

# REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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SUBJECT: Forwards response to NUREG-0612, "Control of Heavy Loads."

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 TITLE: Control of Heavy Loads Near Spent Fuel (USI, A-36) PRE-OL

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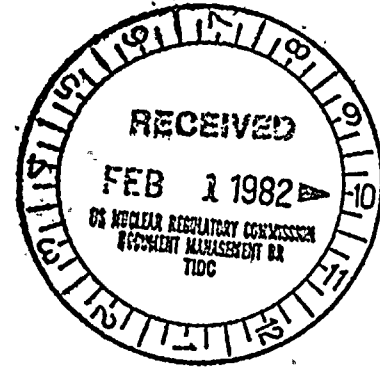
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# Washington Public Power Supply System

P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

January 13, 1982  
G02-82-32  
SS-L-02-CDT-82-012



Docket No. 50-397

Mr. A. Schwencer, Chief  
Licensing Branch No. 2  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2  
RESPONSE TO NUREG-0612  
CONTROL OF HEAVY LOADS

Reference: Letter, D.C. Eisenhower to all Licensees,  
et al, "Control of Heavy Loads," dated  
December 22, 1980

Enclosed are sixty (60) copies of the WNP-2 response to NUREG-0612, "Control of Heavy Loads" transmitted via the reference letter. The WNP-2 draft SER open item on this subject should be closed upon receipt of this response.

Very truly yours,

*G.D. Bouchey*

G. D. Bouchey  
Deputy Director, Safety and Security

CDT/jca

Enclosures

cc: R Auluck - NRC  
WS Chin - BPA  
R Feil - NRC Site

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## CONTROL OF HEAVY LOADS

REFERENCE: NRC to All Licensees of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits, December 22, 1980.

The following are the Supply System's WNP-2 plant's responses to the request for information made in enclosure 3 to the referenced letter

2.1.1 Table I (attached) provides a listing of all overhead handling equipment with the potential to damage systems required for plant shutdown or decay heat removal.

2.1.2 The following cranes listed in Table I can be excluded for the following reasons:

### MT-H01-36

This hoist is inside containment and dedicated to handling reactor recirculation flow control valve internals. It can only be used when the reactor is shutdown and the containment is open. It does not pass over the RHR return suction lines.

### MT-H01-13

This hoist is inside containment and is used for working on the 4 in board main steam containment isolation valves. It will only be used when the reactor is shutdown and containment is opened for maintenance work. These monorails and the hoist lie below both RHR supply lines and thus could not cause failure of the shutdown cooling mode of that system.

### MT-H01-19A&B

These manual hoists are located inside containment and their monorail systems do NOT pass over the RHR lines or electrical cables required for shutdown cooling.

2.1.3 Table 2 lists the heavy loads to be handled by the Reactor Building a,b,c Crane (MT-CRA-2).

Sketches 1 through 8 are enclosed herein and are a part of the procedures listed in Table 2.

The control for assuring that these loads are moved in the prescribed path is procedural. However, the Reactor Building Crane is provided with limit switches to prevent travel over the spent fuel pool as shown on Drawing M570, (enclosure 1).

2.1.3 Verification that the lifting devices for the RPV/Dry-  
(d) well Head (NSSE - EQ15), Dryer/Separator (NSSE - EQ - 14) and the Vessel Service Platform (NSSE - EQ - 39) meet the requirements of ANSI N14.6 1978 is currently being analysed.



The slings procured for the Vessel Cavity and Dryer/Separator Pool Plugs (NSSE - EQ - 40) were purchased to a 39.6 ton safe working load. The four slings with their spread angle conform to ANSI B30.0 1971 requirements.

2.1.3 (e) Plant procedure 10.4.1 - (enclosure 2) invokes the requirements of ANSI B30.2 - 1976, Chapter 2-2.

2.1.3 (f) The reactor building crane meets or exceeds the design of CMAA specification 70 (enclosure 4).

2.1.3 (g) There are no exceptions taken to ANSI B30.2 - 1976 with respect to operator training, qualification and conduct.

2.2.1 Table 3 lists the cranes and hoists that are physically capable of carrying loads over spent fuel in the storage pool or in the reactor vessel.

2.2.2 The Refueling Platform/Service Platform Jib Crane (MT-CRA-9A,9B) are provided with load limiting devices that limit the load to 1200 pounds.

The Channel Handling Boom (MT-CRA-11) is only designed for 200 pound loads. On this basis, these three cranes should be excluded from the criteria of 2.2.1.

2.2.3 The Reactor Building Crane (MT-CRA-2) meets the requirements for a "Single failure proof crane" as per NUREG 0612, Appendix C. See Enclosure 3 - "Letter "Single Failure Proof Reactor Building Crane" - B. A. Holmberg to J. W. Hedges dated November 2, 1981, and the Whiting Bid proposal (enclosure 4).

In addition, travel of the Reactor Building Crane is limited for the main and auxiliary hooks as shown on enclosure 1.

2.3.2.b (3) The following list of cranes and hoists were installed to permit maintenance of a specific piece of equipment. These lifting devices do not meet the requirements of NUREG 0612 and it is not considered economically practical to modify them to meet these requirements. They will be locked out in a safe position and not placed in use until the equipment they service has been declared inoperable per the Plant Technical Specifications.

MT-H01-6 Services RHR Pumps A & E

MT-H01-7 Services RCIC Pumps and Turbine

MT-H01-8 Services RHR Pump C

MT-H01-9 Services LPCS Pumps

MT-H01-10 Services HPCS Pumps

MT-CRA-6A & 6B Services Standby Service Water Pumps, 1A & 1B

MT-H01-18 Services Outboard Main Steam Isolation Valves

MT-CRA-1

The Turbine Building Crane has the potential for damaging the high pressure turbine governor valves with their associated fast closure reactor shutdown switches. Procedural control consisting of a warning NOTICE posted in the crane cab will restrict travel to areas outside the turbines when the turbines are in use. In addition, the RPS turbine control valve fast closure logic is "de-energize to trip" such that failure of the shutdown switches would produce a master scram.

MT-H01-19C

Used for removing and reinstalling main steam relief valves (maximum weight 4,000#), crosses over the 14" RHR loop B - return to RPV at Azimuth 170°. The RHR line is approximately 18 feet under the valve passage and is protected by steel grating (1 1/2" deep 3/16 bars spaced 1 1/8" apart) supported on a 4' rectangle of 8" and 14" deep I beams. The RHR line is a 7' Radius bend at this location making a direct blow almost impossible even if the grating were penetrated. This coupled with the existence of an alternate shutdown cooling system (RHR Loop A) which does not pass under the relief valve monorail provide a ample assurance that shutdown cooling capability will not be compromised by a potential drop of a heavy load.

MT-H01-16

This hoist is inside containment and is used to remove and reinstall the reactor recirculation motor and pump internals. The RRC-P-1A components cross over the single 20" RHR shutdown cooling suction line (elevation 509') from azimuth 145° to 195°. This 20" line lies below the 512' grating and support structure. Because of its physical size the 30 ton pump motor cannot be hoisted more than 6" above the 512' grating level. If the pump motor were to drop, the structural steel framework at elevation 512 would preclude damage to the 20" RHR suction line. As a backup, the RHR system has an alternate shutdown cooling path should this shutdown cooling line become inoperable.

TABLE 1

OVERHEAD HANDLING SYSTEM WITH POTENTIAL FOR DAMAGE TO ANY SYSTEM REQUIRED FOR PLANT SHUTDOWN OR HEAT REMOVAL

TAG NUMBER	LOCATION	TYPE	SERVICE/	CMMA CLASS	TONS CAPACITY	SEISMIC CATEGORY	QUALITY CLASS
MT-H01-19A&B	Reactor Building Inside Containment	Trolley Hoist Manual Chain	Main Steam Relief Valves	A-1	2	II	II
MT-H01-36	Reactor Building Inside Containment	Trolley Hoist Manual Chain	Recirc Flow Control Valve - (RCC-V-60)	A-1	4	II	II
MT-H01-6	Reactor Building 489'-2"	Trolley Hoist Electric	RHR Pumps (A&B)	A-1	6	--	II
MT-H01-7	Reactor Building 492'-2"	Trolley Hoist Electric	RCIC Pump & Turbine	A-1	5	--	II
MT-H01-8	Reactor Building 494'-3"	Trolley Hoist Electric	RHR Pump C	A-1	6	--	II
MT-H01-9	Reactor Building 493'-2"	Trolley Hoist Electric	LPCS Pump	A-1	7	--	II
MT-H01-10	Reactor Building 492'-5"	Trolley Hoist Electric	HPCS Pump	A-1	20	--	II
MT-H01-16	Reactor Building (Inside Containment)	Trolley Hoist Electric	Recirc Pump	A-1	30	--	II
MT-H01-19C	Reactor Building (Inside Containment)	Trolley Hoist Electric	Main Steam Relief Valves	A-1	2	--	II



TABLE 1 (Continued)

TAG NUMBER	LOCATION	TYPE	SERVICE	CMMA CLASS	TONS CAPACITY	SEISMIC CATEGORY	QUALITY CLASS
MT-CRA-6A,6B	Standby Service Water Pump House	Overhead Travelling Crane (under hung)	Standby Service Water Pumps	A-1	8	I	I
MT-CRA-2	Reactor Building 606'	Travelling Bridge Crane	Reactor Refueling Floor & Vessel	A-1	125 Tons	I	I
MT-CRA-1	Turbine Building	Travelling Bridge Crane	Main Turbine & Generator		200 Tons		
MT-CRA-9A,9B	Reactor Building Fuel Pool Vessel Service Platform	Jib Cranes Electric	Spare and New Fuel Handling	A-1		I	I
MT-CRA-11	Reactor Building	Jib Crane	Reactor Service Platform Channel Handling Boom	A-1	200#	I	I
MT-HO1-18	Reactor Building	Trolley Hoist	Outboard Main Steam Isolation Valve Work & Pipe Tunnel Hatch Removal	A-1	8 Tons	II	II
MT-HO1-13	Reactor Building Onside Containment	Trolley Hoist	Inboard Main Steam Isolation Valve Work	A-1	8 Tons	II	II

TABLE 2 - HEAVY LOADS - REACTOR BUILDING CRANE

<u>Load to be Handled</u>	<u>Maximum Weight</u>	<u>Lifting Device</u>	<u>Procedure</u>	<u>Travel Path Sketch</u>
Vessel Cavity Shield Plugs	215,000#	NSSE - EQ - 40 (slings)	PPM 10.3.2	#1
Dryer-Separator Storage Pool Plugs	120,000#	NSSE - EQ - 40 (slings)	PPM 10.3.2	#2
Fueling Slot Plugs	16,000#	NSSE - EQ - 41 (slings)	PPM 10.3.2	#3
Drywell Head	104,000#	NSSE - EQ - 15	PPM 10.3.3	#4
Insulation Head	50,000#	Not Made Yet	PPM 10.3.4	#5
Reactor Pressure Vessel Head	186,700#	NSSE - EQ - 15	PPM 10.3.5	#6
"Cattle" Chute	22,000# ("EST")	Slings	PPM 10.3.5	#6
Vessel Service Platform	12,000# ("EST")	NSSE - EQ - 39 (slings)	PPM 10.3.7	#7
RPV - Steam Dryer	80,000#	NSSE - EQ - 14	PPM 10.3.6	#8
RPV - Moisture Separator	146,500#	NSSE - EQ - 14	PPM 10.3.6	#8
In-Vessel - Rack	600#	Slings	PPM 10.3.8	-
Fuel Cask	Not Purchased est. to weight Approx. 100 Tons	Not Purchased to date	PPM 10.3.9 (not yet written)	-

TABLE 3

NAME	TYPES	CAPACITY	EQUIPMENT DESIGNATION
Reactor Building Crane	Travelling Bridge Crane	125/15 Tons	MT-CRA-2
Refueling Platform & Service Platform Covers	Jib Crane	1200#	MT-CRA-9A,9B
Channel Handling Boom	Jib Crane	200#	MT-CRA-11

ANALYSIS OF RADIOLOGICAL RELEASES

Section 15.7.4 of the WNP-2 Final Safety Analysis Report discusses "Fuel Handling Accident". The modified Table 2.1-2 shown below compares WNP-2 assumptions with those provided in Attachment 7.

TABLE 2.1-2  
HEAVY LOAD DROP ACCIDENT ASSUMPTIONS

Reactor Type		PWR and BWR	WNP-2 Values
	Power Level (Mwt)	3,000	3,323
0-2 hour	X/Q (Exclusion area boundary), sec/M <sup>3</sup>	1.0x10 = <sup>3</sup> <u>1</u> /	1.x10 <sup>-3</sup>
0-2 hour	X/Q LPZ, sec/M <sup>3</sup>	1.0x10 <sup>-4</sup> <u>1</u> /	1.x10 <sup>-4</sup>
	Peaking Factor	1. <u>22</u> /	
	No. of Assemblies in Core	193(PWR), 760(BWR)	764
	Pool Water Decontamination Factor	100 <sup>3</sup> / (for radio- active iodines)	
	Filter Efficiency %:		
	Elemental Iodine	95% <sup>4</sup> /	
	Organic Iodine	95%	
	Cooling Time (hours)	100 or greater	24 Hours

1/ Based on 5% worst meteorological conditions.

2/ Value is 1.2 for greater than one damaged fuel assembly. For a single assembly the values are 1.65 and 1.5 for PWRs and BWRs, respectively.

3/ See Reg. Guide 1.25

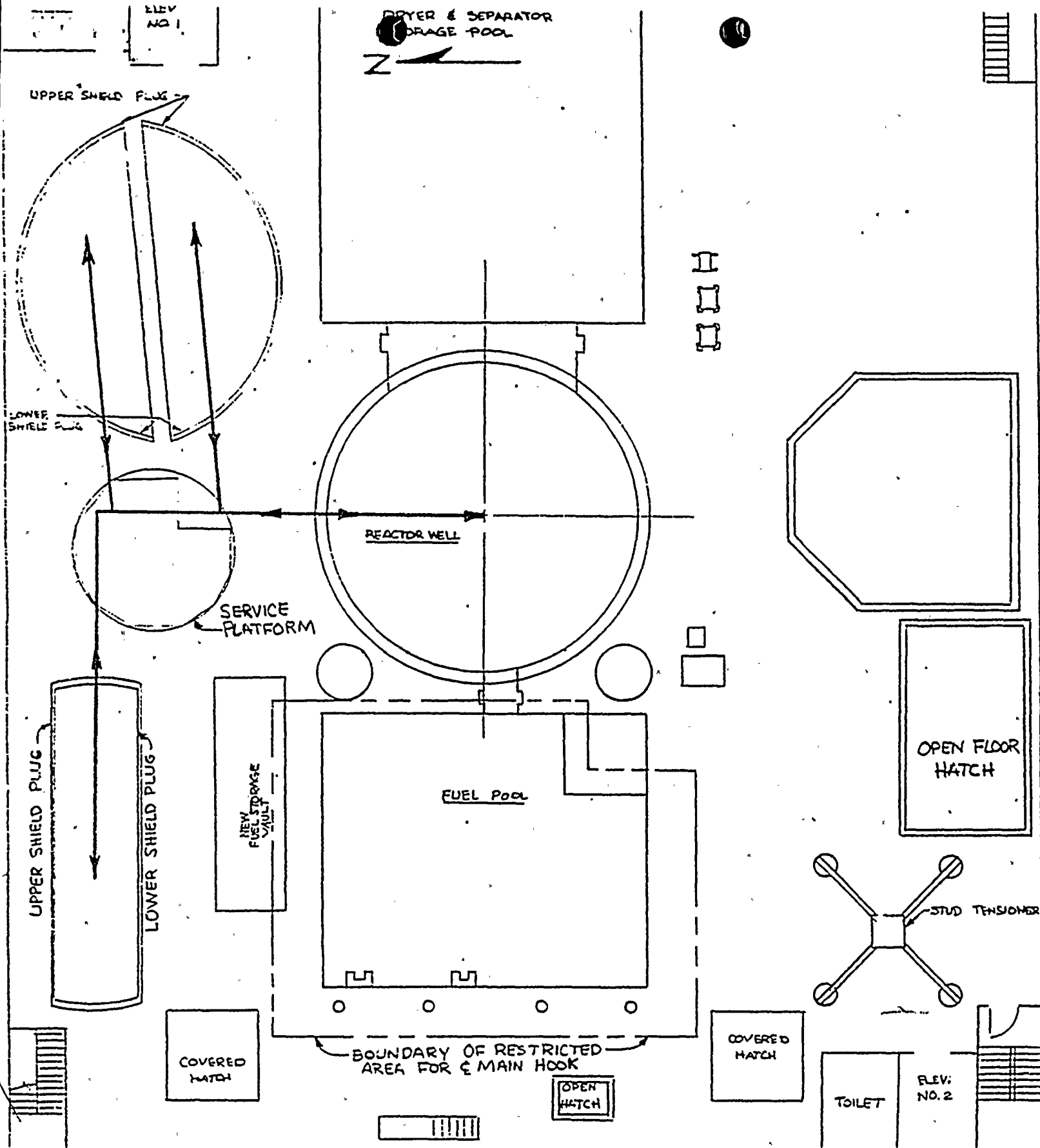
4/ See Reg. Guide 1.52

NOTE: With the exception of power level WNP-2 is more conservative than the assumptions shown in Table 2.1-2.

CRITICALITY ANALYSIS

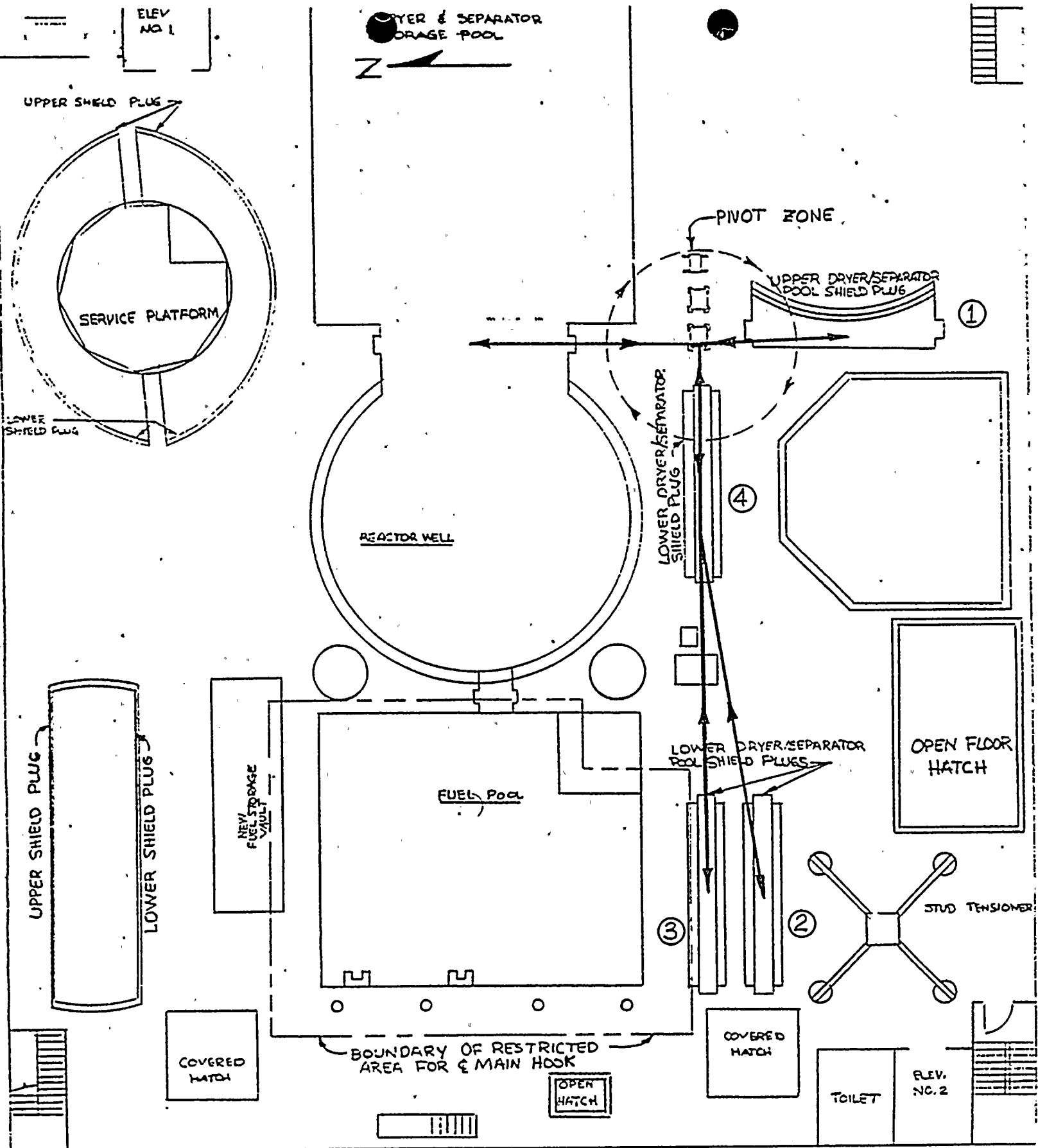
Section 9.1.2.3 of the WNP-2 Final Safety Analysis Report discusses criticality control as it is associated with spent fuel storage. Technical Specification Sections 3/4.9.6 "Refueling Platform Operability" and 3/4.9.7 "Crane Travel - Spent Fuel Storage Pool" provides limiting conditions for operation to limit loads moved over the spent fuel pool to stay within the bounds of the FSAR Criticality Analysis.





SAFE LOAD PATH - REACTOR CAVITY SHIELD PLUGS  
 SKETCH NO. 1

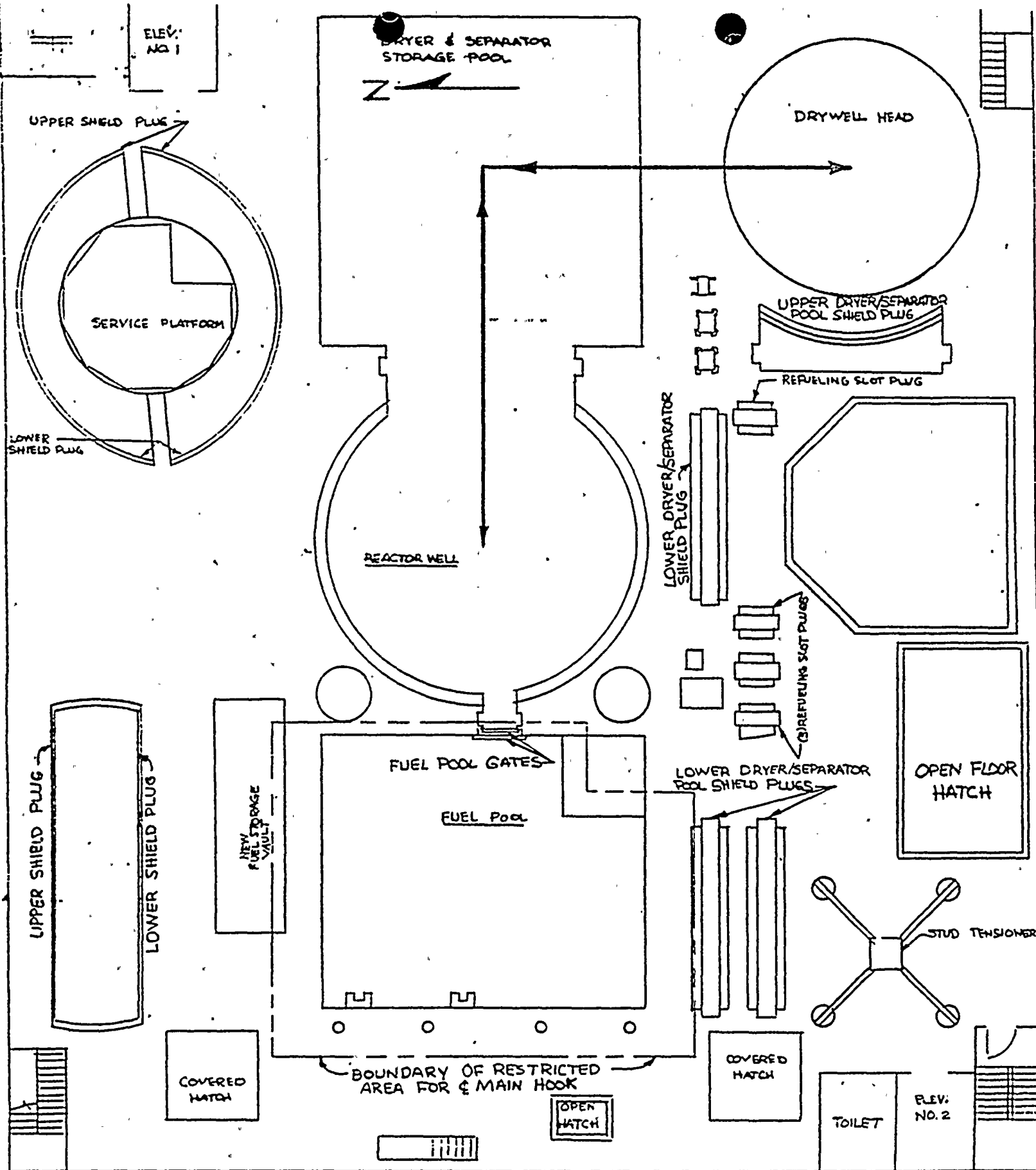




SAFE LOAD PATH - DRYER/SEPARATOR SHIELD PLUGS  
SKETCH NO. 2



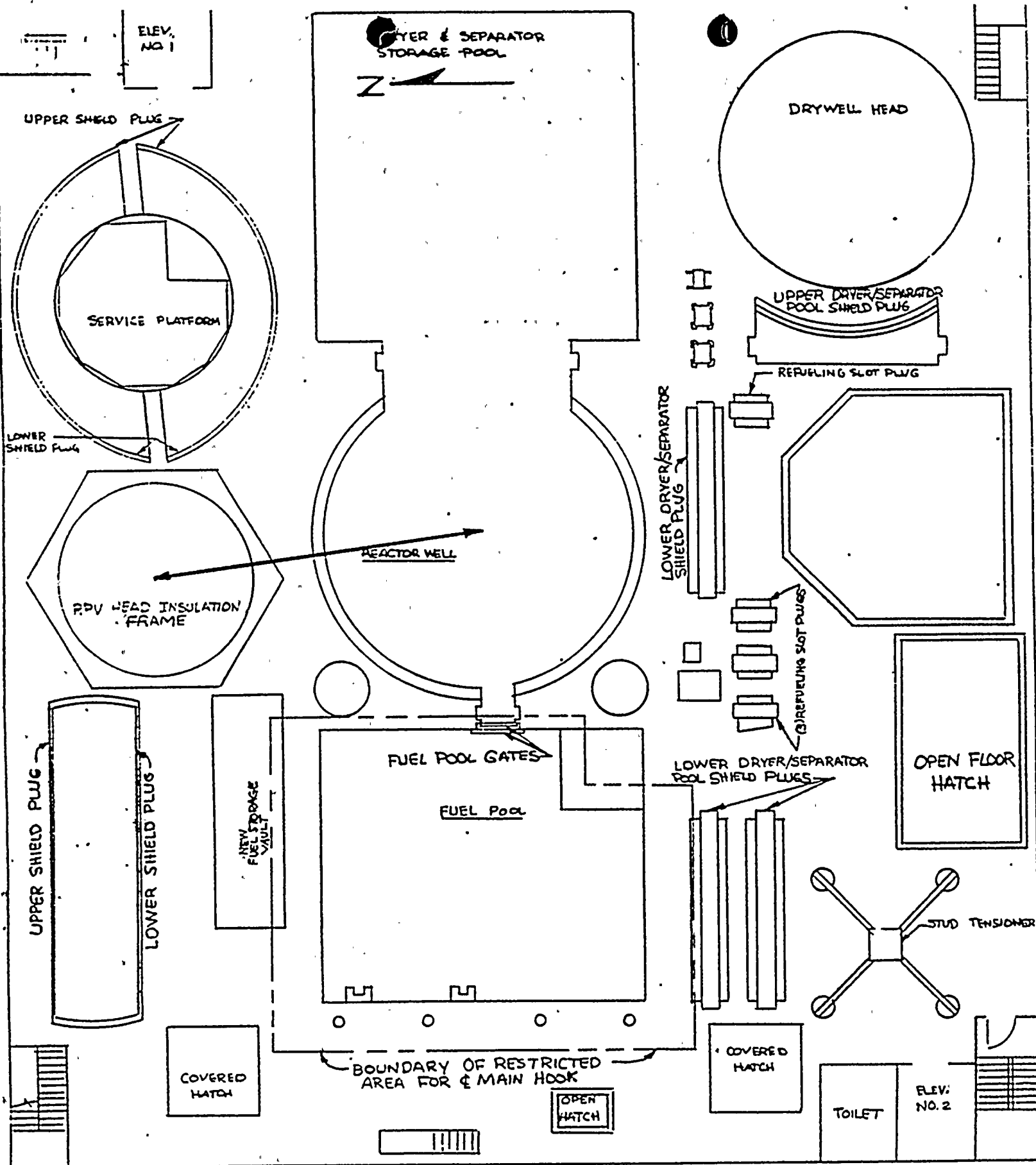




SAFE LOAD PATH - DRYWELL HEAD  
SKETCH NO. 4

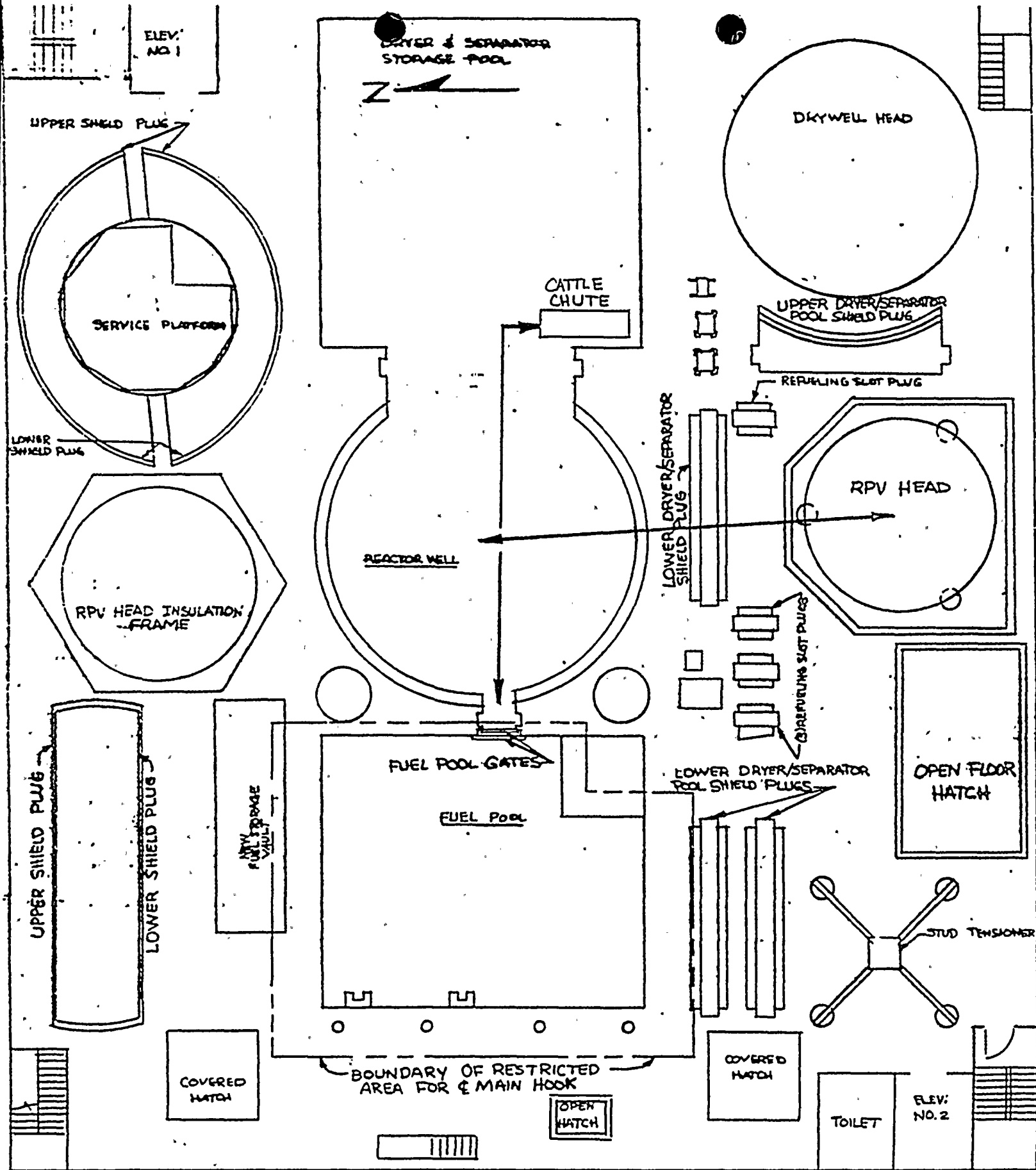


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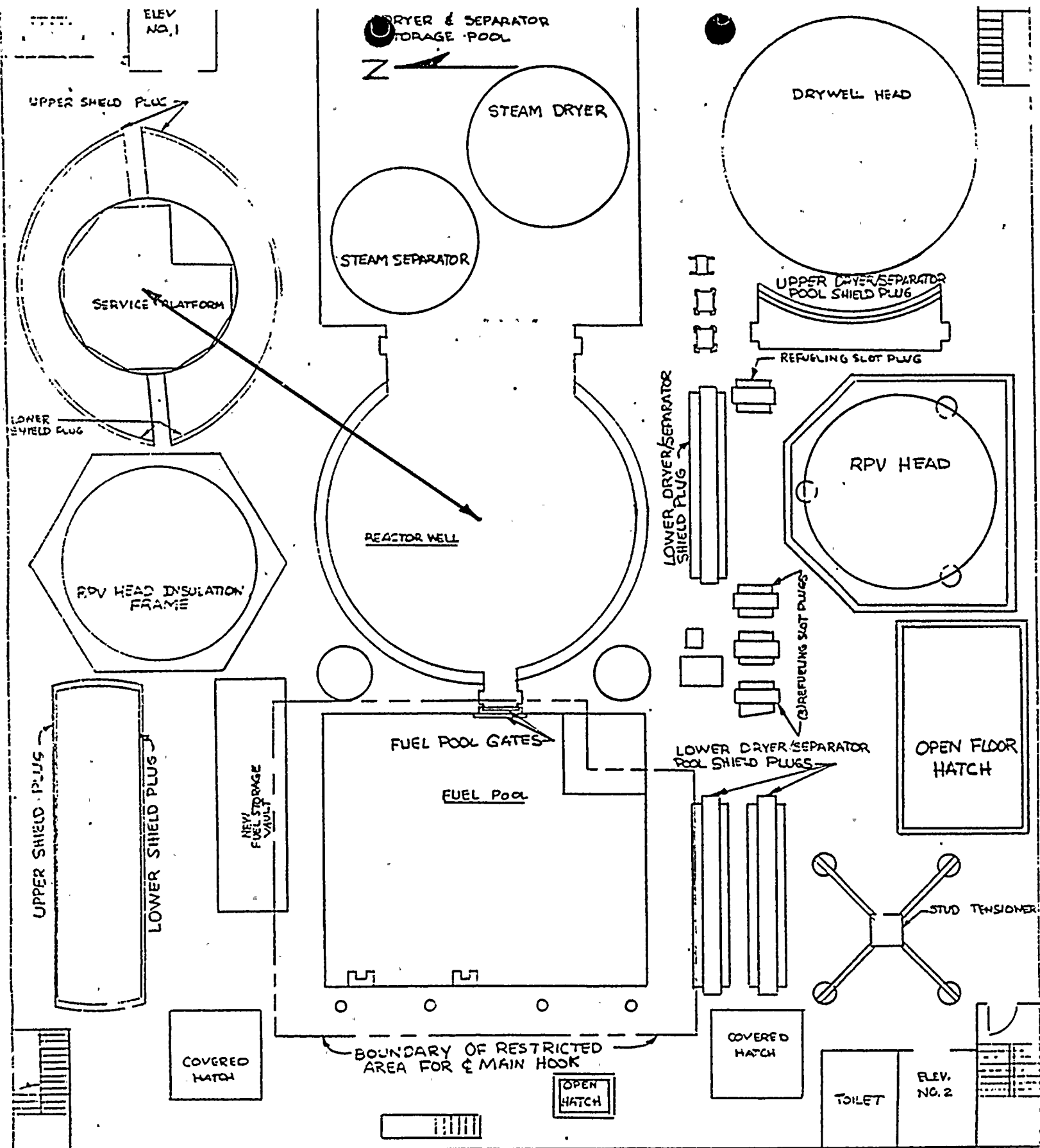


SAFE LOAD PATH - RPV HEAD INSULATION FRAME  
 SKETCH NO. 5

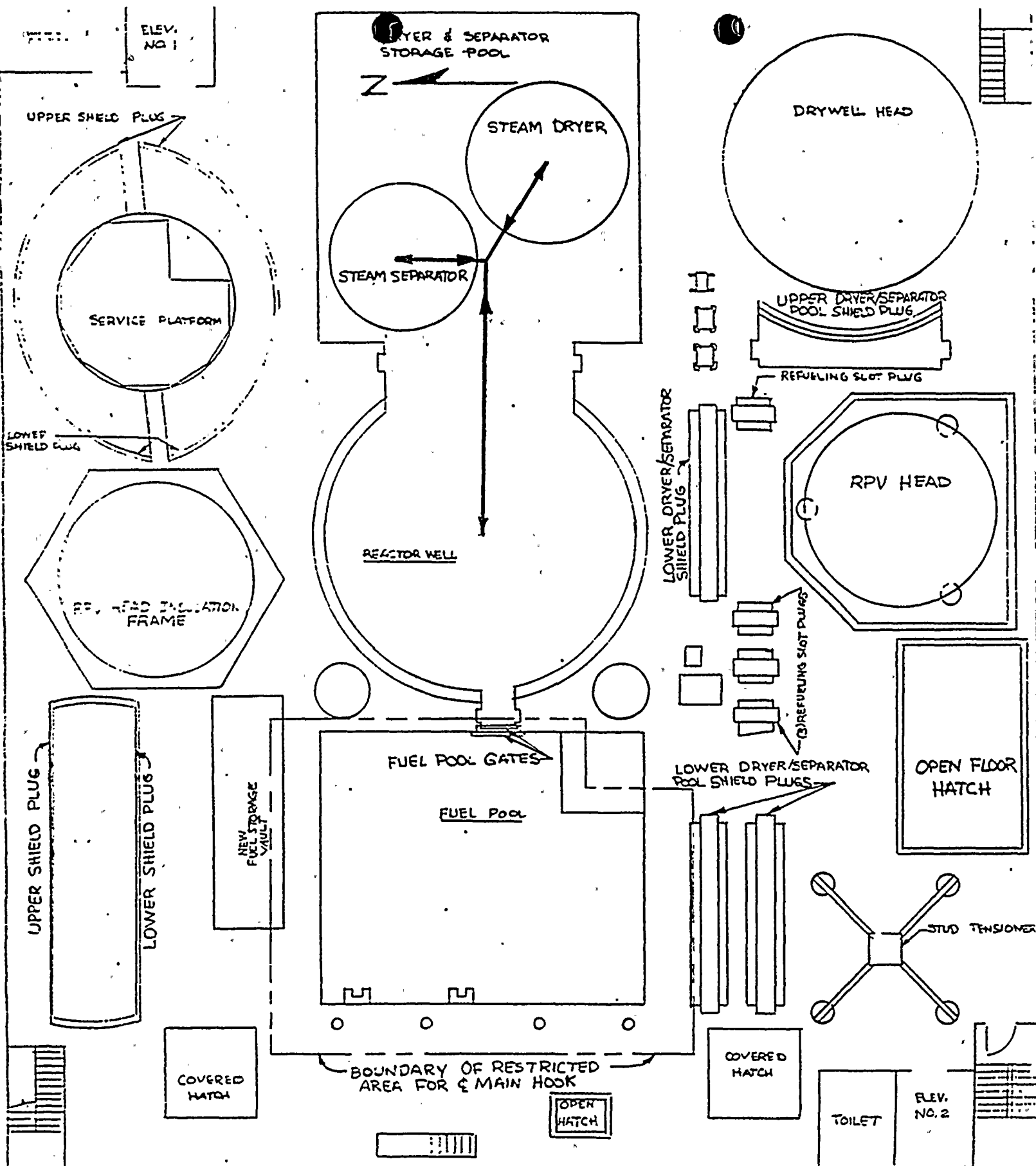




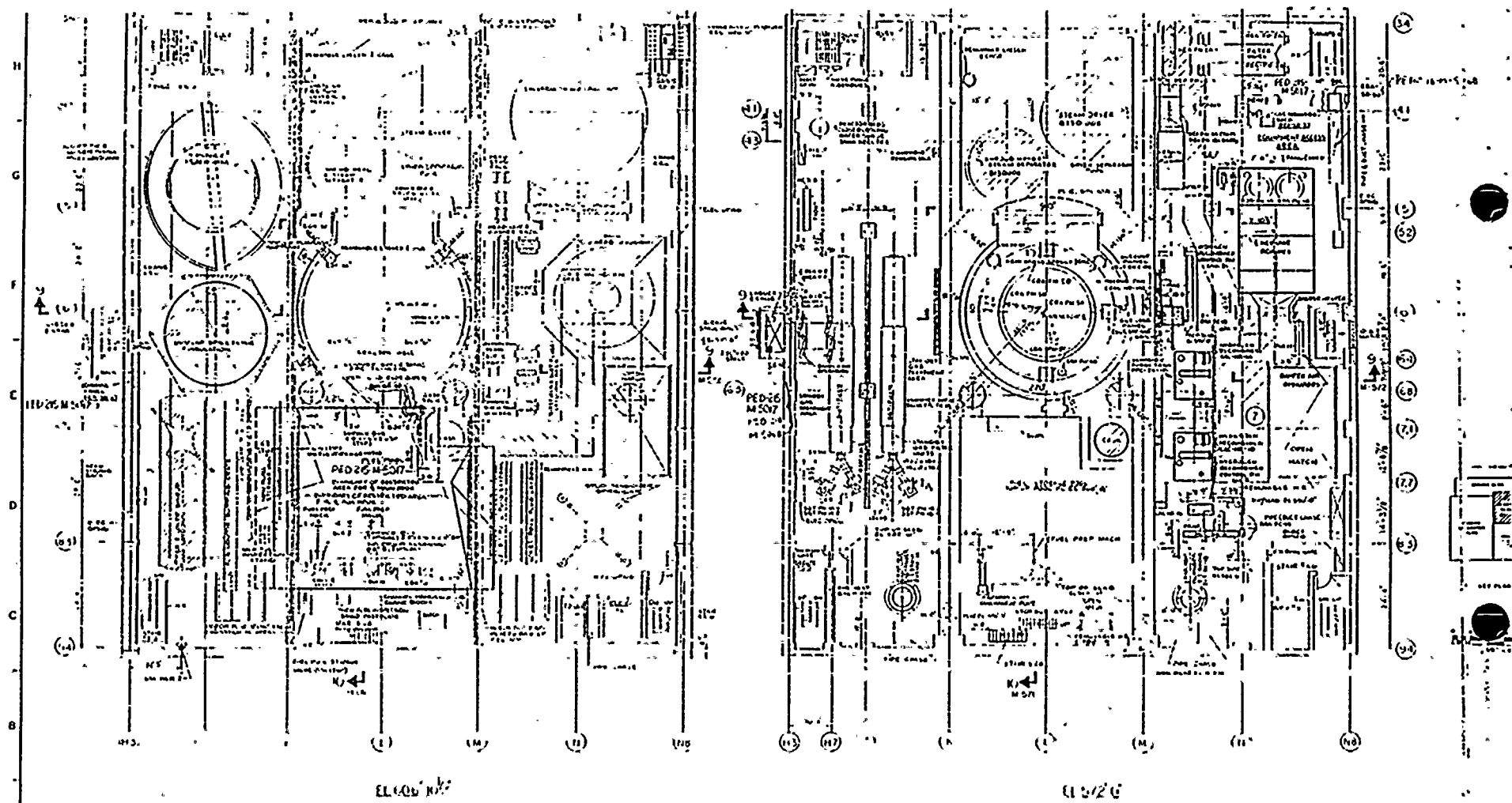
SAFE LOAD PATH - RPV HEAD & CATTLE CHUTE  
SKETCH NO. 6.



SAFE LOAD PATH- SERVICE PLATFORM  
SKETCH NO. 7



SAFE LOAD PATH - STEAM DRYER AND SEPARATOR  
 SKETCH NO. 8



M-570

WASHINGTON PUBLIC POWER SUPPLY SYSTEM  
NUCLEAR PROJECT NO. 2

GENERAL ARRANGEMENT PLAN EL. 572'  
EL. 606' - 10 1/2" REACTOR BUILDIN