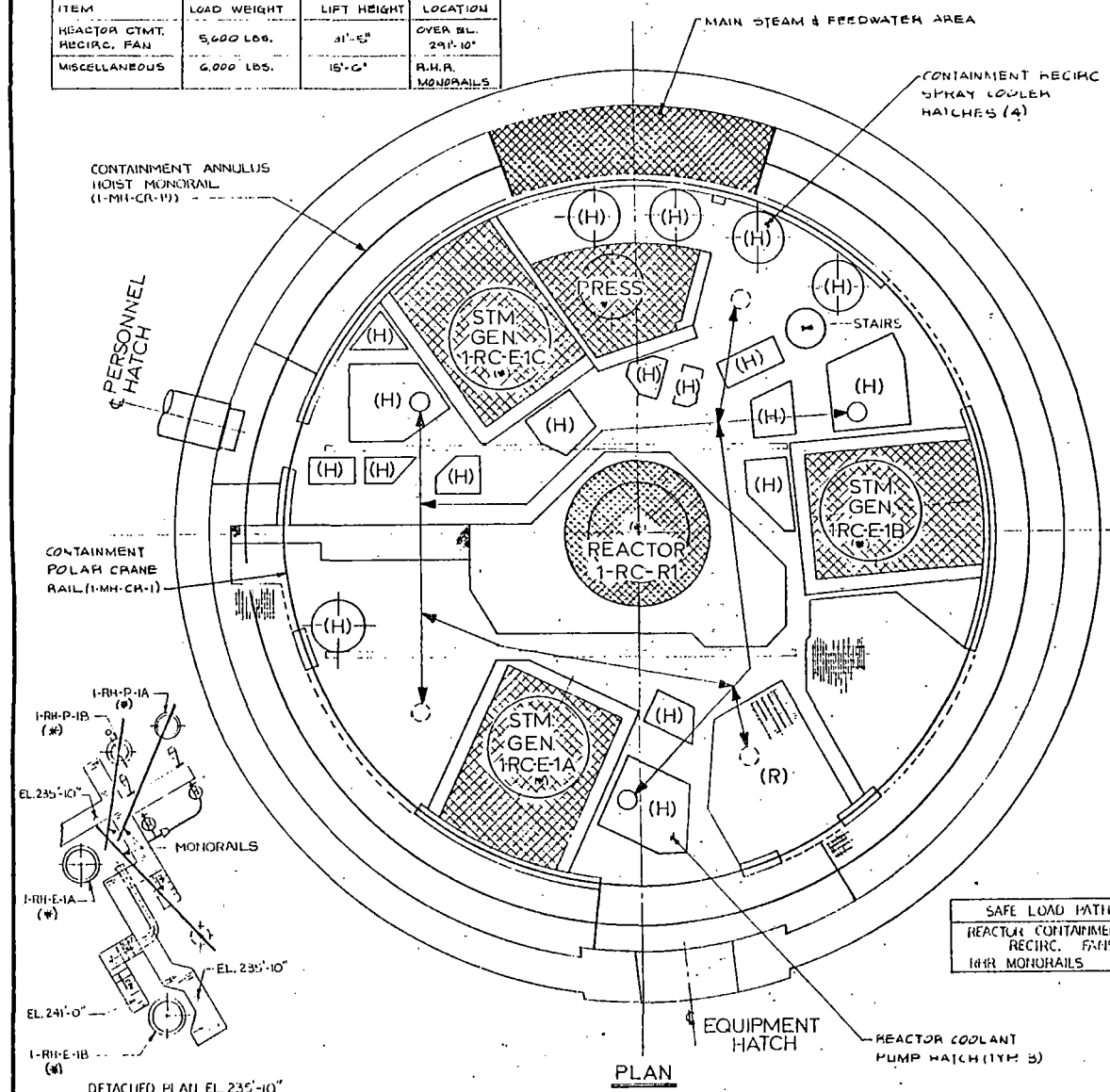








MAXIMUM PERMISSIBLE LIFT HEIGHT			
ITEM	LOAD WEIGHT	LIFT HEIGHT	LOCATION
REACTOR CTMT. RECIRC. FAN	5,000 LBS.	31'-5"	OVER BL. 291'-10"
MISCELLANEOUS	6,000 LBS.	15'-6"	R.H.R. MONORAILS



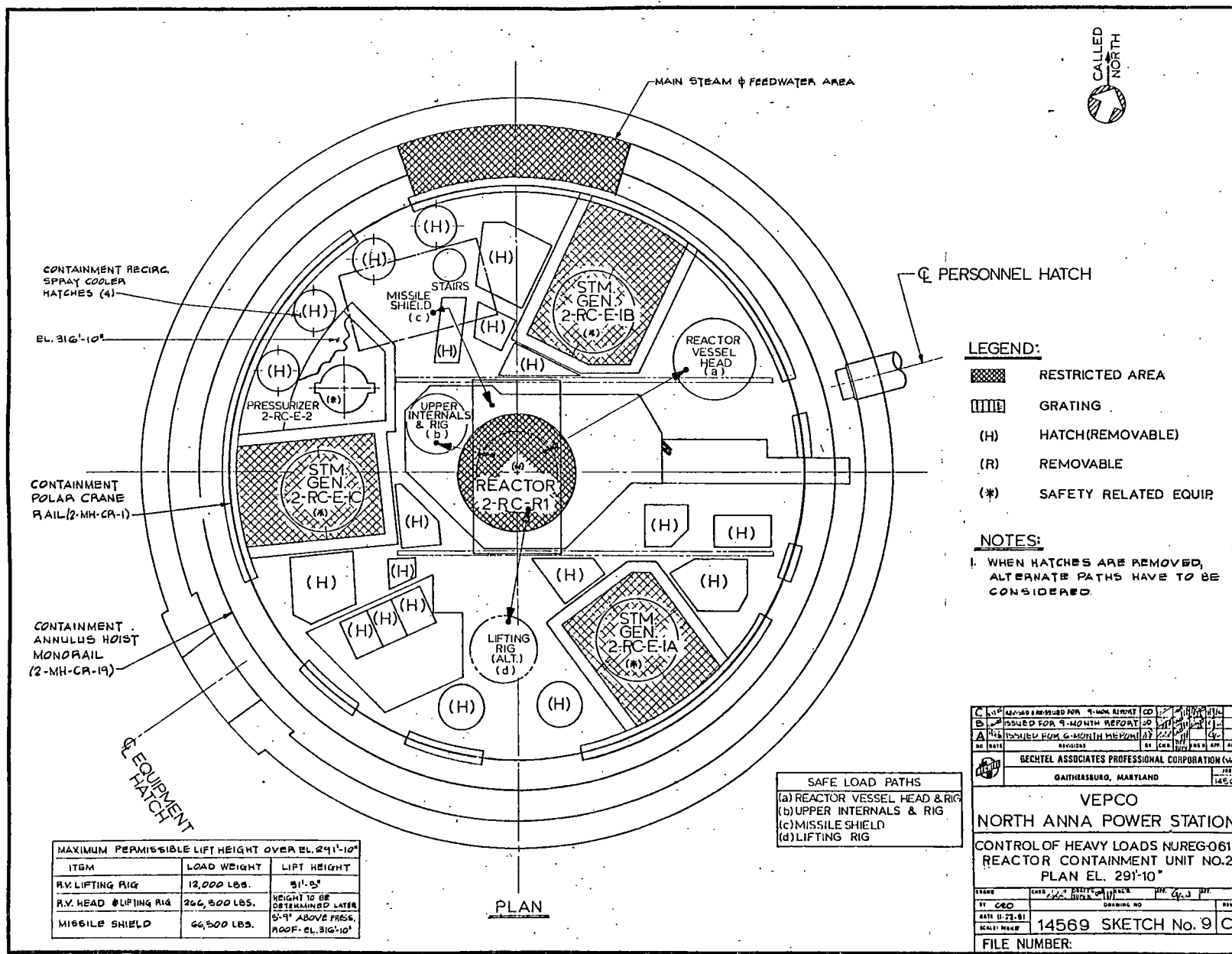
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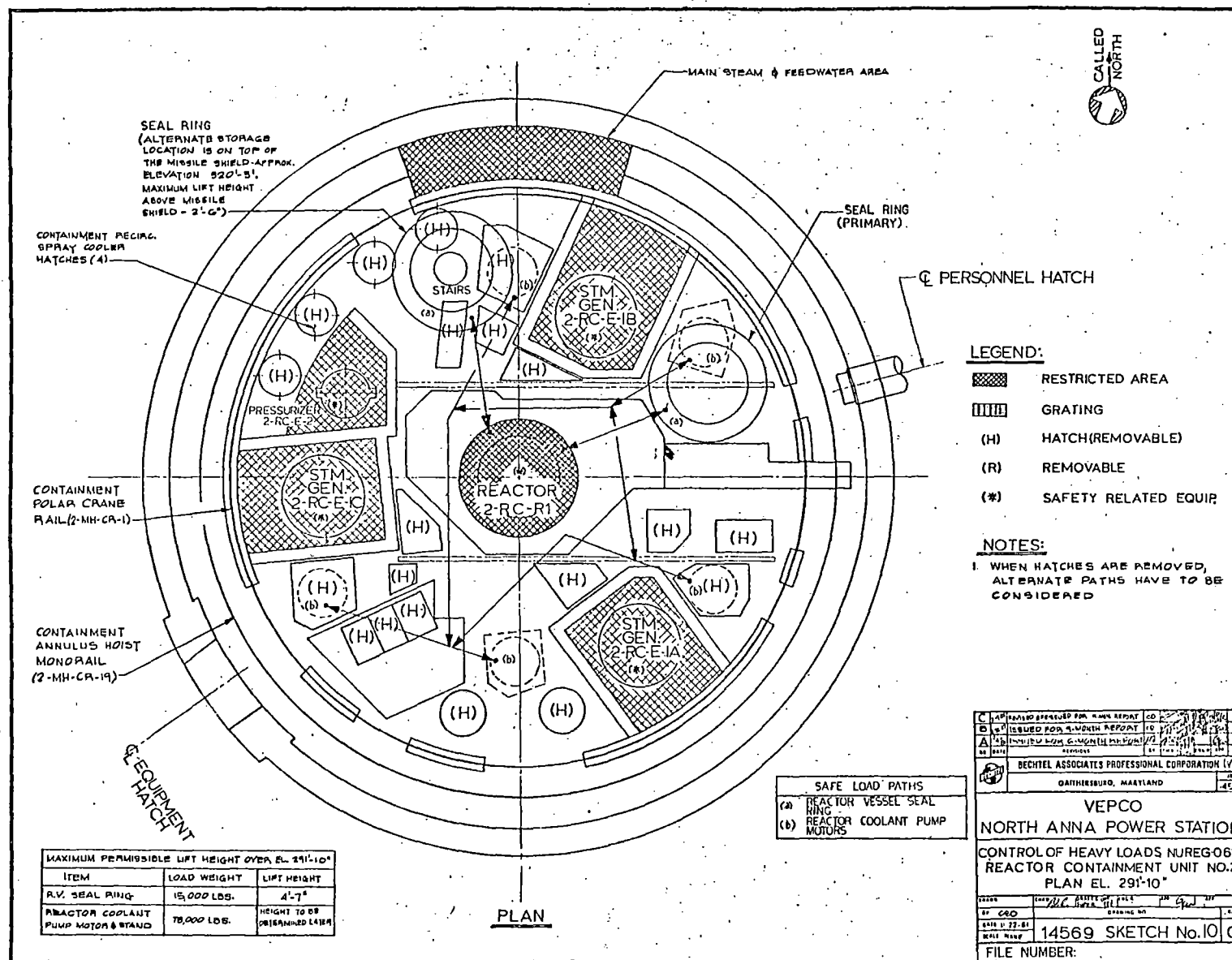
- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP

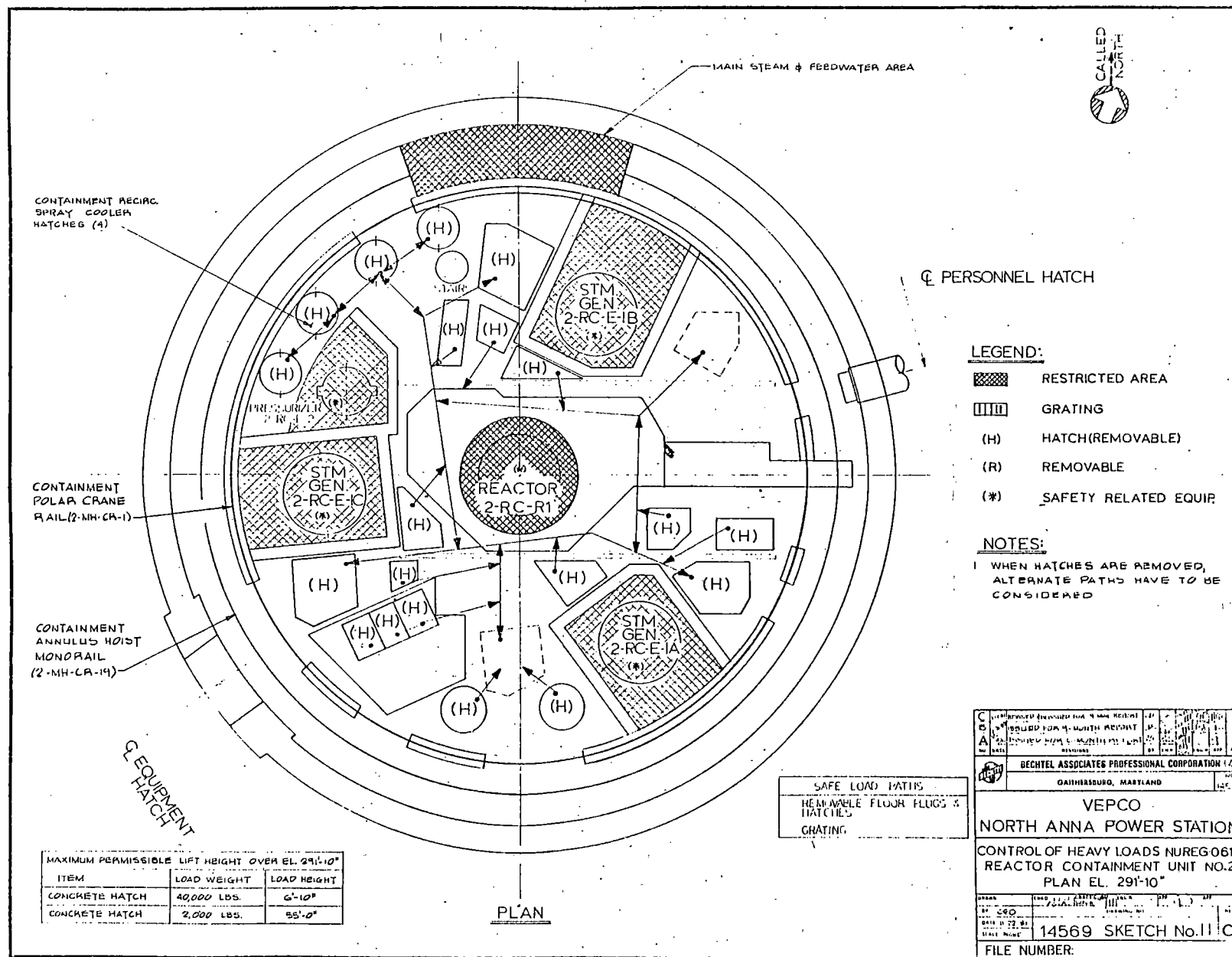
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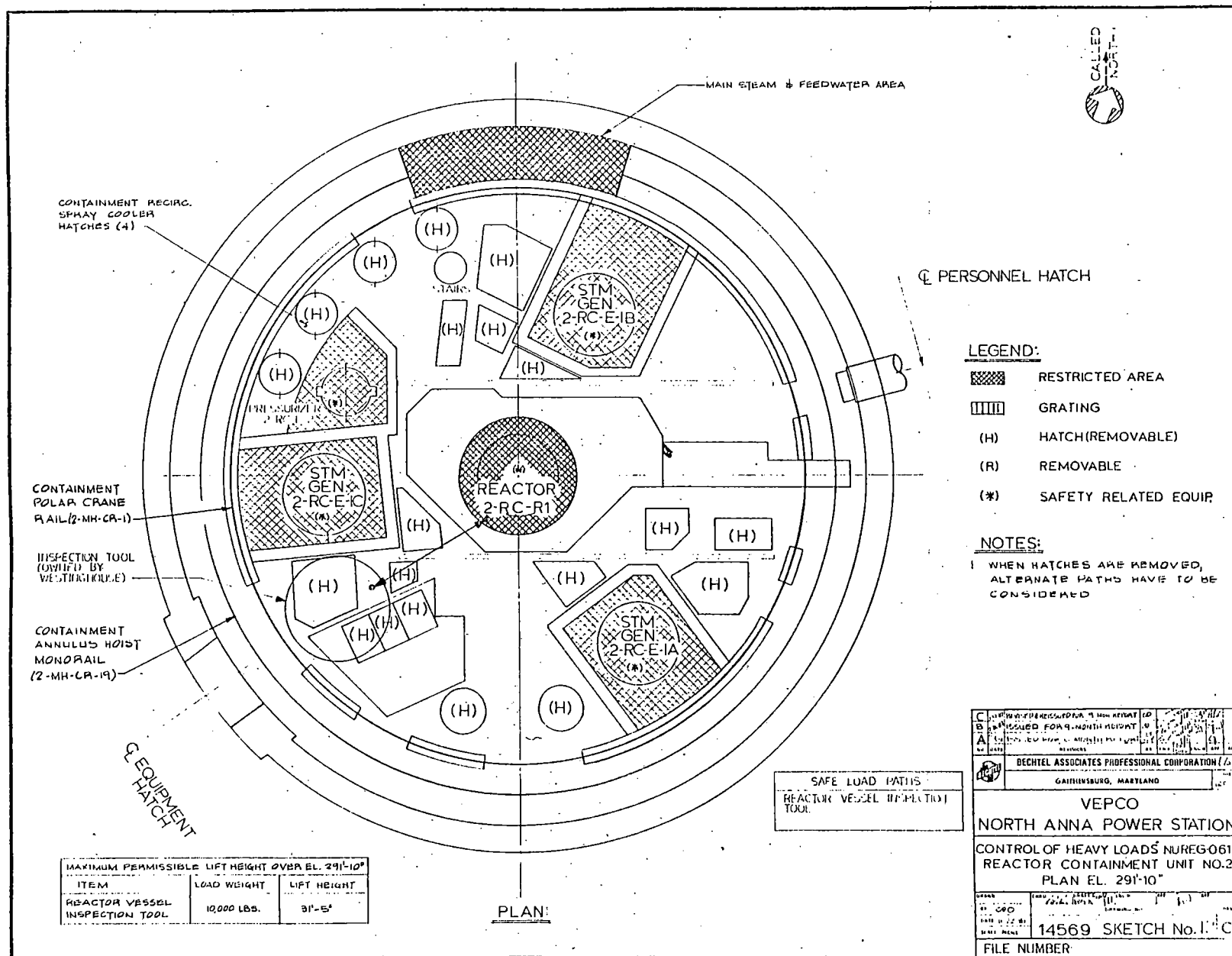
- 1 WHEN HATCHES ARE REMOVED,  
ALTERNATE PATHS HAVE TO BE  
CONSIDERED

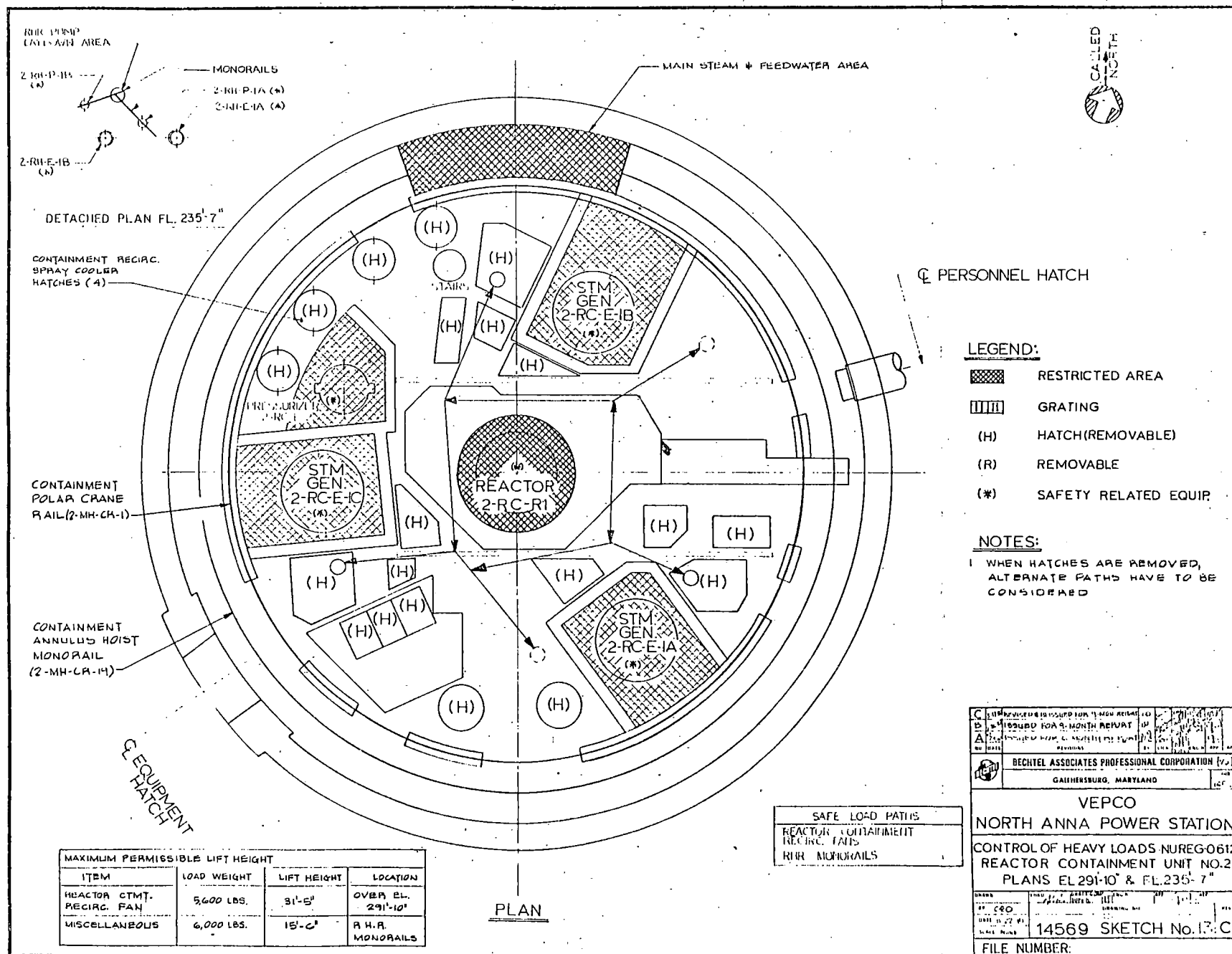
C. LAST REVISED & REISSUED FOR 9-MONTH REPORT		C. 12/1/77	
D. ISSUED FOR 9-MONTH REPORT		D. 12/1/77	
A. PREPARED FOR CONTRACT NO. 14569		A. 12/1/77	
REVISIONS		REVISIONS	
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V)			
GAITHERSBURG, MARYLAND			
VEPCO			
NORTH ANNA POWER STATION			
CONTROL OF HEAVY LOADS NUMBER 0612			
REACTOR CONTAINMENT UNIT NO. 1			
PLANS EL. 291'-10" & EL. 235'-10"			
DESIGNED BY	DATE 11-11-77	SCALE	AS SHOWN
CHECKED BY	DATE 11-11-77	SCALE	AS SHOWN
14569 SKETCH No. 8 C			
FILE NUMBER			



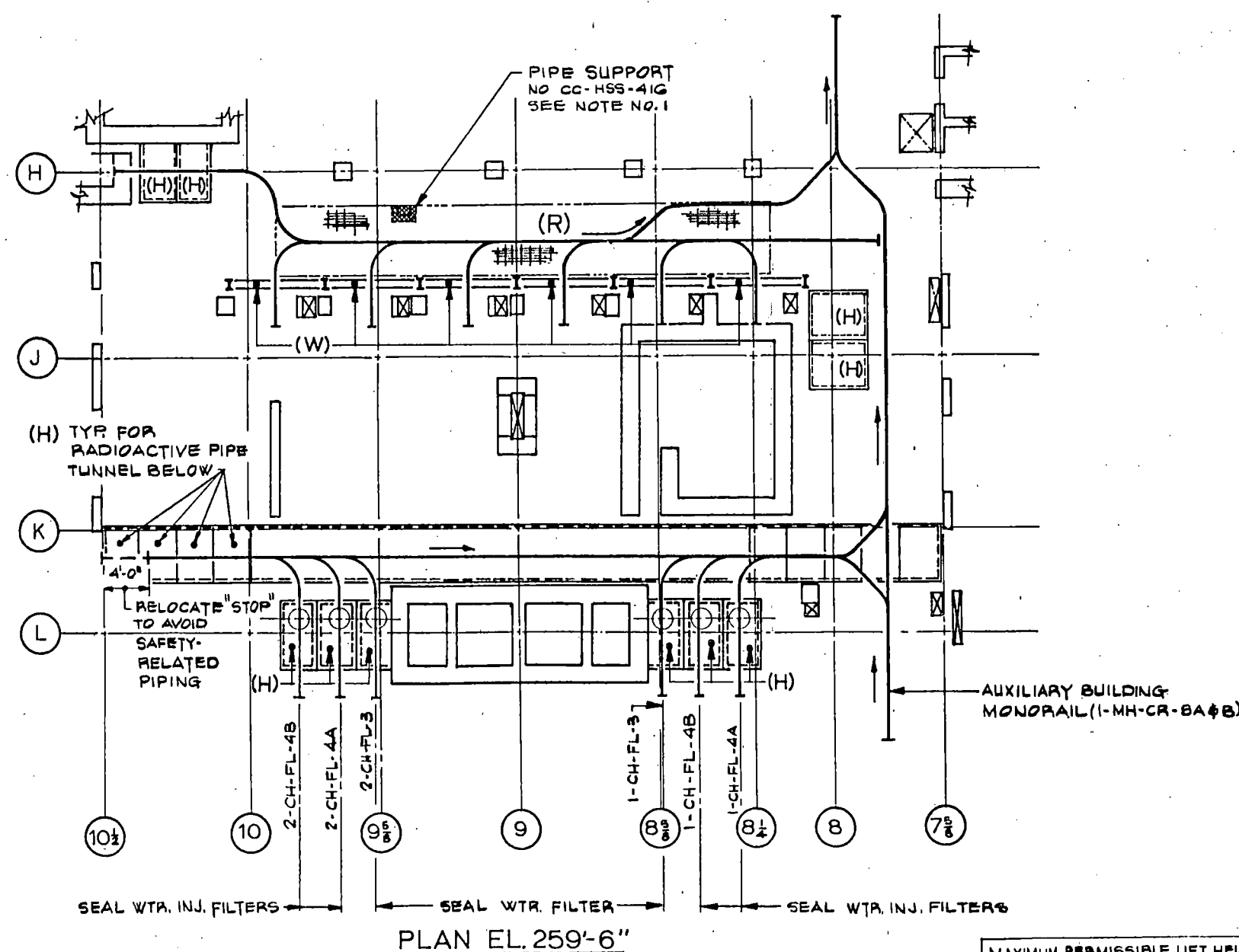












#### LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- SAFE LOAD PATHS
- (W) WALL PANEL (REMOVABLE)

#### NOTES:

1. THE RESTRICTION APPLIES TO VERTICAL LOAD LIFTS AND HORIZONTAL LOADS THAT ARE NOT ADEQUATELY RESTRAINED TO PREVENT A HEAVY LOAD DROP

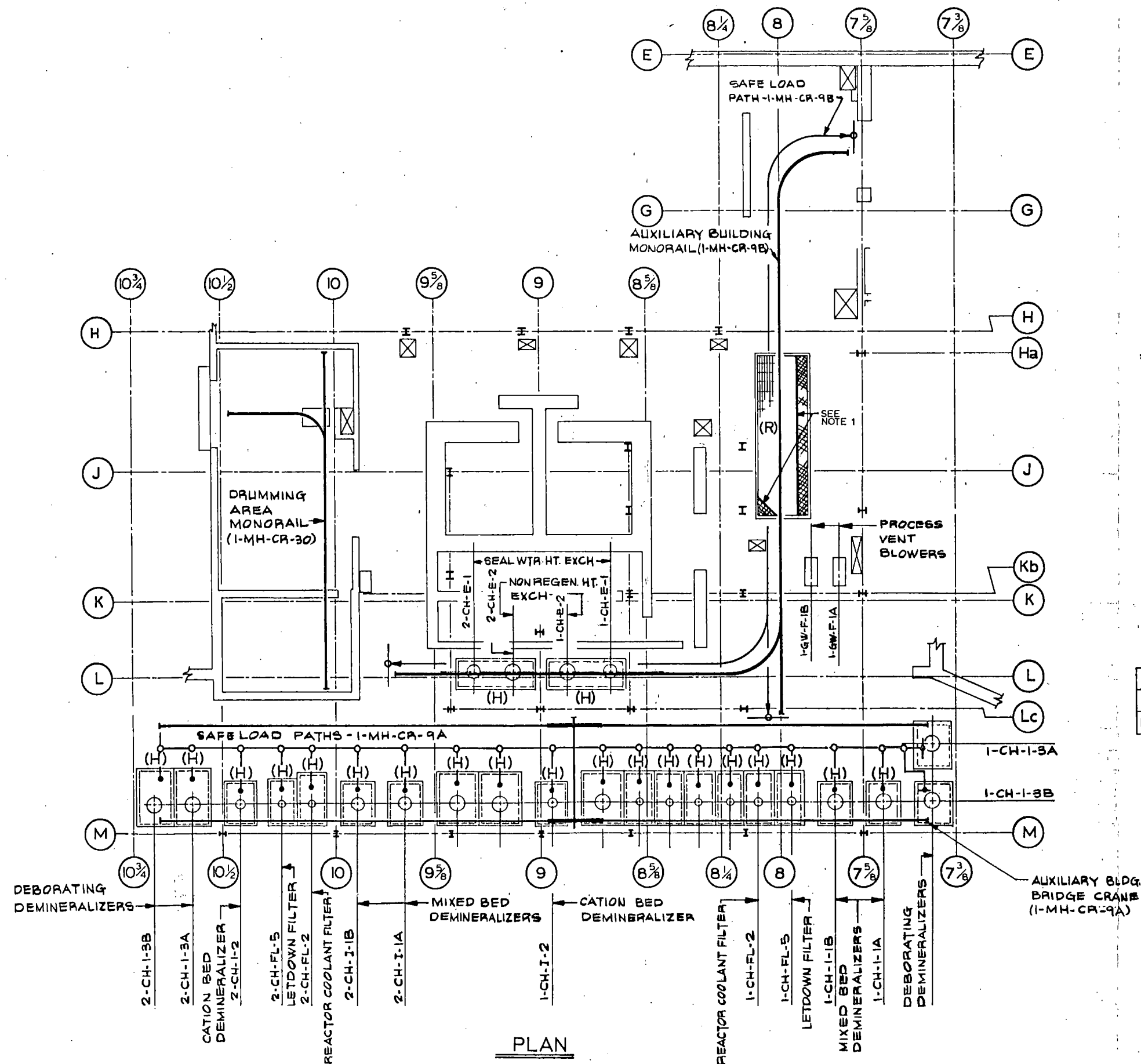
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B	ISSUED FOR 9-MON. REPORT	GO	11/1/81	14669
A	ISSUED FOR 6-MON. REPORT	11/1/81	14669	
NO.	DATE	REVISIONS	BY	CHK'D
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V.L.)				
GAITHERSBURG, MARYLAND				

VEPCO  
NORTH ANNA POWER STATION  
CONTROL OF HEAVY LOADS NUREG-0612  
AUXILIARY BUILDING UNITS NO. 1 & 2  
PLAN EL. 259'-6"



MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 259'-6"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
MISCELLANEOUS	8,000 LBS.	12"

DRAWN	CHK'D	DRAFTED	BY	APP.
11-17-BI	11-17-BI	11-17-BI	11-17-BI	11-17-BI
DATE	DATE	DATE	DATE	DATE
SCALE: NONE	14569	SKETCH No. 1	C	

FILE NUMBER:



# **LEGEND:**

-  RESTRICTED AREA
-  GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE

## **NOTES:**

- 1) THE RESTRICTED AREA APPLIES TO LOAD LIFTS OVER SAFETY RELATED CONDUITS.

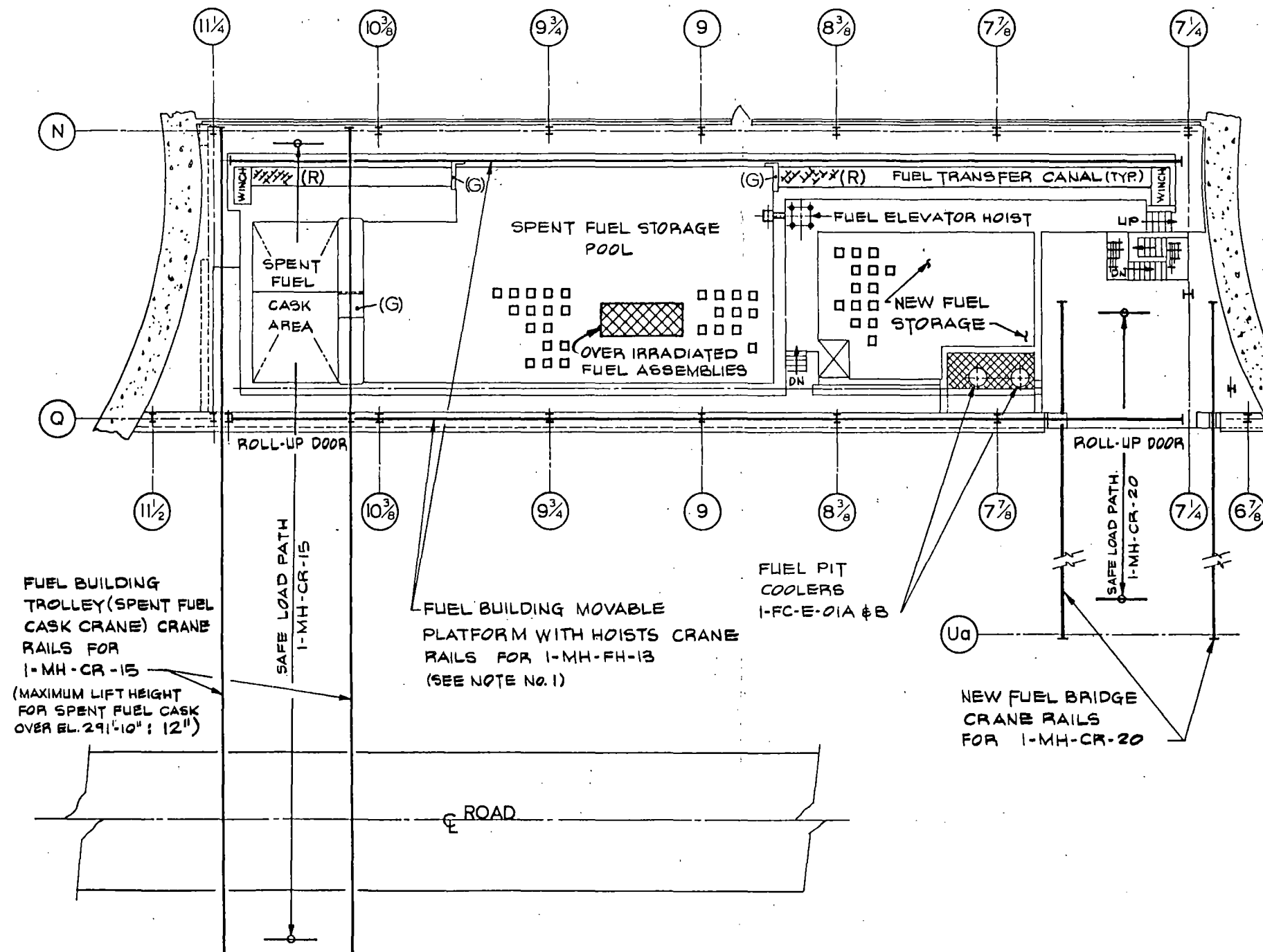
MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 274'-0"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
MISCELLANEOUS	8,000 LBS.	6'-3"

C	10/1/77	REVISED & REISSUED FOR 9-MON. REPORT	CD	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/77	10/1/7
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**VEPCO**  
**NORTH ANNA POWER STATION**

CONTROL OF HEAVY LOADS NUREG-0612  
AUXILIARY BUILDING UNITS NO. 1 AND 2  
PLAN EL. 274'-0"

DRAWN J.L.S.	CHKD. J.L.S.	DATE 11-16-81	SCALE: NONE
BY		DRAWING NO.	REV.
		14569 SKETCH No. 2	C
FILE NUMBER:			



# LEGEND:

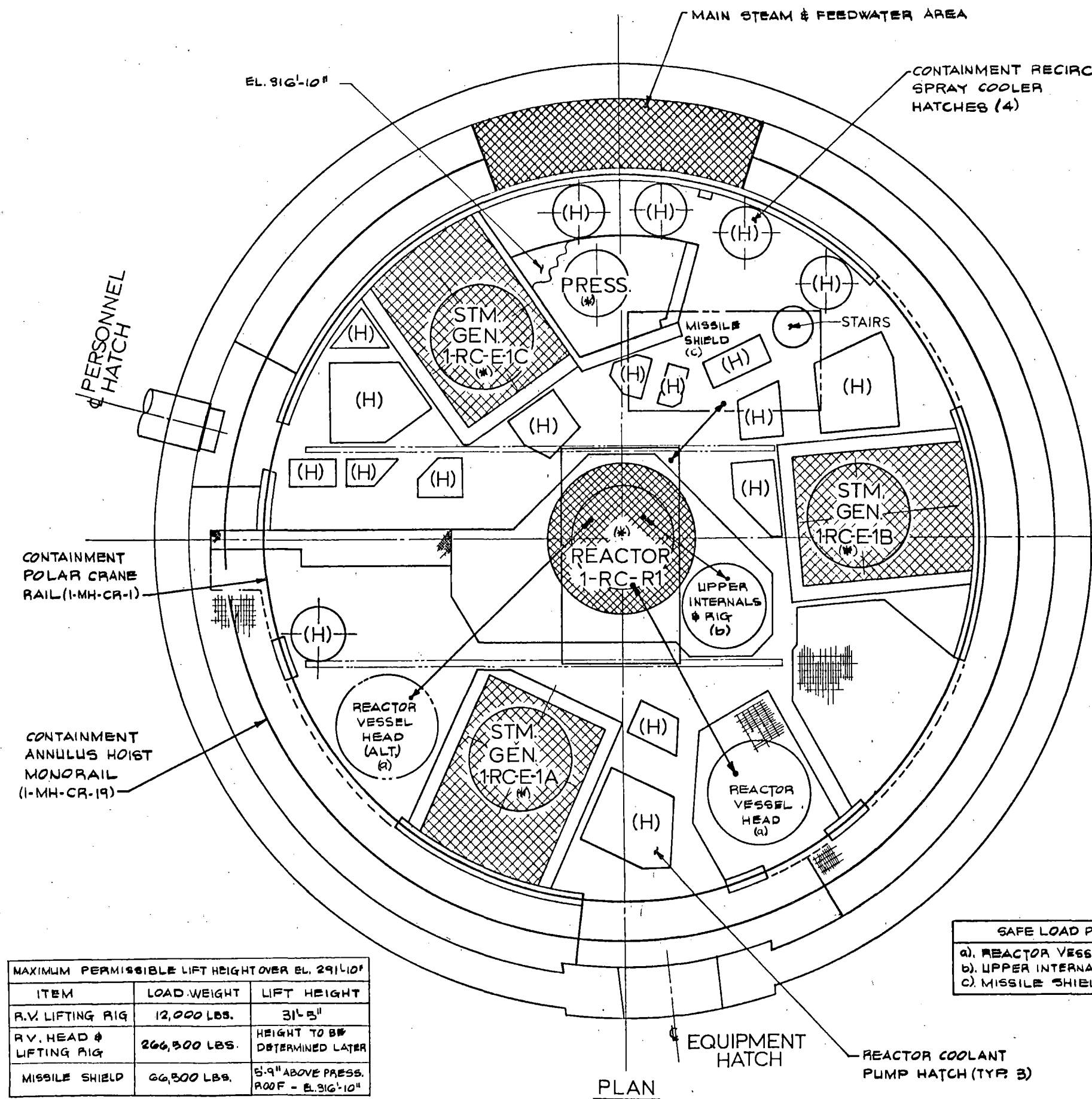
- RESTRICTED AREA
- CHECKERED PLATE
- (G) GATE (REMOVABLE)
- (R) REMOVABLE

# NOTES:

- SAFE LOAD PATHS FOR THE FUEL BUILDING MOVABLE PLATFORM W/HOISTS, 1-MH-FH-13, ARE ANY AREAS OUTSIDE OF THE IDENTIFIED RESTRICTED AREAS.

PLAN

REVISED & REISSUED FOR 9-MON. REPORT	CO	11/17/81	11/17/81
ISSUED FOR 9-MONTH REPORT	CO	11/17/81	11/17/81
ISSUED FOR 9-MONTH REPORT	CO	11/17/81	11/17/81
NO. DATE	REVISIONS	BY	CHK. DIT. ENG'R APP. APP.
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (A)			
GAITHERSBURG, MARYLAND			
VEPCO			
NORTH ANNA POWER STATION			
CONTROL OF HEAVY LOADS NUREG-0612			
FUEL BUILDING UNITS NO.1 AND 2			
PLAN EL. 291'-10"			
DRAWN J.L.S.	CHKD. P.D.	DATE 11-17-81	SCALE: NONE
DRAWING NO. 14569 SKETCH No. 3			REV. C
FILE NUMBER:			



#### LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP

#### NOTES:

1. WHEN HATCHES ARE REMOVED, ALTERNATE PATHS HAVE TO BE CONSIDERED.

MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 291'-10"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
R.V. LIFTING RIG	12,000 LBS.	31'-5"
R.V. HEAD & LIFTING RIG	266,500 LBS.	HEIGHT TO BE DETERMINED LATER
MISSILE SHIELD	66,500 LBS.	5'-9" ABOVE PRESS. ROOF - EL. 316'-10"

SAFE LOAD PATHS  
a). REACTOR VESSEL HEAD & RIG  
b). UPPER INTERNALS & RIG  
c). MISSILE SHIELD

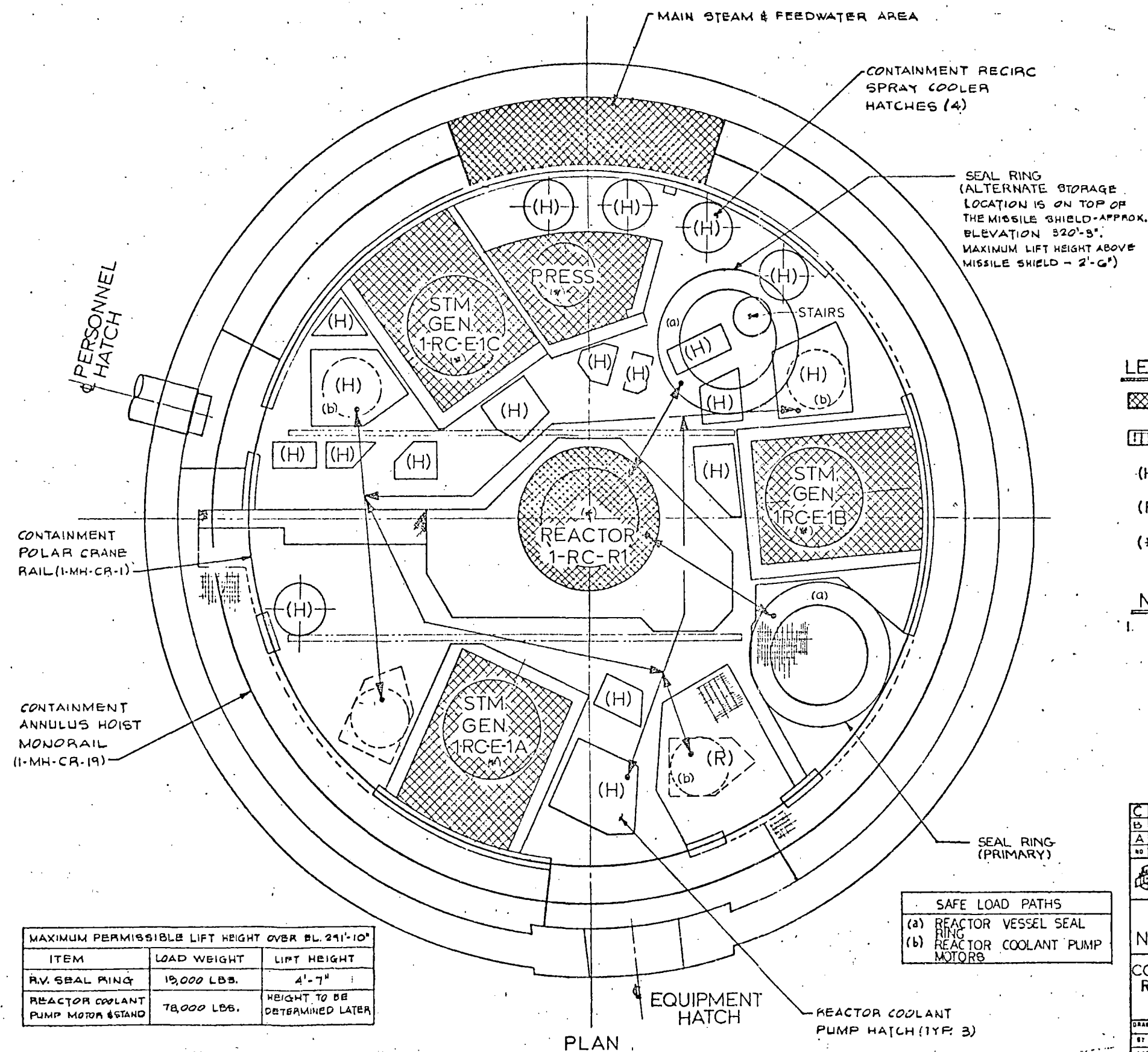
C	REVISED & REISSUED FOR 9-MONTH REPORT	CD	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81
B	ISSUED FOR 9-MONTH REPORT	CD	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81
A	ISSUED FOR 9-MONTH REPORT	CD	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81	1/1/81
NO.	DATE	REVISIONS	BY	CHK.	APP.	ENG'R	APP.	APP.	APP.
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V6)									
GAITHERSBURG, MARYLAND									
14569									

VEPCO  
NORTH ANNA POWER STATION

CONTROL OF HEAVY LOADS NUREG-0612  
REACTOR CONTAINMENT UNIT NO.1  
PLAN EL. 291'-10"

DRAWN	CHKD.	DRAFTING	ENG'R.	APP.	APP.
BY CED		ISSUED		APP.	
DATE 11-11-81		DRAWING NO.			REV.
SCALE: NONE		14569 SKETCH No. 4			C

FILE NUMBER:



#### LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP

#### NOTES:

1. WHEN HATCHES ARE REMOVED, ALTERNATE PATHS HAVE TO BE CONSIDERED.

MAXIMUM PERMISSIBLE LIFT HEIGHT OVER BL. 291'-10"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
R.V. SEAL RING	19,000 LBS.	4'-7"
REACTOR COOLANT PUMP MOTOR STAND	78,000 LBS.	HEIGHT TO BE DETERMINED LATER

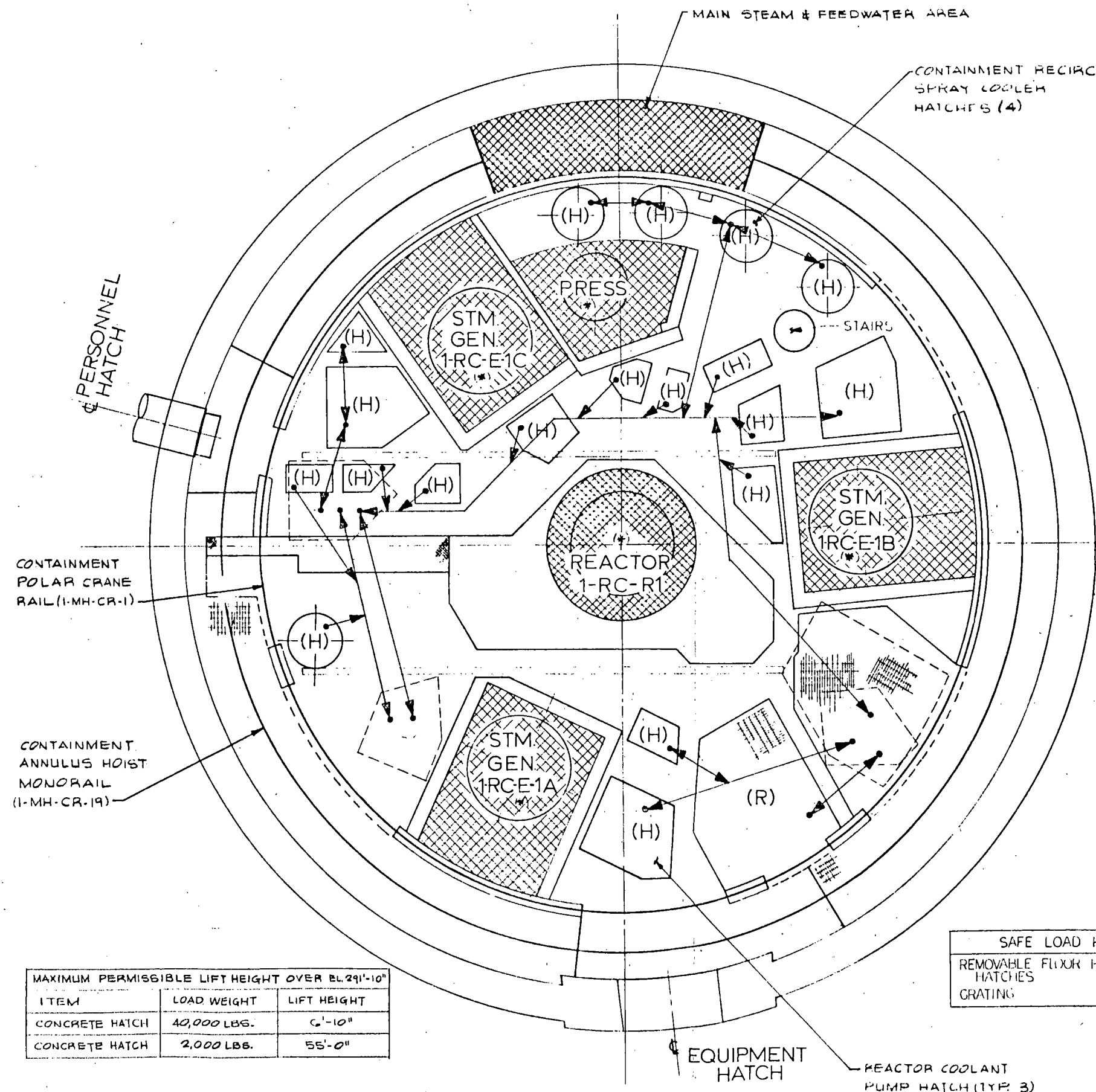
SAFE LOAD PATHS	
(a)	REACTOR VESSEL SEAL RING
(b)	REACTOR COOLANT PUMP MOTORS

REVISED & REISSUED FOR 9-MON. REPORT	CO	10/1/71
ISSUED FOR 9-MON. REPORT	CO	10/1/71
ISSUED FOR 9-MON. REPORT	CO	10/1/71
NO. DATE	REVISIONS	BY CHK'D INCH APP APP
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V)		
GAITHERSBURG, MARYLAND		
14569		

VEPCO  
NORTH ANNA POWER STATION

CONTROL OF HEAVY LOADS NUREG-0612  
REACTOR CONTAINMENT UNIT NO.1  
PLAN EL. 291'-10"

DRAWN	CHKD	DATE	BY	APP
ST CED		10/1/71	10/1/71	10/1/71
DATE (11-11-81)	DRAWING NO.			REV
SCALE: NONE	14569 SKETCH No.5			C
FILE NUMBER:				



# LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP.

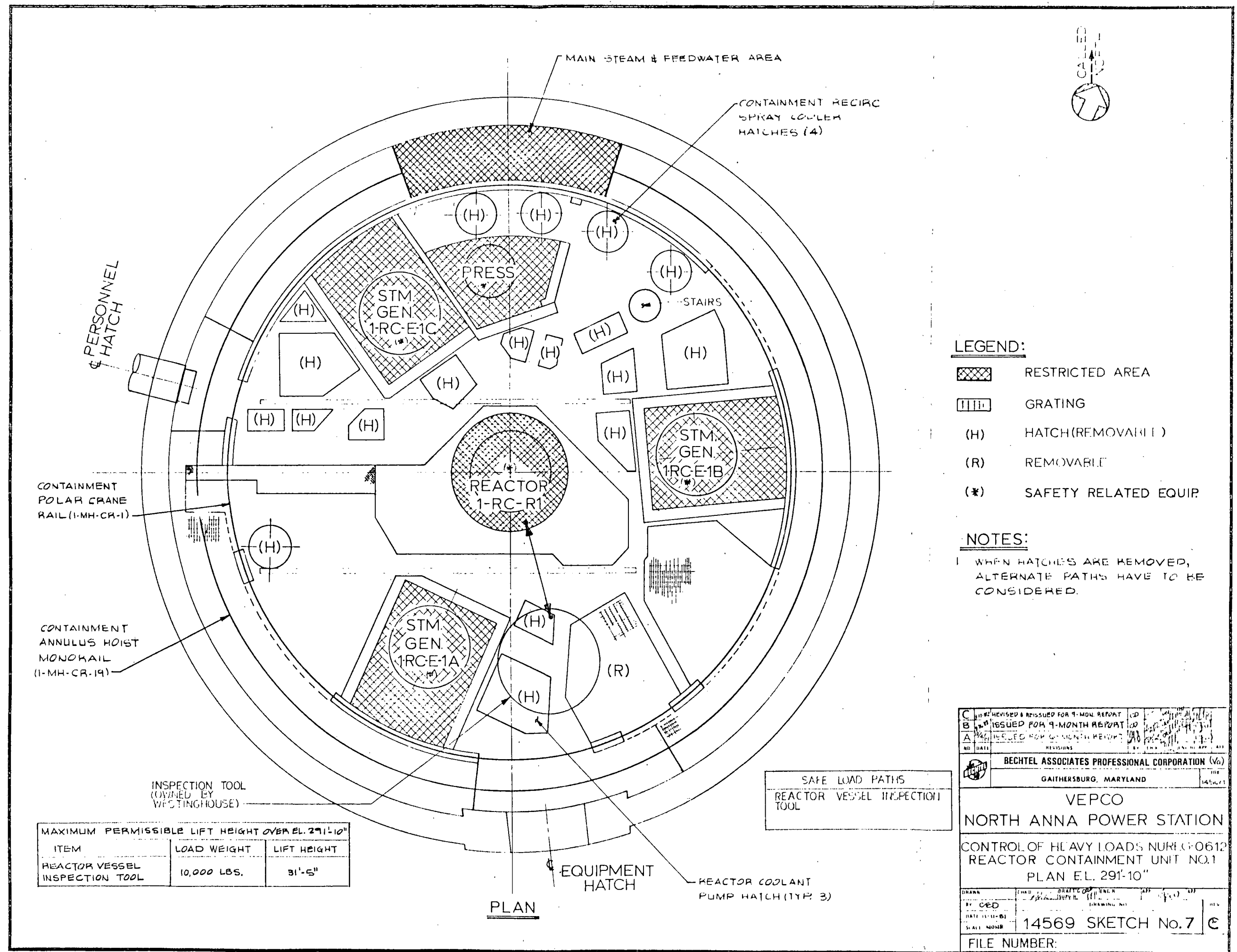
## NOTES:

- 1 WHEN HATCHES ARE REMOVED, ALTERNATE PATHS HAVE TO BE CONSIDERED.

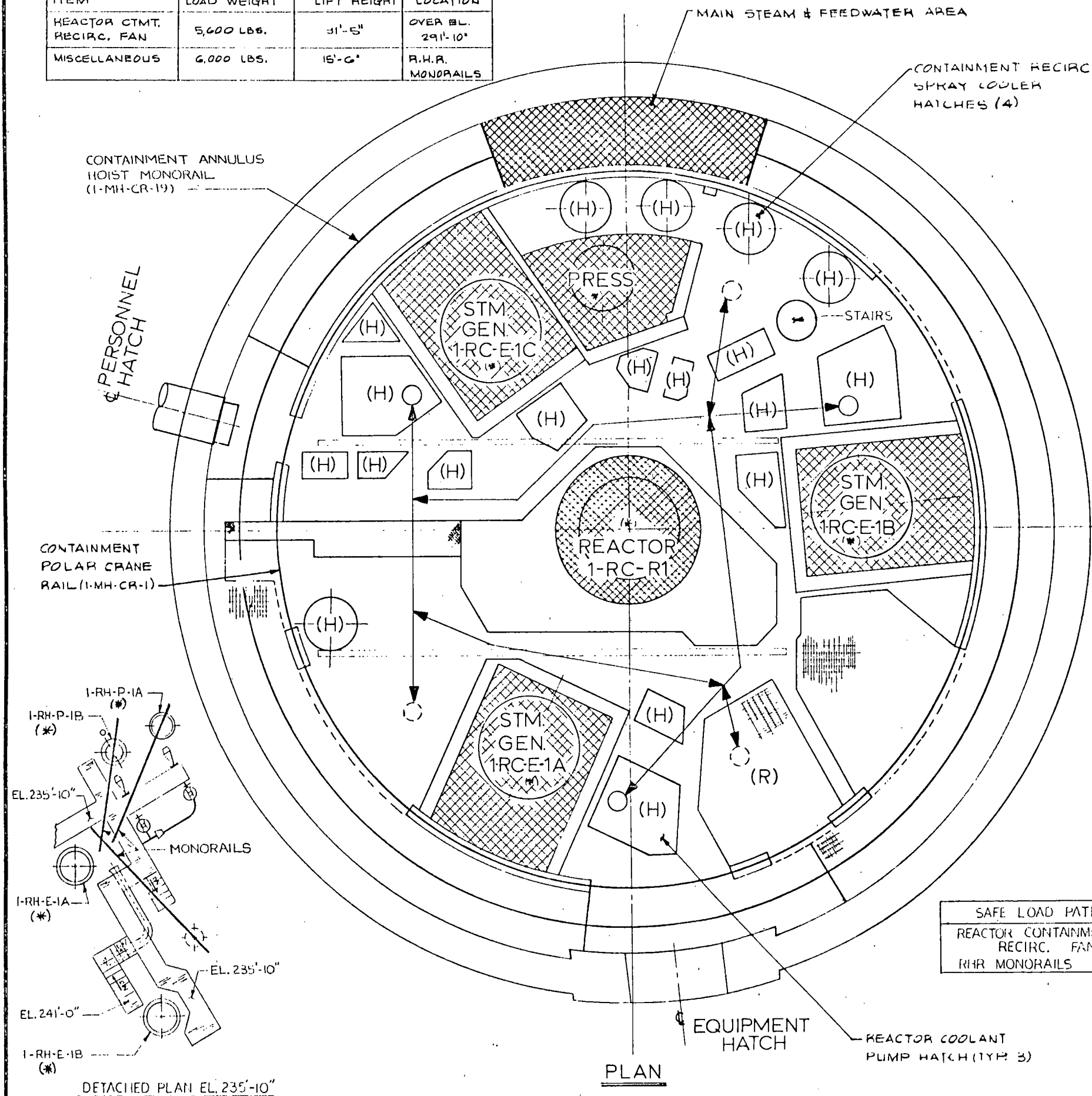
MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 291'-10"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
CONCRETE HATCH	40,000 LBS.	6'-10"
CONCRETE HATCH	2,000 LBS.	55'-0"

PLAN

C. REVISED & REISSUED FOR 9-MONTH REPORT		CD	
B. ISSUED FOR 9-MONTH REPORT		CD	
A. ISSUED FOR 9-MONTH REPORT		CD	
NO.	DATE	REVISIONS	BY
<b>BECHTEL ASSOCIATES PROFESSIONAL CORPORATION</b> GAITHERSBURG, MARYLAND			
<b>VEPCO</b> <b>NORTH ANNA POWER STATION</b> CONTROL OF HEAVY LOADS NUREG-0612 REACTOR CONTAINMENT UNIT NO. 1 PLAN EL. 291'-10"			
DRAWN	CHKD	DATE	APP
BY CED	DATE 11-1-81	SCALE	14569 SKETCH No. 6
FILE NUMBER:			



MAXIMUM PERMISSIBLE LIFT HEIGHT			
ITEM	LOAD WEIGHT	LIFT HEIGHT	LOCATION
REACTOR CTMT. RECIRC. FAN	5,600 LBS.	31'-5"	OVER BL. 291'-10"
MISCELLANEOUS	6,000 LBS.	15'-6"	R.H.R. MONORAILS



#### LEGEND:

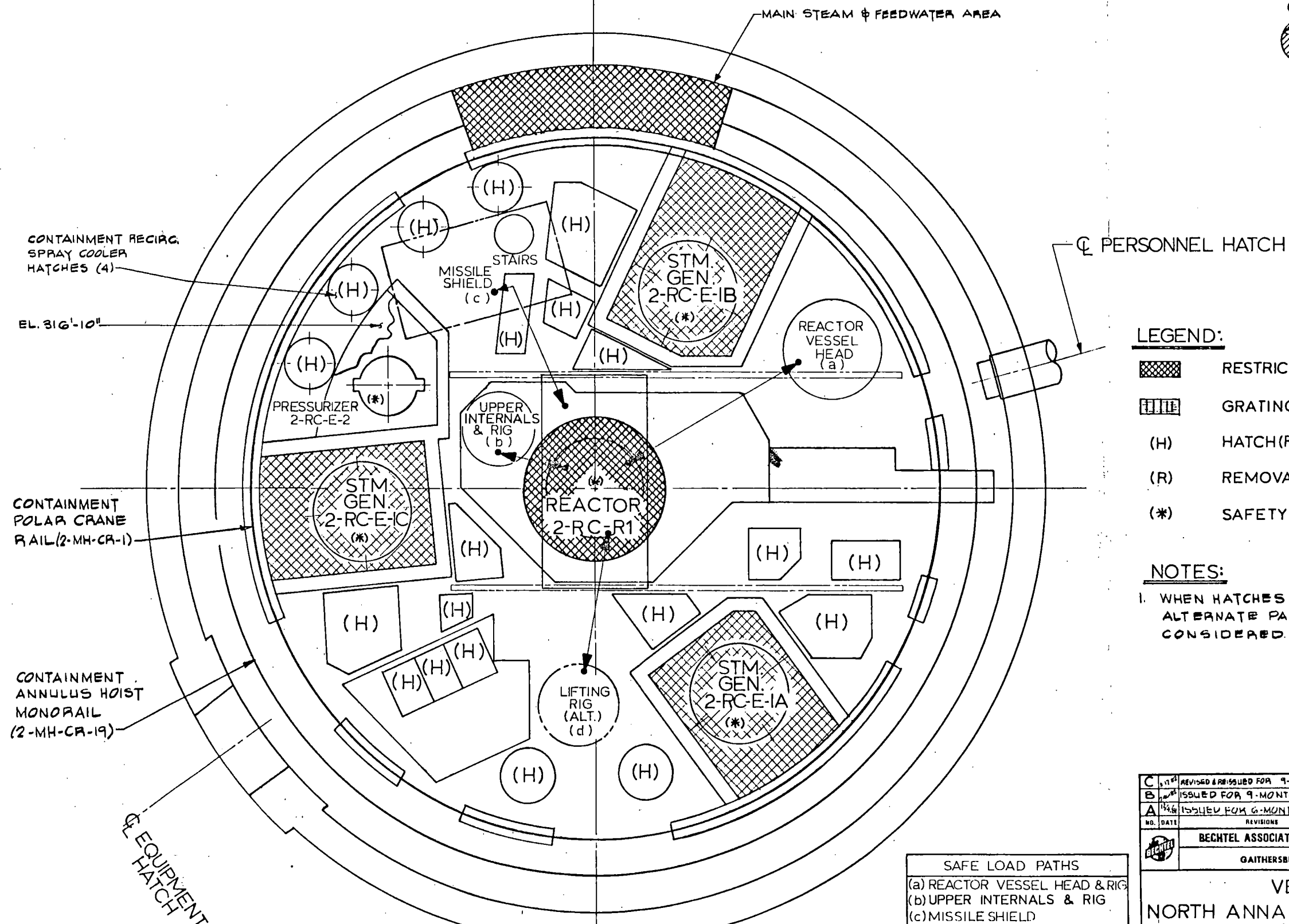
- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP

#### NOTES:

- 1 WHEN HATCHES ARE REMOVED, ALTERNATE PATHS HAVE TO BE CONSIDERED.

C	REVISED & REISSUED FOR 9-MON REPORT	CD	
B	ISSUED FOR 9-MONTH REPORT	CD	
A	ISSUED FOR 9-MONTH REPORT	CD	
NO	DATE	REVISIONS	BY
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V4)			
GAITHERSBURG, MARYLAND			
VEPCO			
NORTH ANNA POWER STATION			
CONTROL OF HEAVY LOADS NUREG-0612			
REACTOR CONTAINMENT UNIT NO. 1			
PLANS EL. 291'-10" & EL. 235'-10"			
DRAWN	BY	DATE	FILE NUMBER
BY CED	DATE 11-11-81	STATE NONE	14569 SKETCH No. 8 C
FILE NUMBER			

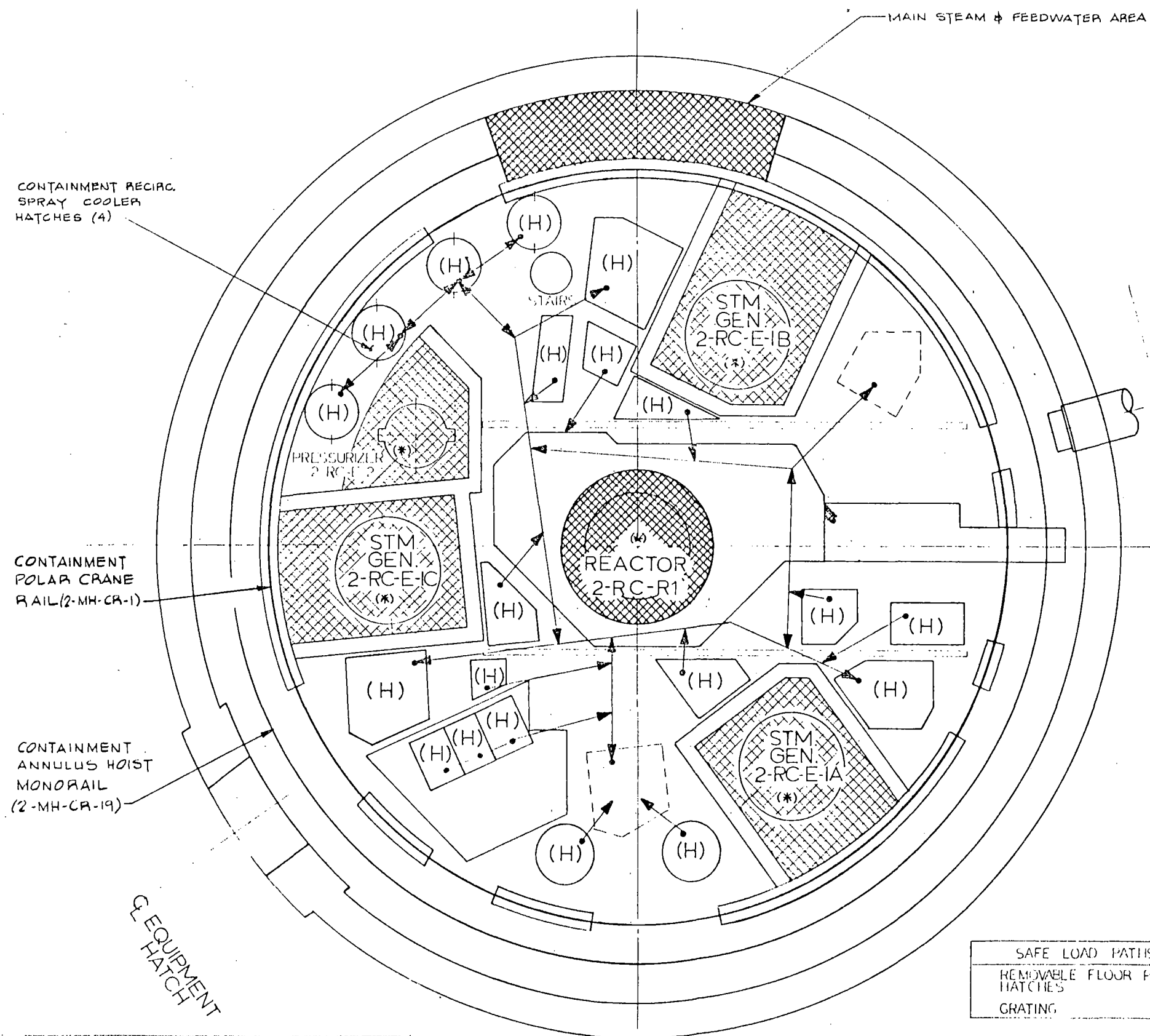






MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 291'-10"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
R.V. LIFTING RIG	12,000 LBS.	5'-5"
R.V. HEAD & LIFTING RIG	266,500 LBS.	HEIGHT TO BE DETERMINED LATER
MISSILE SHIELD	66,500 LBS.	5'-9" ABOVE PRESS. ROOF - EL. 316'-10"

C	REVISED & RE-ISSUED FOR 9-MON. REPORT	CD	11/22/91	14569		
B	ISSUED FOR 9-MON. REPORT	CD	11/22/91	14569		
A	ISSUED FOR 6-MON. REPORT	CD	11/22/91	14569		
NO.	DATE	REVISIONS	BY	CHK.	APP.	APP.
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V6)						
GAITHERSBURG, MARYLAND						
JOB 14569						
VEPCO						
NORTH ANNA POWER STATION						
CONTROL OF HEAVY LOADS NUREG-0612						
REACTOR CONTAINMENT UNIT NO. 2						
PLAN EL. 291'-10"						
DRAWN	CHKD	DRATTG	ENG'R	APP	APP	APP
BY	CEO	DRAWING NO.			REV	
DATE	11-22-91	14569 SKETCH No. 9			C	
SCALE	NON	FILE NUMBER:				





LEGEND:

	RESTRICTED AREA
	GRATING
(H)	HATCH(REMOVABLE)
(R)	REMOVABLE
(*)	SAFETY RELATED EQUIP.

NOTES:

1 WHEN HATCHES ARE REMOVED,  
ALTERNATE PATHS HAVE TO BE  
CONSIDERED

CONTAINMENT  
POLAR CRANE  
RAIL (2-MH-CR-1).


CONTAINMENT  
ANNULUS HOIST  
MONORAIL  
(2-MH-CR-19) —

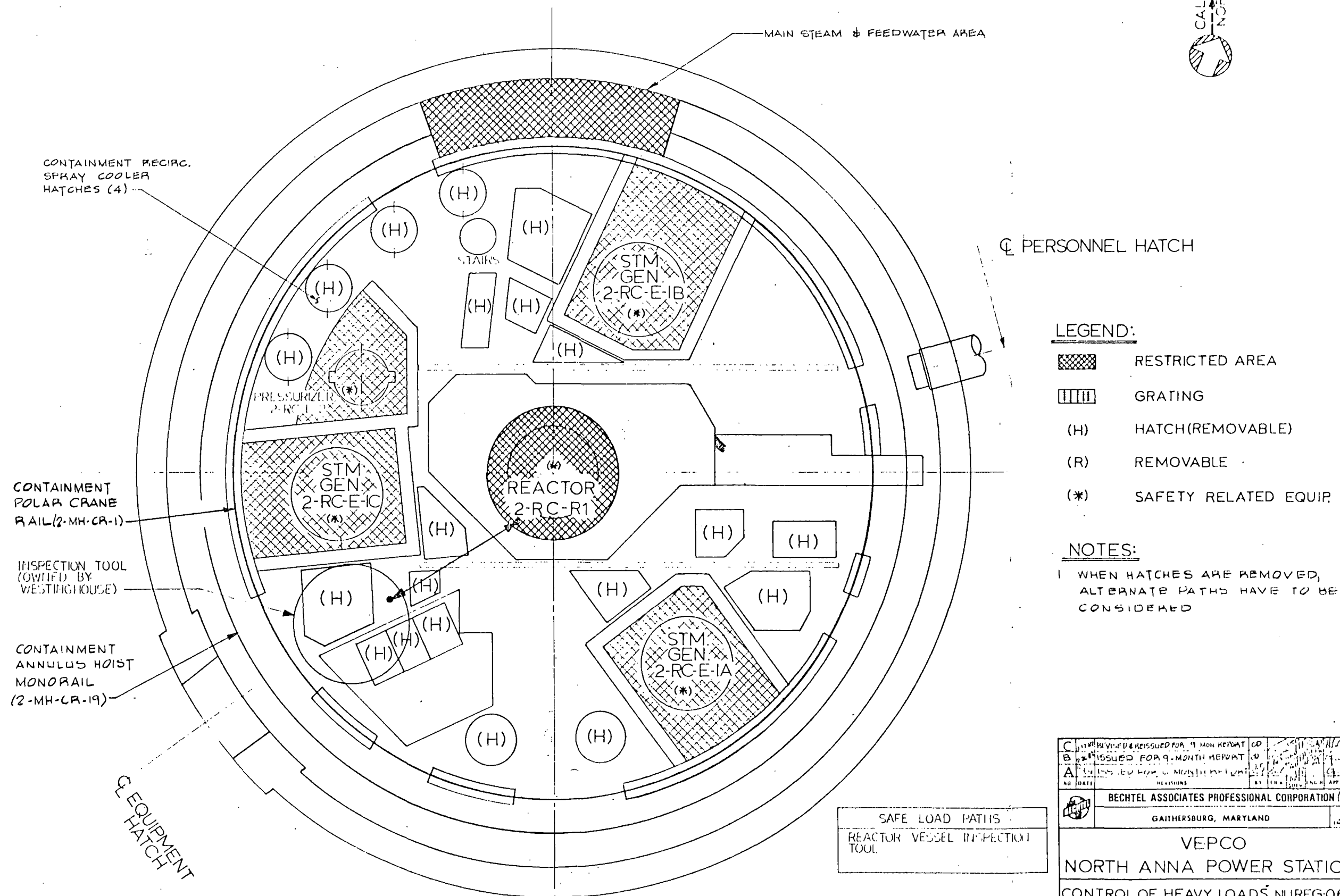
£ EQUIPMENT  
HATCH

SAFE LOAD PATHS
REMOVABLE FLOOR PLUGS & HATCHES
GRATING

MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 291'-10"		
ITEM	LOAD WEIGHT	LOAD HEIGHT
CONCRETE HATCH	40,000 LBS.	6'-10"
CONCRETE HATCH	2,000 LBS.	55'-0"

## PLAN

C S A	REVISED (REISSUED FOR 4 MONTH REPORT)	20	21	22	23	24	25	26	27	28	29	30
	ISSUED FOR 6-MONTH REPORT	31	32	33	34	35	36	37	38	39	40	41
NO	DATE	REVISIONS	BY	CHK	APP	DATE	APP	DATE	APP	DATE	APP	DATE
		BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (125)										
GAITHERSBURG, MARYLAND										JOB		
VEPCO												
NORTH ANNA POWER STATION												
CONTROL OF HEAVY LOADS NUREG-061												
REACTOR CONTAINMENT UNIT NO.2												
PLAN EL. 29'-10"												
DRAWN	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY	CHKD	DATE	BY
BY	CEO											
DATE	11-22-81											
SCALE	NONE	14569 SKETCH No. 11 C										
FILE NUMBER:												

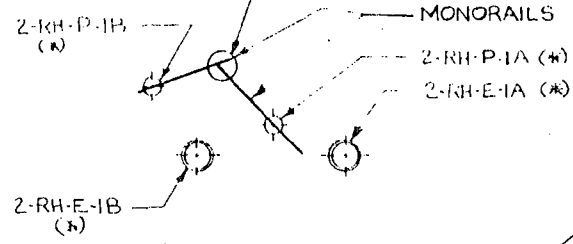


MAXIMUM PERMISSIBLE LIFT HEIGHT OVER EL. 291'-10"		
ITEM	LOAD WEIGHT	LIFT HEIGHT
REACTOR VESSEL	10,000 LBS.	31'-5"
INSPECTION TOOL		

PLAN

C	REVIEWED & REISSUED FOR 9-MONTH REPORT	CD	
B	ISSUED FOR 9-MONTH REPORT	U	
A	ISSUED FOR 9-MONTH REPORT	U	
NO	DATE	REVISIONS	BY
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (A)			
GAITHERSBURG, MARYLAND			
VEPCO			
NORTH ANNA POWER STATION			
CONTROL OF HEAVY LOADS NUREG-0612			
REACTOR CONTAINMENT UNIT NO. 2			
PLAN EL. 291'-10"			
DRAWN	DATE	SCALE	FILE NUMBER
BY CRO	DATE 11-22-81	SCALE NONE	14569 SKETCH No. 1 C

RHR PUMP  
LAYDOWN AREA



DETACHED PLAN FL. 235'-7"

CONTAINMENT RECIRC.  
SPRAY COOLER  
HATCHES (4)

CONTAINMENT  
POLAR CRANE  
RAIL (2-MH-CR-1)

CONTAINMENT  
ANNULUS HOIST  
MONORAIL  
(2-MH-CR-19)

EQUIPMENT  
HATCH

MAIN STEAM & FEEDWATER AREA

PERSONNEL HATCH

LEGEND:

- RESTRICTED AREA
- GRATING
- (H) HATCH (REMOVABLE)
- (R) REMOVABLE
- (\*) SAFETY RELATED EQUIP.

NOTES:

1 WHEN HATCHES ARE REMOVED,  
ALTERNATE PATHS HAVE TO BE  
CONSIDERED

MAXIMUM PERMISSIBLE LIFT HEIGHT			
ITEM	LOAD WEIGHT	LIFT HEIGHT	LOCATION
REACTOR CTMT. RECIRC. FAN	5,600 LBS.	31'-5"	OVER BL. 291'-10"
MISCELLANEOUS	6,000 LBS.	15'-0"	A.H.R. MONORAILS

SAFE LOAD PATHS  
REACTOR CONTAINMENT  
RECIRC. FANS  
RHR MONORAILS

PLAN



C	REVISIONS	ISSUED FOR 9-MONTH REPORT	CO	1
B	REVISIONS	ISSUED FOR 9-MONTH REPORT	CO	1
A	REVISIONS	ISSUED FOR 9-MONTH REPORT	CO	1
BECHTEL ASSOCIATES PROFESSIONAL CORPORATION (V)				
GAITHERSBURG, MARYLAND				
VEP NORTH ANNA POWER STATION CONTROL OF HEAVY LOADS NUREG-0612 REACTOR CONTAINMENT UNIT NO.2 PLANS EL291-10" & FL.235'-7"				
DRAWN BY CEO DATE 11/2/81 SCALE NONE	CHECKED DATE 11/2/81 SCALE NONE	DESIGNED DATE 11/2/81 SCALE NONE	APPR. DATE 11/2/81 SCALE NONE	FILE NUMBER: 14569 SKETCH No. 13 C