Tesesco
Stells

The Light company Houston Lighting & Power P.O. Box 1700 Houston, Texas 77001 (713) 228-9211

August 24, 1981
ST-HL-AE-718
SFN: C-0510

Mr. Darrell G. Eisenhut
Division of Licensing
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Eisenhut:

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
Response to Generic Letter 81-07:
Control of Heavy Loads (Section 2.1)

Houston Lighting & Power Company has reviewed Generic Letter 81-07 and associated documents which requested information regarding control of heavy loads at the South Texas Project. HL&P has conducted a review of the STP design under the guidelines of NUREG-0612 (Control of Heavy Loads at Nuclear Power Plants).

The terms of the generic letter specify that the criteria in NUREG-0612 apply to applicants for operating licenses; however, design of the South Texas Project has not yet reached the stage where all requested information can be supplied. The attached report contains the information that is available at this time. For those items that cannot be fully addressed at this time, an approximate schedule for their completion has been included.

If there are any questions, please contact Mr. Michael E. Powell at (713) 676-8592.

Very truly yours,

Claire H Robertson for

J. H. Goldberg
Vice President
Nuclear Engineering & Construction

PLW/amj
Attachments

B030
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Revision Date 7-28-81

SOUTH TEXAS PROJECT
CONTROL OF HEAVY LOADS (SECTION 2.1)

The following is a list of the requirements delineated in Generic Letter 81-07 and associated documents. Responses provided by HL&P reflect the current design of the South Texas Project. These responses may be modified in the future as STP design nears completion. Note that the schedule for completion of the activities is approximate.

1. Requirement

Report the results of your review of plant arrangements to identify all overhead handling systems from which a load drop may result in damage to any system required for plant shutdown or decay heat removal.

Response

The overhead handling systems at STP from which a load drop may result in damage to a system required for plant shutdown or decay heat removal are:

a) 352/15 ton Reactor Containment Building polar crane

b) 15/2 ton Fuel Handling Building overhead crane

c) 20 ton Essential Cooling Pond gantry crane

2. Requirement

Justify the exclusion of any overhead handling system from (1) above.

Response

The Fuel Handling Machine is located in the Fuel Handling Building and is provided for moving fuel assemblies in the spent fuel pool. The Fuel Handling Machine is designed so that the maximum lift will not raise the load above the surface of the pool. The Fuel Handling Machine does not have the capacity for carrying a load that, should it be dropped, would result in damaging any system required for plant shutdown or decay heat removal.

The Refueling Machine is located in the Reactor Containment Building and is provided for moving fuel assemblies between the Reactor Pressure Vessel and the Fuel Transfer System. The fuel assemblies are lifted by the refueling machine to a height not exceeding the water level in the filled refueling cavity. The fuel assemblies will not pass over any equipment required for decay heat removal.

The 150-ton spent fuel cask handling crane is provided for handling the spent fuel shipping cask. Crane design and building arrangement preclude travel of this crane over equipment required for plant shutdown or decay heat removal.

The 5-ton new fuel handling area overhead crane is used for movement of new fuel assemblies within the new fuel handling area. This crane travels over no safety-related equipment.

Monorail hoists are used extensively throughout the South Texas Project. These hoists are by definition restricted in their travel. Controls over operation of these systems will be covered by procedures discussed under item (3).

3. Requirement

With respect to the design and operation of heavy-load-handling systems in the containment and the spent-fuel pool area and those load-handling systems identified in the response to item (1) above, provide an evaluation concerning compliance with the guidelines of NUREG-0612, Section 5.1.1.

a. Safe load paths should be defined for the movement of heavy loads to minimize the potential for heavy leads, if dropped, to impact irradiated fuel in the reactor vessel and in the spent fuel pool, or to impact safe shutdown equipment. The path should follow, to the extent practical, structural floor members, beams, etc., such that if the load is dropped, the structure is more likely to withstand the impact. These load paths should be defined in procedures, shown on equipment layout drawings, and clearly marked on the floor in the area where the load is to be handled. Deviations from defined load paths should require written alternative procedures approved by the plant safety review committee.

Response

The attached figures indicate the safe load paths tentatively anticipated for use in the Reactor Containment Building. See also the response to item (b) below.

Physical marking of safe load paths in the Reactor Containment Building will be evaluated for use on an as-needed basis.

The South Texas Project meets the intent of NRC Regulatory Guide 1.104, Revision 0, for the 15/2 ton Fuel Handling Building (FHB) overhead crane. This overhead crane has been designed to meet the single-failure criterion. Accordingly, the designation of safe load paths is not necessary since crane design provides adequate assurance that a load drop event will not occur.

The Essential Cooling Pond gantry crane will be used in removing the Essential Cooling Water (ECW) equipment for repair and/or maintenance. Each train is located in a separate cubicle. A minimum of two of the three ECW trains for each plant (Units 1 & 2) is required to operate following a Design Basis Accident. Administrative controls will be employed so that the crane will not carry a component over any other ECW cubicle at any time.

b. Procedures should be developed to cover load handling operations for heavy loads that are or could be handled over or in proximity to irradiated fuel or safe shutdown equipment. At a minimum, procedures should cover handling of those loads listed in Table 3-1 of this report. These procedures should include: identification of required equipment; inspections and acceptance criteria required before movement of load; the steps and proper sequence to be followed in handling the load; defining the safe load path; and other special precautions.

Response

Inspections and acceptance criteria required before movement of a "heavy load" will be included in plant maintenance procedures which will be completed six months prior to initial fuel loading.

The steps and proper sequence to be followed in handling the load will be included in plant maintenance procedures which will be completed six months prior to initial fuel loading.

The safe load paths for handling heavy loads inside containment will be defined in plant maintenance procedures which will be completed six months prior to initial fuel loading.

Note that a Reactor Pressure Vessel head drop analysis has been performed which determined that dropping the head would not result in an unacceptable degree of core damage. This analysis was submitted to the NRC via Westinghouse letter NS-CE-1101 (June 11, 1976) and received NRC approval by letter on November 30, 1976.

The plant maintenance procedures will also address any special precautions that may be necessaryfor handling heavy loads including provisions for deviating from the designated load paths that special circumstances may require.

The attached table lists those heavy loads, including their weights, which will be handled by the RCB polar crane. Each such load will be handled according to a written procedure. These procedures will incorporate the criteria given above.

c. Crane operators should be trained, qualified and conduct themselves in accordance with Chapter 2-3 of ANSI B30.2-1976, "Overhead and Gantry Cranes".

Response

The training and qualification program for crane operators will be defined in the plant maintenance procedures which will be completed six months prior to initial fuel loading. This program will follow the guidelines of Chapter 2-3 of ANSI B30.2-1976.

d. Special lifting devices should satisfy the guidelines of ANSI N14.6-1978, "Standard for Special Lifting Devices for Shipping Containers Weighing 10,000 pounds (4500 kg) or More for Nuclear Materials." This standard should apply to all special lifting devices which carry heavy loads in areas as defined above. For operating plants certain inspections and load tests may be accepted in lieu of certain material requirements in the standard. In addition, the stress design factor stated in Section 3.2.1.1 of ANSI N14.6 should be based on the combined maximum static and dynamic loads that could be imparted on the handling device based on characteristics of the crane which will be used. This is in lieu of the guideline in Section 3.2.1.1 of ANSI N14.6 which bases the stress design factor on only the weight (static load) of the load and of the intervening components of the special handling device.

Response

Extensive review of the special lifting devices to be used on the South Texas Project is necessary to determine their specific degree of compliance with ANSI N14.6-1978. Results of the design evaluation are expected to be available for submittal to the NRC by December 18, 1981.

e. Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9-1971, "Slings." However, in selecting the proper sling, the load used should be the sum of the static and maximum dynamic load. The rating identified on the sling should be in terms of the "static load" which produces the maximum static and dynamic load. Where this restricts slings to use on only certain cranes, the slings should be clearly marked as to the cranes with which they may be used.

Response

Extensive review of the lifting devices that are not specially designed is necessary to determine their specific degree of compliance with ANSI B30.9-1971. Results of the design evaluation are expected to be available for submittal to the NRC by December 18, 1981.

f. The crane should be inspected, tested, and maintained in accordance with Chapter 2-2 of ANSI B30.2-1976, "Overhead and Gantry Cranes," with the exception that tests and inspections should be performed prior to use where it is not practical to meet the frequencies of ANSI B30.2 for periodic inspection and test, or where frequency of crane use is less than the specified inspection and test frequency (e.g., the polar crane inside a PWR containment may only be used every 12 to 18 months during refueling operations, and is generally not accessible during power operation. ANSI B30.2, however, calls for certain inspections to be performed daily or monthly. For such cranes having limited usage, the inspections, tests, and maintenance should be performed prior to their use).

Response

The program for inspecting, testing and maintaining cranes at the South Texas Project will be defined in the plant maintenance procedures which will be completed six months prior to initial fuel loading. This program will follow the guidelines of Chapter 2-2 of ANSI B30.2-1976, with the exceptions given above.

g. The crane should be designed to meet the applicable criteria and guidelines of Chapter 2-1 of ANSI B30.2-1976, "Overhead and Gantry Cranes" and of CMAA-70, "Specifications for Electric Overhead Travelling Cranes." An alternative to a specification in ANSI B30.2 or CMAA-70 may be accepted in lieu of specific compliance if the intent of the specification is satisfied.

Response

For those cranes which handle heavy loads that could be brought in proximity to or over safe shutdown equipment or irradiated fuel, their design complies with the guidelines of CMAA-70. Chapter 2-1 of ANSI B30.2-1976 is satisfied by the designs of the containment polar crane, the FHB overhead crane, and the spent fuel cask handling crane. The design of the ECW gantry crane is being reviewed to determine its specific degree of compliance with ANSI B30.2-1976. Results of the design evaluation are expected to be available for submittal to the NRC by December 18, 1981.

TABLE I

HEAVY LOADS TO BE CARRIED BY THE RCB POLAR CRANE

Load	Load Weight (lbs)	Hoist	Load Path
Containment Fuel Pool Gate	7,400	aux.	Fig. 1, 2
Containment Fuel Racks	3,400	aux.	Fig. 6
Burnable Poison Rod Assembly Handling Tool	850	aux.	Fig. 3
Thimble Plug Handling Tool	260	aux.	Fig. 3
Spent Fuel Handling Tool	375	aux.	Fig. 3
Irradiated Sample Tool	260	aux.	Fig. 3
CRD Shaft Unlatching Tool	220	aux.	Fig. 3
Inservice Inspection Rig	3,600	main	Fig. 4
Reactor Coolant Pump			
Flywheel	16,500	main	Fig. 5
Motor	97,600	main	Fig. 5
Rotor	36,800	main	Fig. 5
Residual Heat Removal System			
Pump	6,900	aux.	Fig. 9, 10
Motor	5,700	aux.	Fig. 9, 10
Heat Exchanger	29,000	main	Fig. 10
Heat Exchanger Tube Bundle	14,000	main	Fig. 10
*Reactor Vessel Head Lift Rig Assembly	8,800	main	**
*Lift Rods (4)	1,800 (each)	aux.	Fig. 3, 7
*Missile Shield	30,000	main	Fig. 7
*Cooling Shroud	30,000	main	Fig. 7
*Cables on Shroud	5,000	aux.	Fig. 3, 7
*Cooling Fans and Ducts (3)	2,400 (each)	aux.	Fig. 3, 7

*These items are part of the Integrated Head Package and will be lifted together during rapid refueling.

**This will be available at least six months prior to fuel load.

TABLE I (Continued)

HEAVY LOADS TO BE CARRIED BY THE RCB POLAR CRANE

Load	Load Weight (lbs)	Hoist	Load Path
*Hoist Assemblies (3)	2,100 (each)	aux.	Fig. 3, 7
*Control Rod Drive Mechanisms (57)	1,315 (each)	main	Fig. 3, 7
*Reactor Vessel Head plus water in head during lift	230,000	main	Fig. 7
Integrated Head Package	612,000	main	Fig. 7
*Upper Internals	137,400	main	Fig. 8
*F/L Drive Rods (57)	170 (each)	aux.	**
*Cable Tray	7,500	aux.	Fig. 7
*Cables on Cable Tray	15,000	main	Fig. 7
*RPI Coil Stack (57)	210 (each)	aux.	**
*Rod Cluster Control Assembly (57)	112 (each)	aux.	**
*Stud Tensioners (3)	6,000 (each)	aux.	Fig. 8
Studs, Nuts, Washers (36)	1,586 (each)	aux.	Fig. 8
Seismic Tie Rods (6)	600 (each)	aux.	**
*Load Cell Linkage	3,000	aux.	**
Guide Studs (2)	1,750 (each)	aux.	**
Internals Lifting Rig	20,000	main	Fig. 8
*Dummy Can	1,500	aux.	**
*Internals Lift Rod Housing	1,500	aux.	**

*These items are part of the Integrated Head Package and will be lifted together during rapid refueling.

**This will be available at least six months prior to fuel load.

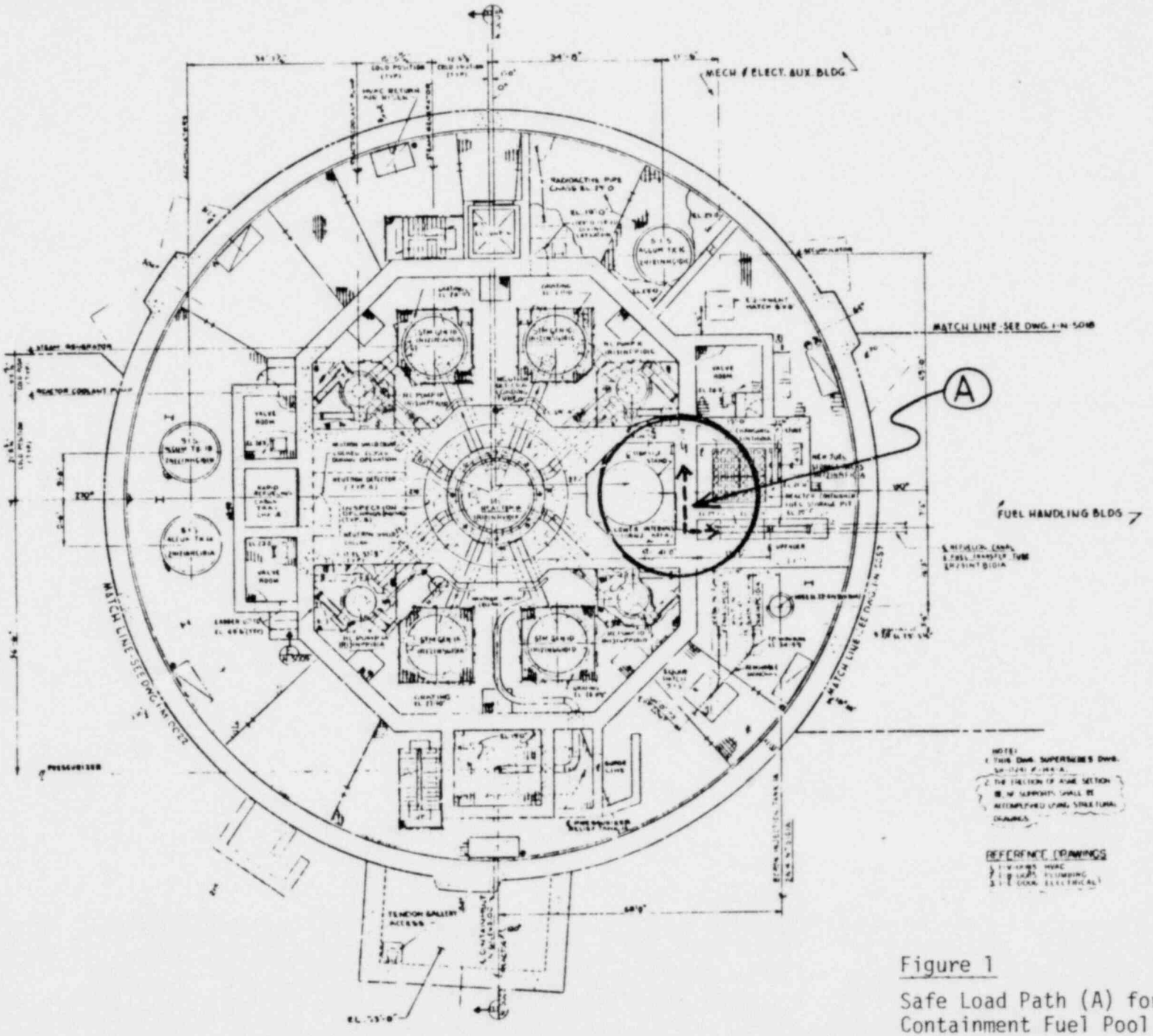

Figure 1

Safe Load Path (A) for the Containment Fuel Pool Gate

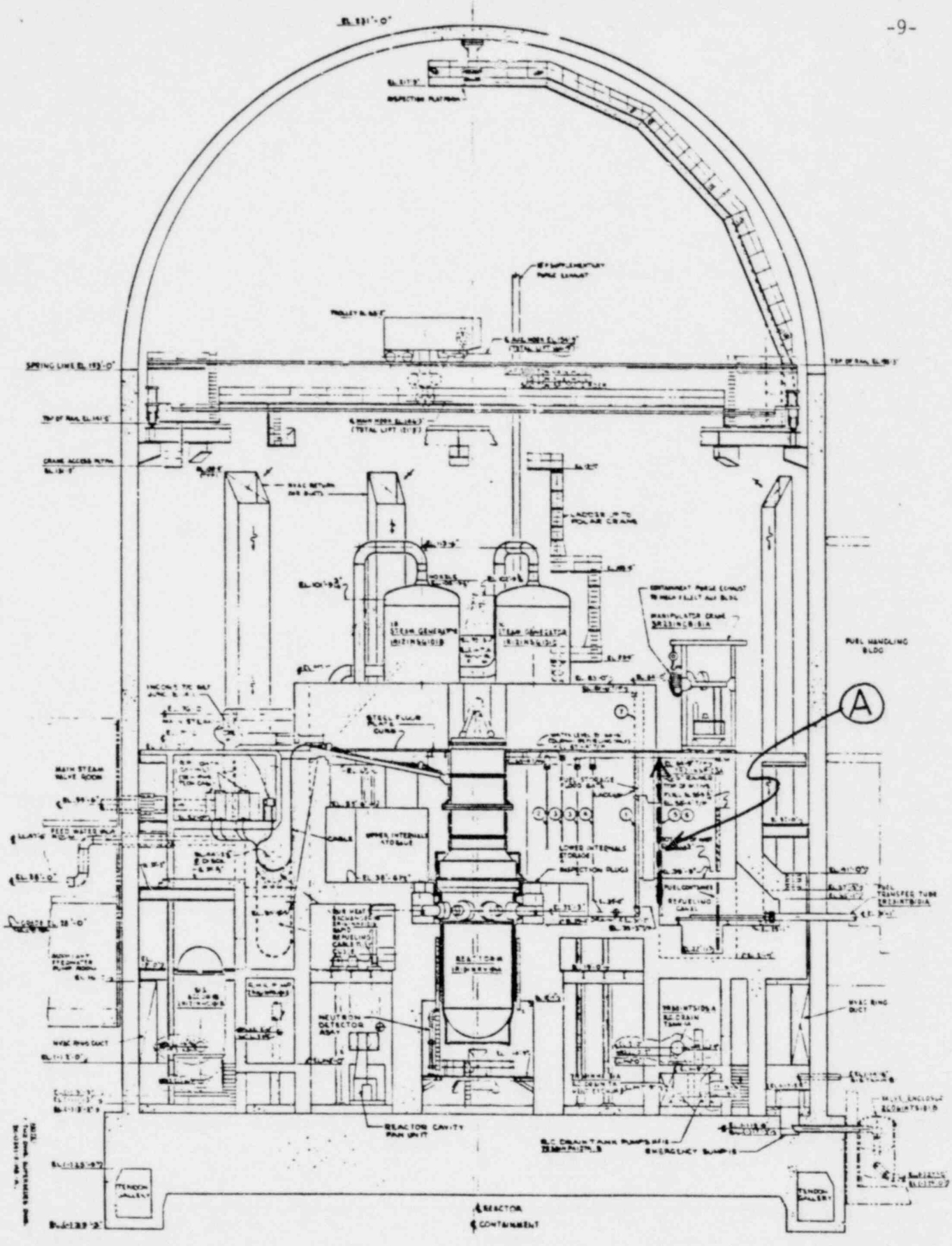

Figure 2

Safe Load Path (A) for the Containment Fuel Pool Gate

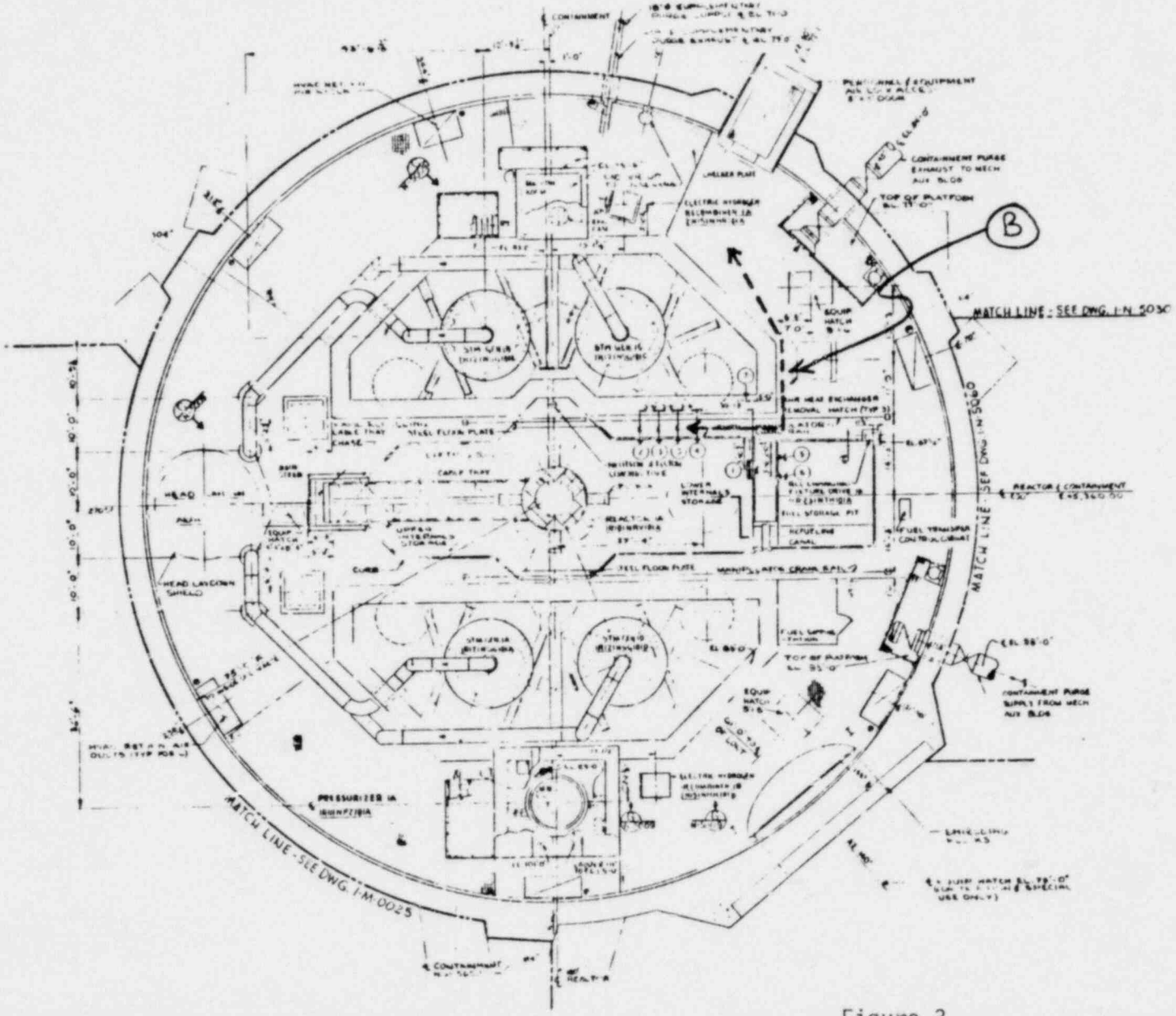

Figure 3

Safe Load Path (B) for Burnable Poison Rod Assembly Handling Tool, Thimble Plug Handling Tool, Spent Fuel Handling Tool, Irradiated Sample Tool, and CRD Shaft Unlatching Tool

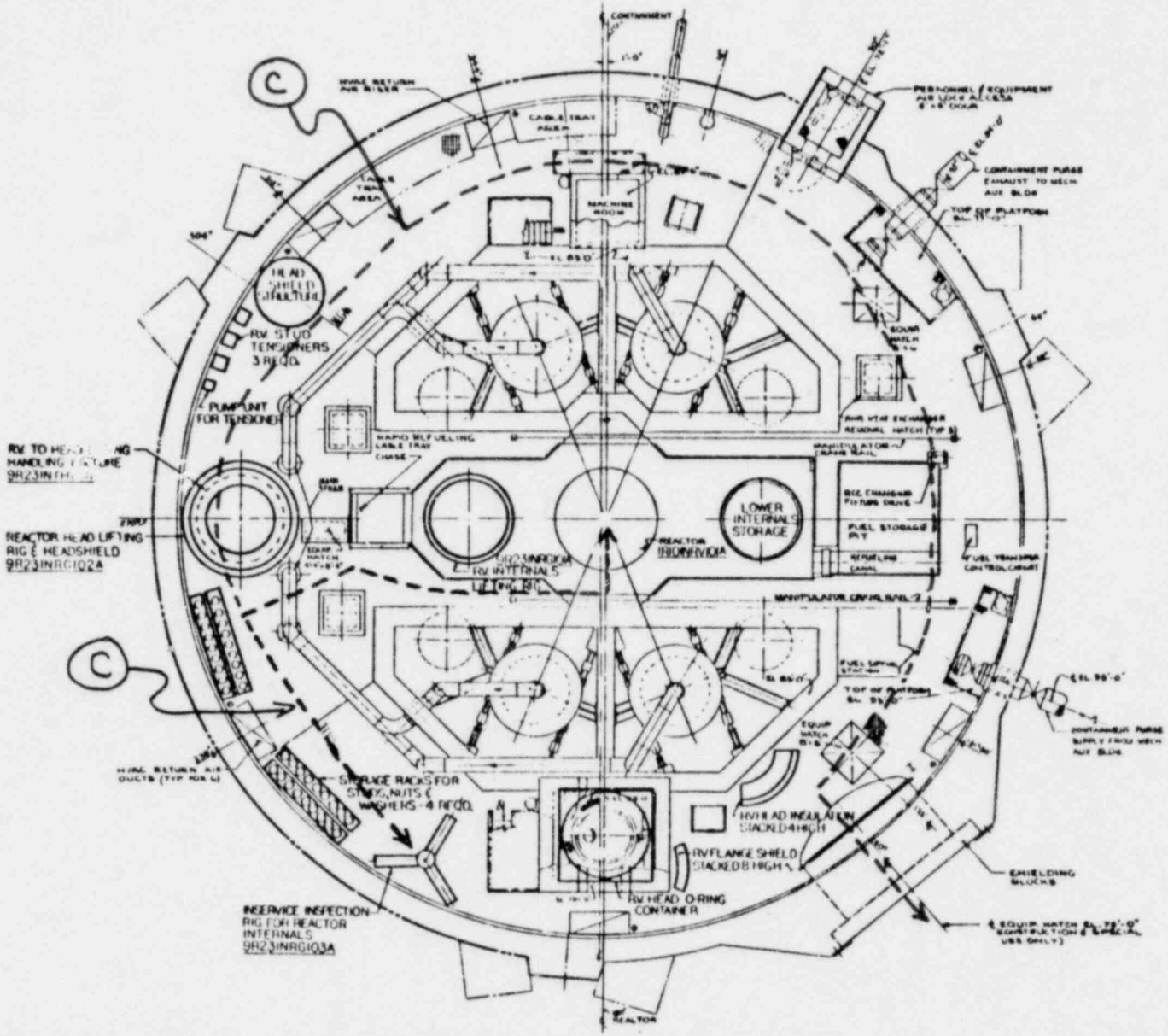

Figure 4

Safe Load Path (C) for the Inservice Inspection Rig for Reactor Internals

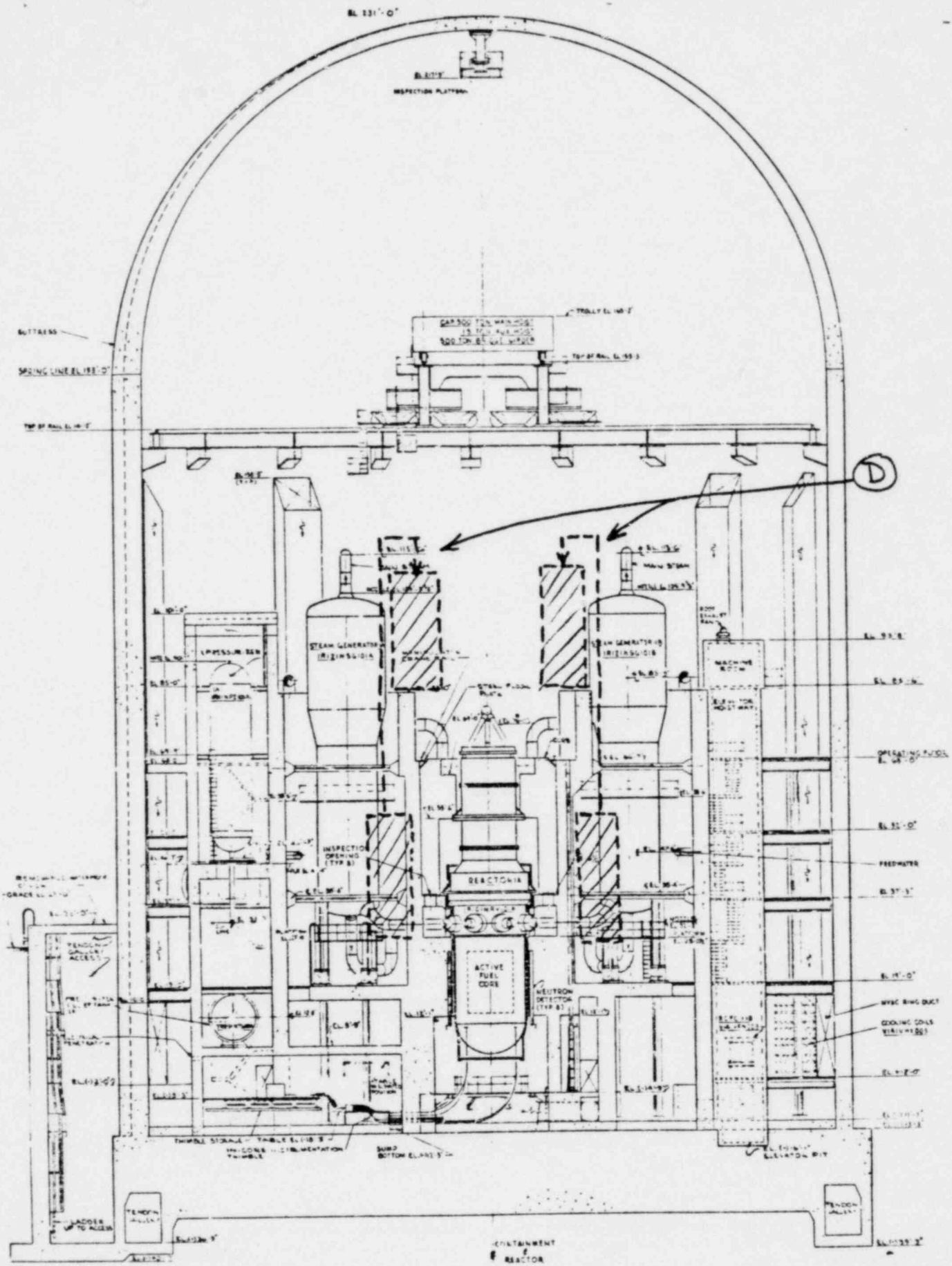

Figure 5

Safe Load Paths (D) for the Reactor Coolant Pump Flywheel, Motor, and Rotor

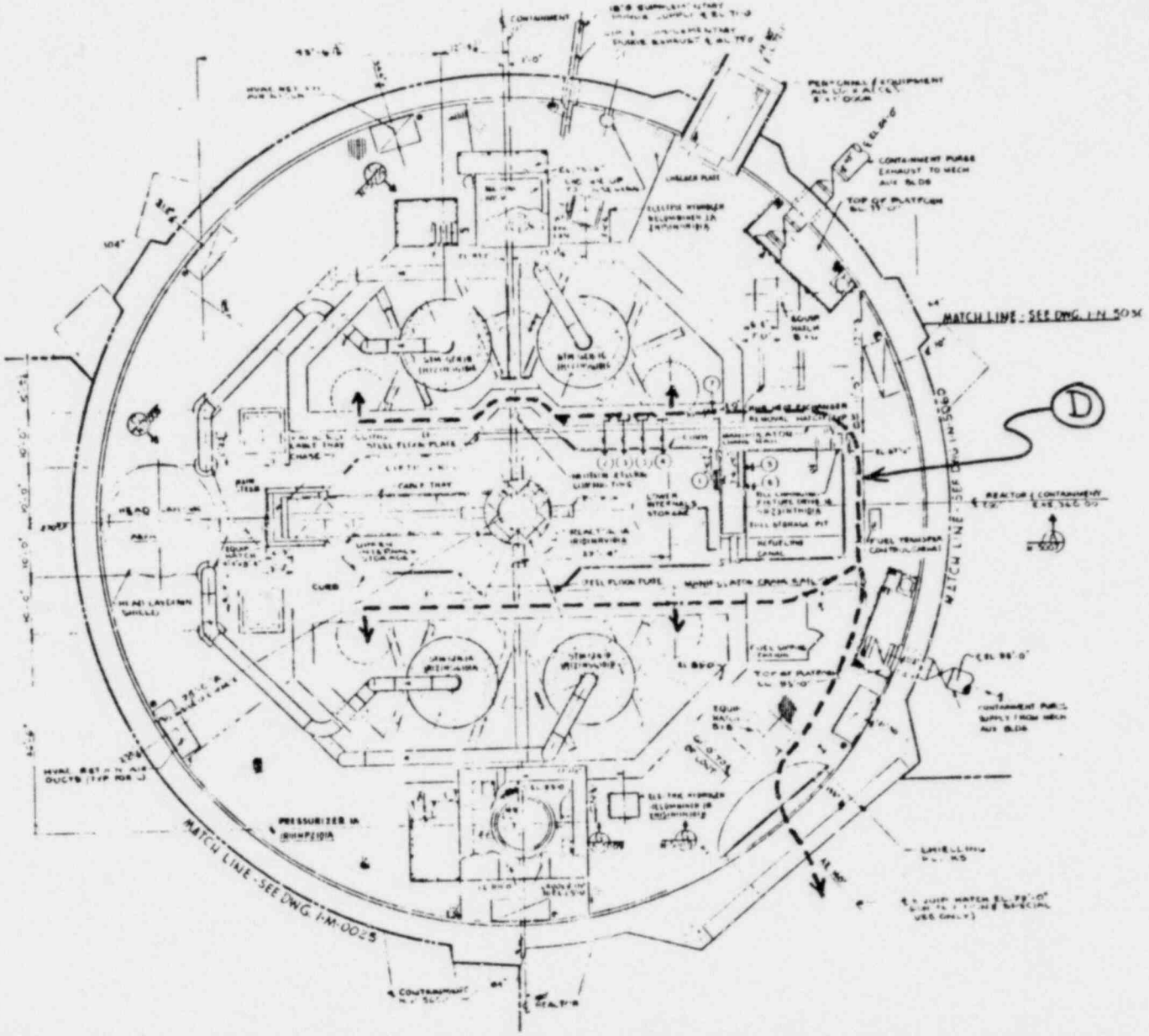

Figure 6

Safe Load Paths (D) for the Reactor Coolant Pump Flywheel, Motor, and Rotor

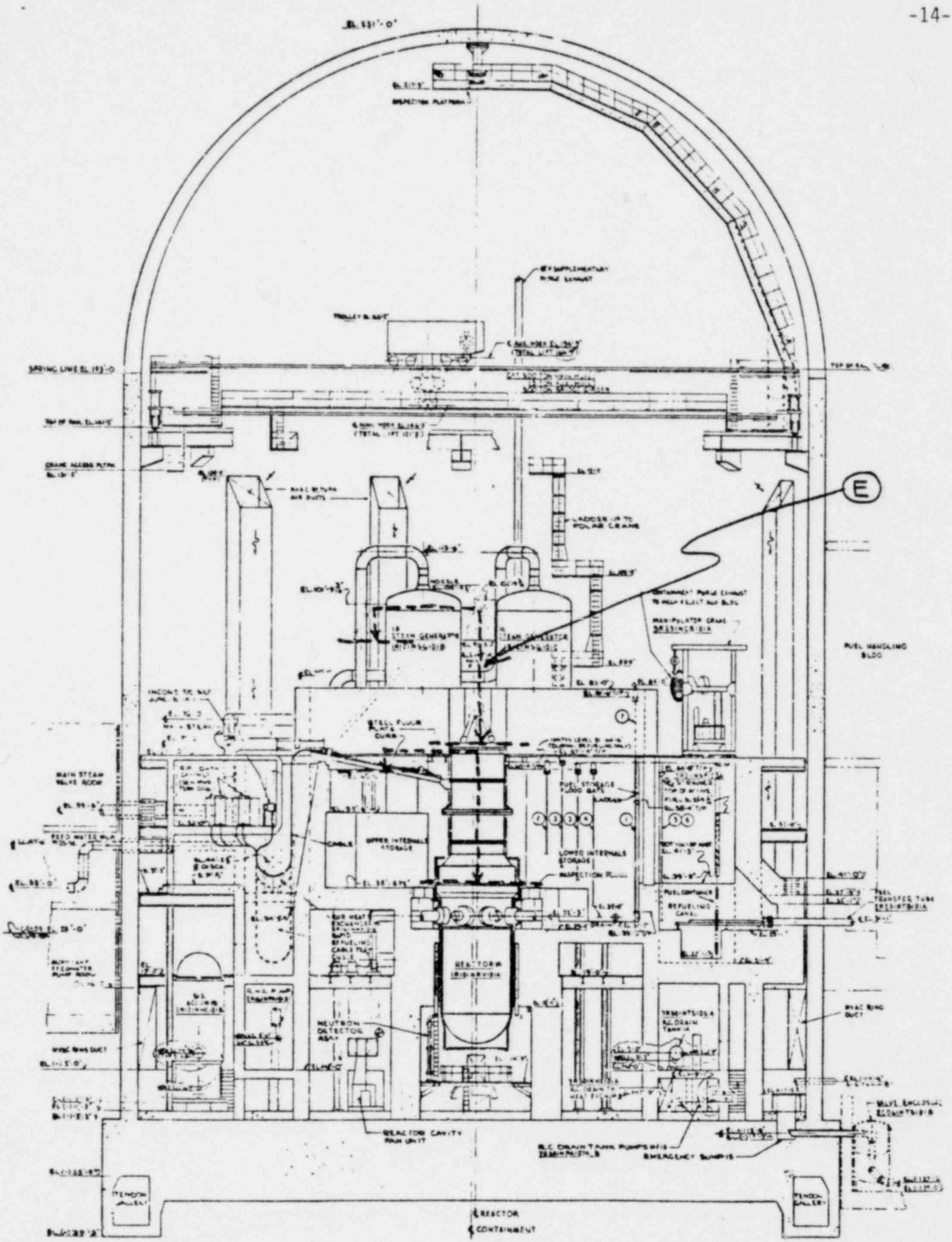

Figure 7

Safe Load Path (E) for
Reactor Vessel Head

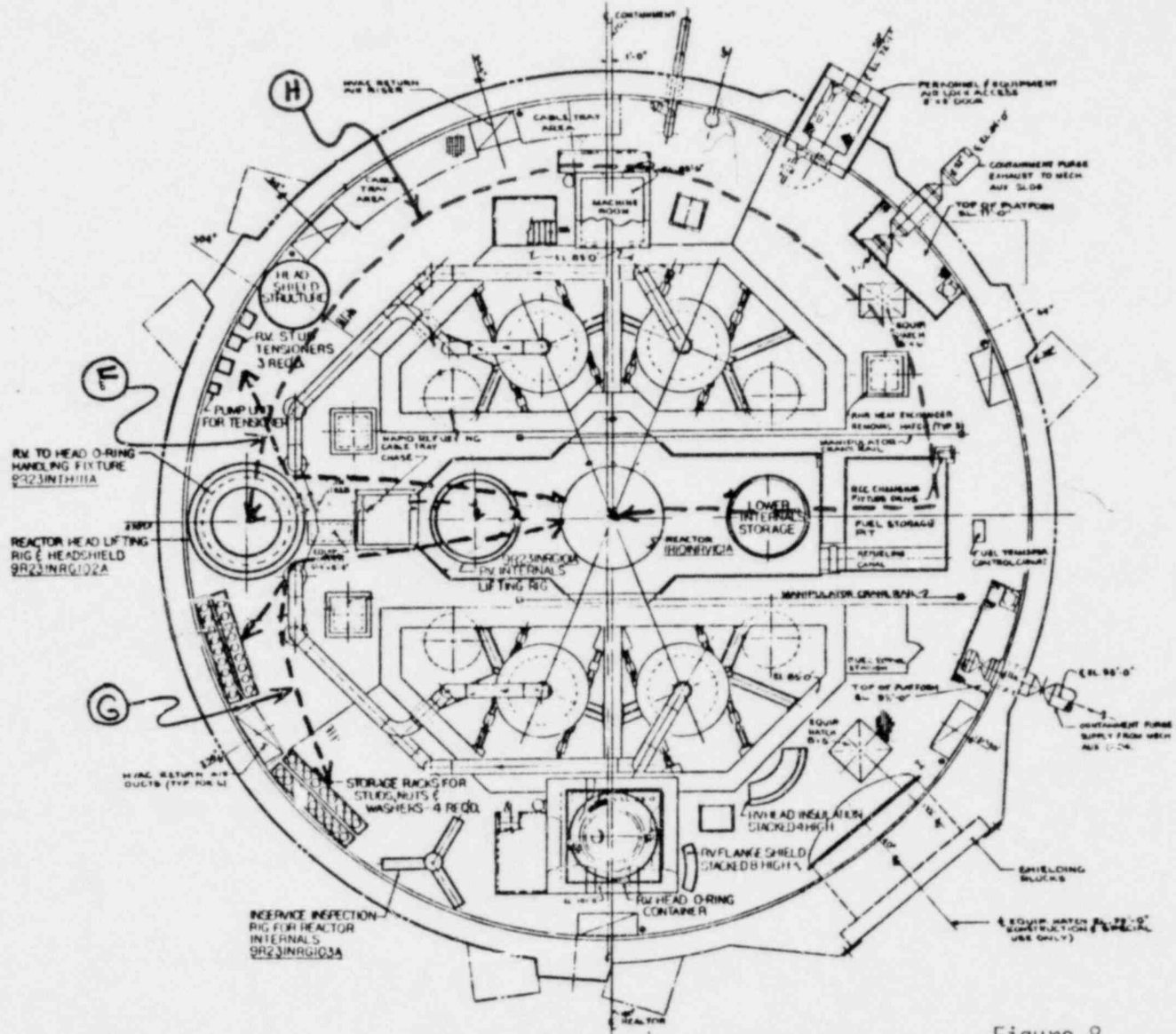

Figure 8

Safe Load Paths for:

(F) Stud Tensioners
(G) Studs, Nuts, and Washers
(H) Internals Lifting Rig

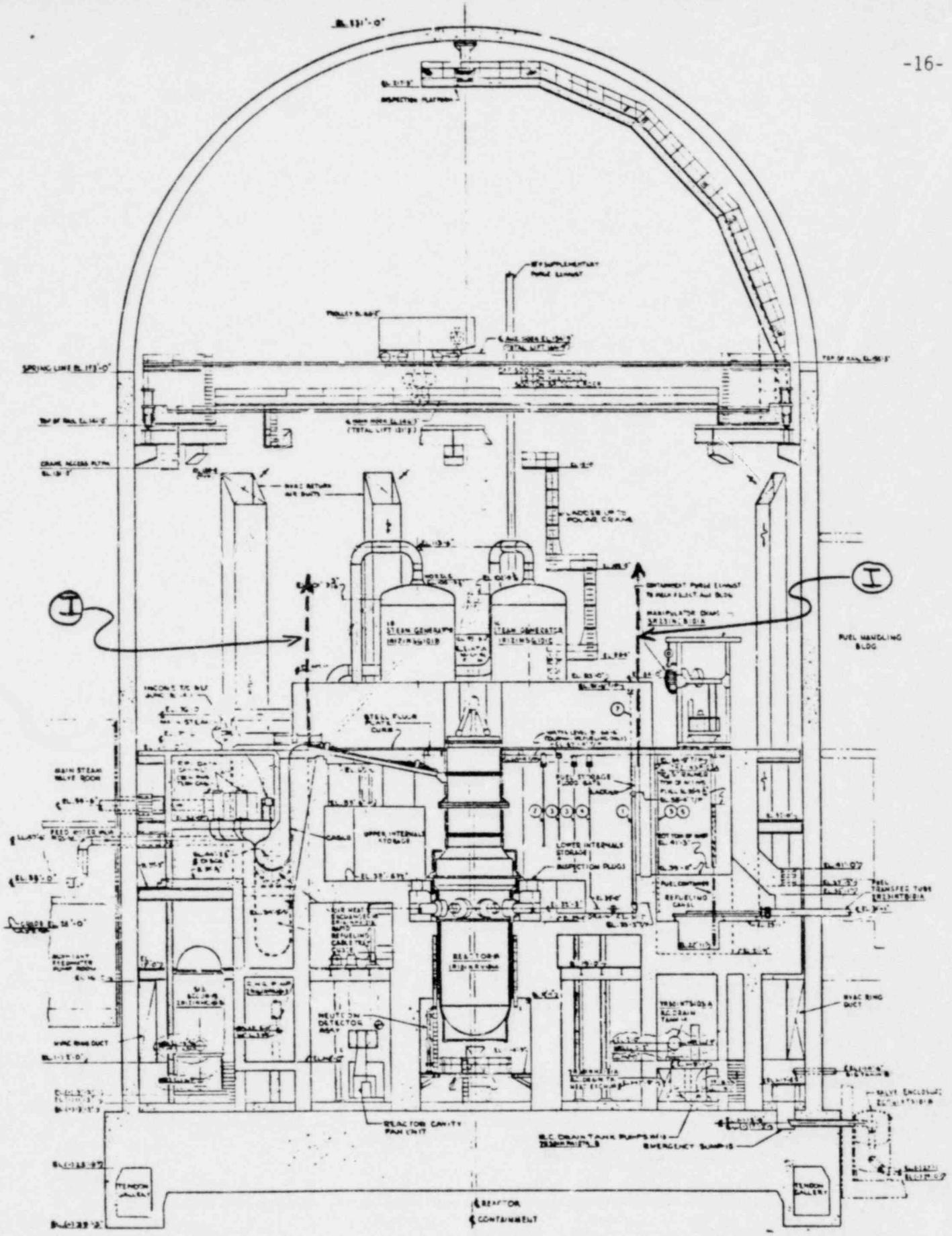

Figure 9

Safe Load Paths (I) for the RHR Pumps and Motors

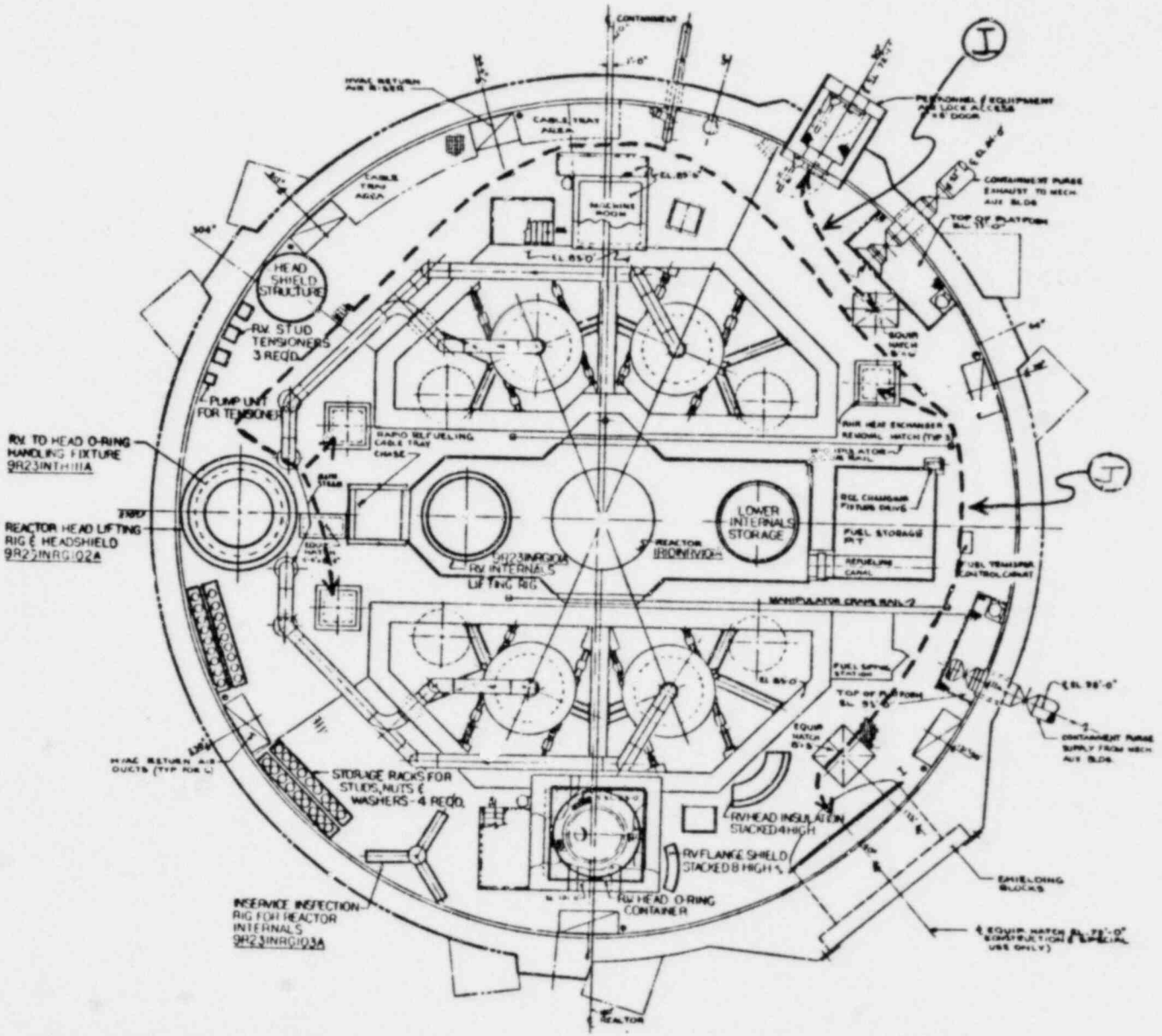

Figure 10

Safe Load Paths for:

(I) RHR Pump
RHR Motor

(J) RHR Heat Exchanger
RHR Heat Exchanger Tube Bundle