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SCHWENCER,A. Licensing Branch 2

SUBJECT: Submits util position re remote shutdown compliance, in response to 820311 request.

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EXTERNAL:	ACRS	41	10	10	BNL(AMDTS ONLY)		1	1
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JUN 0 3 1982

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

SUSQUEHANNA STEAM ELECTRIC STATION
REMOTE SHUTDOWN COMPLIANCE
ER 100450 FILE 841-2, 265 Docket Nos. 50-387
PLA - 1071 50-388

Dear Mr. Schwencer:

In the meeting on March 11, 1982, the staff requested that we prepare a summary of our positions on all of their concerns on the Remote Shutdown issue. This letter addresses the staff's positions as given to PP&L in a meeting on August 17, 1981.

A. To Meet GDC-19 (As interpreted in SRP Section 7.4)

1) The design should provide redundant safety grade capability to achieve and maintain hot shutdown from a location or locations remote from the control room, assuming no fire damage to any required systems and equipment and assuming no accident has occurred. Credit may be taken for manual actuation (exclusive of continuous control) of systems from locations that are reasonably accessible from the Remote Shutdown Panel. Credit may not be taken from manual actions involving jumpering, rewiring or disconnecting circuits.

2) The design should provide redundant safety grade capability for attaining subsequent cold shutdown through the use of suitable procedures.

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Response:

Attachment 1 tabulates the primary and redundant paths through hot and cold shutdown from outside the main control room. The systems are safety grade with the exception of the placement of the three safety relief valves in the primary path, which was intended to denote the preferred method of operation. While the use of the three safety relief valves does have a limited safety grade capability through the use of accumulators, the backup method (actuation of ADS) provides a redundant safety grade capability for depressurization. Within ADS there are six valves, each of which has redundant divisionalized control from the relay rooms. If a valve was to fail (i.e. stick closed for any reason), any of the other valves could be

used. If there was a control failure, up to and including the loss of a complete division, control could be achieved through the other division from the panel in the other relay room. For these reasons, ADS provides the required redundant safety grade capability for the purposes of remote shutdown.

With respect to previous staff concerns on the accessibility of ADS controls in the relay rooms, due to a common HVAC system, the following response was provided:

The HVAC system for the control room, the upper relay rooms, and the lower relay rooms is not a common system. Control room HVAC requirements are provided by the control room air handling units (Fan nos. OV117A&B), upper relay room HVAC requirements are provided by the control structure air handling units (Fan nos. OV103A&B), and lower relay room HVAC requirements are provided by the computer room air handling units (Fan nos. OV115A&B). These are three different HVAC systems with independent supply and return ducting. Further detail is provided in FSAR subsection 9.4.1.

Each of the relay rooms is equipped with early warning ionization detectors in the rooms themselves, in safety-related cabinets, and under the false floors. In the event of a control room evacuation, we believe that access would be available to both relay rooms for the following reasons: first, the HVAC systems are independent as described above; secondly, the control room, upper relay room, and lower relay room are located on three different floor elevations within the control structure. This second point effectively minimizes any intersystem leakage. In addition to these design features, and provided only as an additional backup level of protection an adequate number of self-contained breathing apparatus are available for use in gaining access to the relay rooms.

Table 1 provides the locations including elevations for hot and cold shutdown mechanisms in the redundant path which are not controlled from the Remote Shutdown Panel. The accompanying figures are provided to depict the tabulated information.

With respect to accessibility from the Remote Shutdown Panel, it is important to note the availability of various forms of communication from the Remote Shutdown Panel area to the various areas requiring local control, including:

a. an intraplant public address, 5-channel, page/talk handset intercom system,

b. an intraplant maintenance/test jack telephone system, and

c. portable communication systems (walkie talkies).

These systems will support the control of any of the aforementioned redundant mechanisms.

A description of the instrument indicators needed for hot and cold shutdown and their locations is provided below.

a. Reactor Vessel Pressure - PI-14262 on the Remote Shutdown Panel. Numerous backup pressure indicators are available on panels 1C004 (Area 29) and 1C005 (Area 27) on elevation 749'-1".

b. Reactor Vessel Level - LI-14262 on the Remote Shutdown Panel. Numerous backup level indicators are available on panels 1C004 (Area 29) and 1C005 (Area 27) on elevation 749'-1".

c. Suppression Pool Level - LI-15776B2 on the Remote Shutdown Panel. A local level indicator, LI-15776A2, is being added in Area 27, elevation 645'-0".

d. Suppression Pool Temperature - TI-15751 (Division I) and TI-15752 (Division II) are being added to the Remote Shutdown Panel.

e. RCIC Turbine Speed/Flow - SI-15001B (RCIC Turbine Speed), FI-14903 (RCIC Flow), and FIC-14903 (RCIC Flow Indicator/Controller) are all on the Remote Shutdown Panel. These indicators act as backups to each other.

NOTE: In the redundant path to Hot Shutdown. HPCI is used under automatic control (See Attachment 1). Indication of HPCI operation is by direct visual and/or audible observation of the system. System effectiveness is determined by examination of the redundant reactor water level instrumentation.

f. RHR System Flow - FI-15105 on the Remote Shutdown Panel. A local flow indicator, FI-15105A, is being added in Area 27, elevation 683'-0".

g. RHR Service Water Flow - FI-11207B on the Remote Shutdown Panel. Required flow in the alternate loop may be inferred from local observation of valve HV-11210A in Area 29, elevation 645'-0".

If an indicator that is used to determine a primary parameter (a, b, c & d above) fails, its backup is used. If an indicator that is used to determine system operation (e, f & g above) fails, and the necessary information cannot be inferred from other available information, then the system is considered failed and the backup system is used.

These indicators have been designed and procured in a manner consistent with the importance of the related equipment function and the design bases for remote shutdown.

Equipment associated with remote shutdown capability for Susquehanna SES has undergone and will undergo a significant amount of qualification testing and analysis. This is documented in detail as part of the PP&L Susquehanna SES Seismic and Environmental Qualification Programs.

A brief summary of the information available from these programs for remote shutdown equipment is as follows:

1. Remote Shutdown Panel (excluding indicators)

   A. Wyle Laboratories Seismic Simulation Test Report 43929-1 dated July 21, 1978. A seismic test was run on the panel. Eight channels of information recording were used to monitor electrical functions, including switches and transfer switches.

   B. Analysis of Control and HVAC Panels for Seismic and Hydrodynamic Loads. Volume 5 Panel 2C201B. Prepared by Computech Engineering Services Inc. This provided an analysis that demonstrated the structural integrity of selected panels. This provides assurance of structural integrity for all local panels due to similarity of design. One of the panels analyzed was 2C201B (Unit 2 Remote Shutdown Panel - RHR Section). This panel was analyzed for seismic and SRV loads.

   C. Test Report In-Situ Dynamics Testing of Control Panels. Performed by Bechtel Power Corporation. A test was performed on various panels, including 2C201B to verify the model used in the panel analysis (1B above).

   D. Report of Test on Class 1E Qualification of Panel Mounted Electrical Devices for Combined Load and Hydrodynamic Fatigue Loads per IEEE-344-1975. Combined load and fatigue tests were run on various panel mounted devices, including class 1E Remote Shutdown Panel switches and RSP transfer switches to prove their ability to withstand these events and perform their safety function.

2. Remote shutdown Panel Indicators

   A.

PI-14262	Reactor Vessel Pressure
LI-14262	Reactor Vessel Level
LI-15776B2	Suppression Pool Level
TI-15751	Suppression Pool Temperature
TI-15752	Suppression Pool Temperature
SI-15001B	RCIC Turbine Speed
FI-14903	RCIC Flow
FI-15105	RHR System Flow
FI-11207B	RHR Service Water Flow

These devices are identical to other devices that will be qualified to NUREG-0588 Category I requirements. This qualification program includes dynamic testing as part of the required sequential testing. Bids have been received for this testing. This qualification will be completed in accordance with PP&L commitments for environmental qualification of Class 1E equipment (i.e. by the end of the first refueling outage).

   B. FIC-14903 RCIC Flow Indicator/Controller. This model controller is not being qualified, but a similar controller is being qualified by the program described in 2A.

3. Local Indicators

A. DRF A00-1147 Seismic Qualification Reevaluation Class 1E Equipment (Preliminary) by General Electric. This summarizes the qualification status (dynamic) for GE supplied items. The actual reports are held by GE at Valley Forge where they were audited by PP&L on May 12, 13 1982. This shows that racks 1C004 and 1C005 were qualified by similarity to Zimmer/LaSalle Racks. It also shows that the level instruments (indicators) on the racks were qualified for active functions and the pressure indicators were qualified for passive functions.

B. LI-15776A2 - Suppression Pool Level Indicator was seismically qualified to IEEE-344-1975.

C. FI-15105A - RHR System Flow Indicator was seismically qualified to IEEE-344-1975

The systems described above require no manual actions involving jumpering, rewiring, or disconnecting circuits.

To Meet Appendix K (ECCS Requirements)

3) The design should be such that the manual transfer of control to the remote locations(s) should not disable any automatic actuation of ESF functions while the plant is attaining or maintained in hot shutdown, other than where ESF features are manually placed in service to achieve or maintain hot shutdown. It is permissible to disable automatic LPCI actuation in this manner only when necessary in order to enable control of the RHR system from the remote location and while operating this system to effect cold shutdown from hot shutdown.

Response:

Automatic actuation of HPCI, ADS, and Core Spray are not disabled by manual transfer of control to the Remote Shutdown Panel. The LPCI mode of RHR is defeated by the transfer of control; at present the operator would not transfer control of this mode to the remote shutdown panel until it is needed.

The remote shutdown panel design does not presently allow for transfer of the primary loop of RHR to the panel while leaving the secondary loop in a configuration that allows automatic initiation of LPCI.

PP&L will undertake design activities aimed at modifying panel design such that those valves whose transfer defeats automatic initiation of LPCI by the secondary loop will be connected to a single transfer switch dedicated to that function. This will allow the second loop to maintain automatic LPCI initiation capability until the operator must make use of the loop. The design and modifications to equipment and procedures will be completed by the end of the first refueling outage.

[illegible]

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[illegible]

[illegible]

To Meet Appendix R (Fire Protection Requirements)

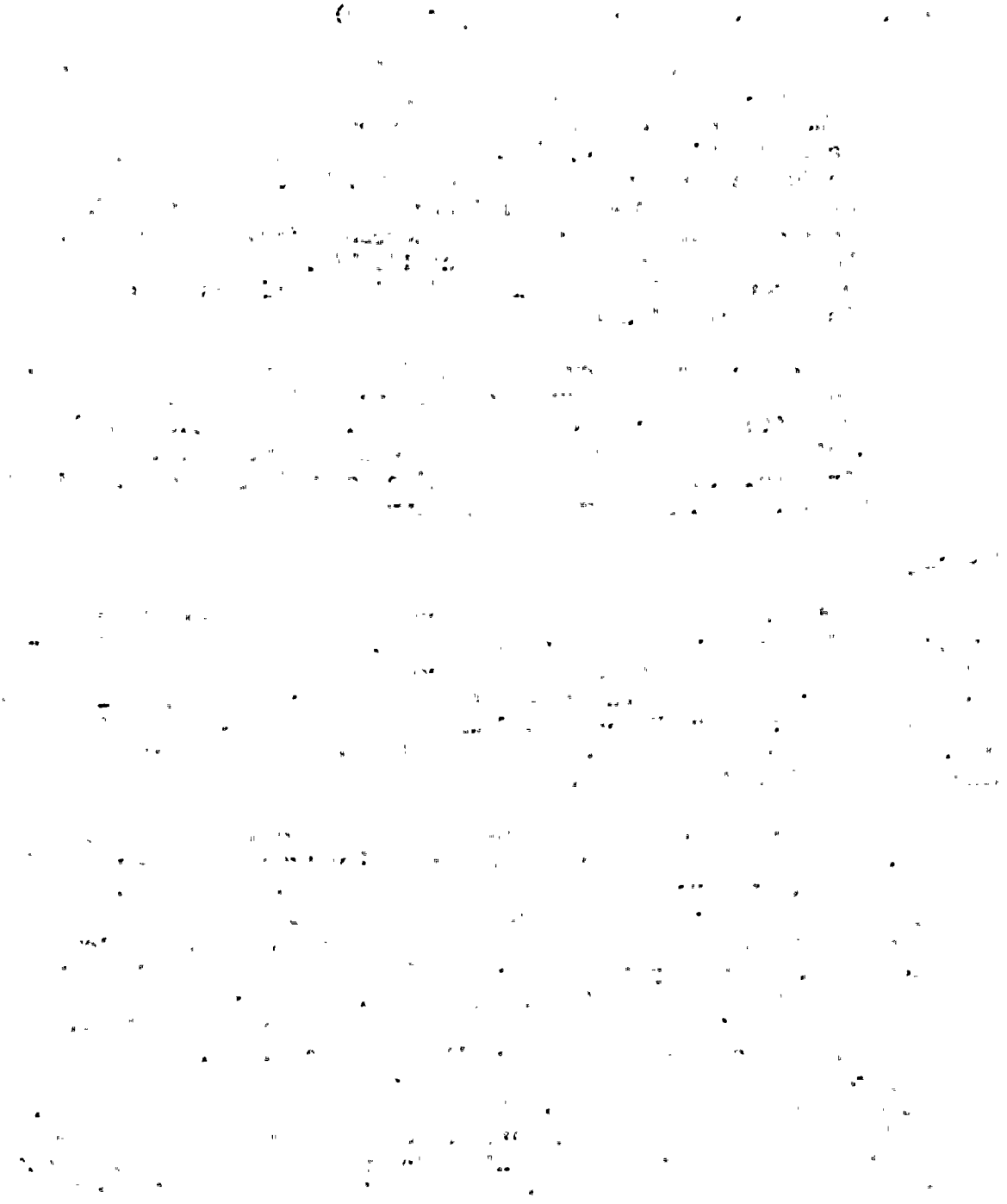
4) The design should provide, as a minimum, non-redundant safety grade systems necessary to achieve and maintain hot shutdown from either the control room or from a remote location(s) assuming a postulated fire in any fire area, including the control room or the Remote Shutdown Panel. Credit may be taken for manual actuation (exclusive of continuous control) of systems from locations that are reasonably accessible from the control room or the Remote Shutdown Panel, as applicable. Credit may not be taken for manual actions involving jumpering, rewiring or disconnecting circuits.

5) The design should provide, as a minimum, non-redundant safety grade systems necessary to achieve and maintain cold shutdown from either the control room or from a remote locations(s). The design should be such that in the event of fire damage in any fire area, systems could be repaired or made operable within 72 hours if required for cold shutdown.

Response:

As described in Section 4.2 of the Susquehanna SES Fire Protection Review Report, the design provides protection to safety grade systems which are necessary to achieve and maintain hot or cold shutdown from either the control room or from a remote location(s) assuming a postulated fire in any fire area, including the Remote Shutdown Panel or the loss of habitability of the control room. Manual actions involving jumpering, rewiring or disconnecting circuits are not taken.

B. In the March 11 meeting, the staff also raised concerns with respect to time constraints on manually controlled valves that are part of our remote shutdown procedure. In the path to Hot Shutdown there is local cycling of butterfly valves associated with the redundant path (Loop B) of Suppression Pool Cooling. These valves immediately allow flow upon cracking them open, and become fully open in about 20 minutes. Due to the large volume of water in the suppression pool and the fact that the plant is in a scrammed condition, the delay associated with local manual control does not result in an increase in pool temperature to a point where it would become a concern. There are larger valves which take approximately 30 minutes to open fully when cycled locally, but these actuations would take place during the Shutdown Cooling period, when this delay will not in any way affect our ability to maintain the plant in a safe, stable configuration.



This letter, along with our response (PLA-1029, dated March 10, 1982) to your request for additional information dated February 19, 1982, closes all open concerns on the Remote Shutdown System at Susquehanna SES.

Very truly yours,

N. W. Curtis
Vice President - Engineering & Construction-Nuclear

RRS/law
Attachments

cc: R. L. Perch - NRC

ATTACHMENT

HOT & COLD SHUTDOWN MECHANISMS FROM OUTSIDE THE MCR

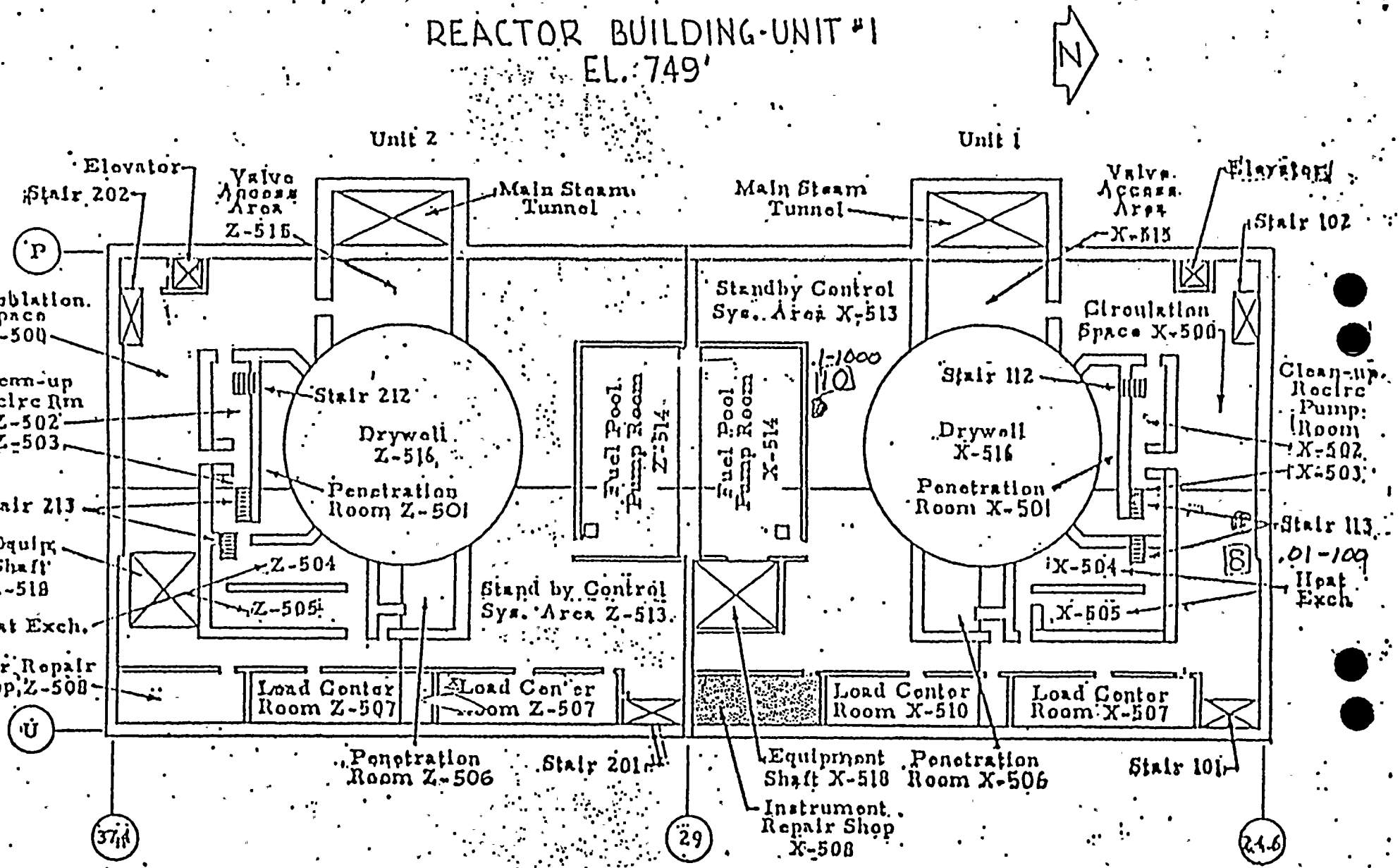
PRIMARY PATH	REDUNDANT PATH
Hot Shutdown	Hot Shutdown
1) RCIC-level control	1) HPCI (automatic actuation)
2) SRV's mechanical or manual actuation-pressure control	2) SRV's mechanical actuation (or ADS valves manual actuation)
3) RHR Suppression Pool Cooling-Loop B	3) RHR Suppression Pool Cooling-Loop A
4) RHR SW-Loop B	4) RHR Service Water-Loop A
5) ESW-Loop B	5) ESW Loop A
6) RPV Level and Suppression Pool Temperature Indication	6) RPV Level and Suppression Pool Temperature Indication-local
7) Status of MSIV inboard valves	7) Visual observation of MSIV's-outboard
Cold Shutdown (in addition to 1-7)	Cold Shutdown (in addition to 1-7)
8) RHR Shutdown Cooling (when RPV pressure permissive is satisfied)	8) Alternate Shutdown Cooling mode (SRV's, Core Spray and RHR Suppression Pool Cooling)
9) SRV's to depressurize	9) ADS Safety Relief Valves
10) Containment instrument gas to support 9	10) ADS Safety Relief Valves
11) Recirc. suction valve closure to support 8	11) Alternate Shutdown Cooling mode (SRV's Core Spray and RHR Suppression Pool Cooling)

Table 1

REDUNDANT PATH	LOCATION	ELEVATION	REFERENCE PAGE	ROOM
RHR Suppression Pool Cooling Loop - A	RHR Room	645'	5	X-14
	RHR Auxiliary Swittchgear	683'	3	X-202
		749'	1	X-510
RHR Service Water Loop A	RHR Room	645'	5	X-14
	Switchgear	719'	2	X-407
	Valve Pit	Ground Elevation	N/A	Near Spray Pond
ESW Loop A	Switchgear	749'/719'	1/2	X-510 X-407
RPV Level	1C004/5	749'	1	X-513
Suppression Pool Temperature Division II	1C201	670'	4	X-109
MSIV Outboard	Valve Access Area	749'	1	X-515
Alternate S/D Cooling	Upper/Lower Relay Room	754'/689'	N/A	Control Structure
	Core Spray Room	645'	5	X-10/X-17
	Valve Room	749'	1	X-515
	Switchgear	719'/749'	1/2	X-510 X-407
ADS	Upper/Lower Relay Room	754'/698'	N/A	Control Structure
Remote Shutdown Panel	1C201	670'	4	X-109

EL. 749

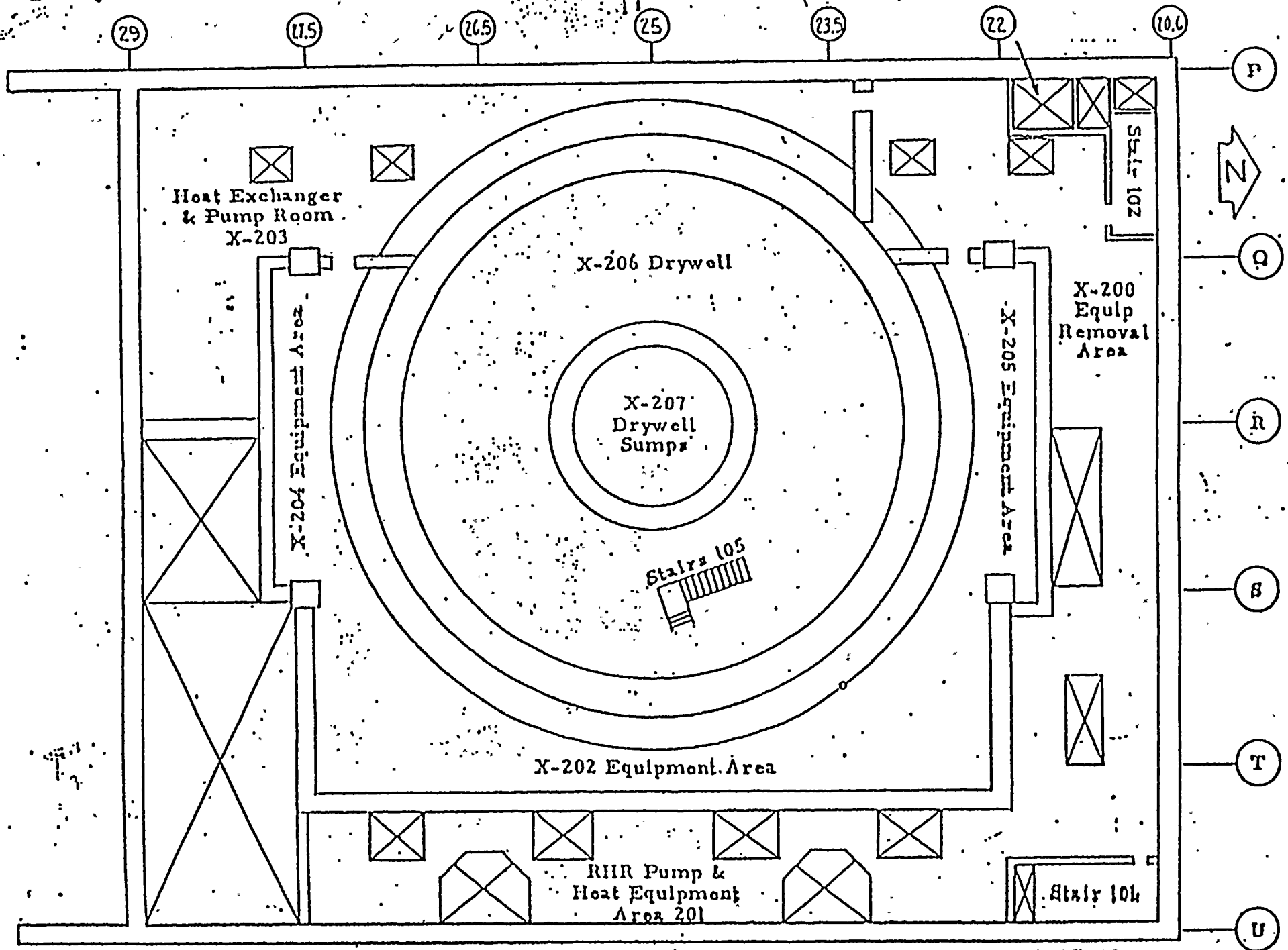
REACTOR BUILDING-UNIT #1
EL. 749'



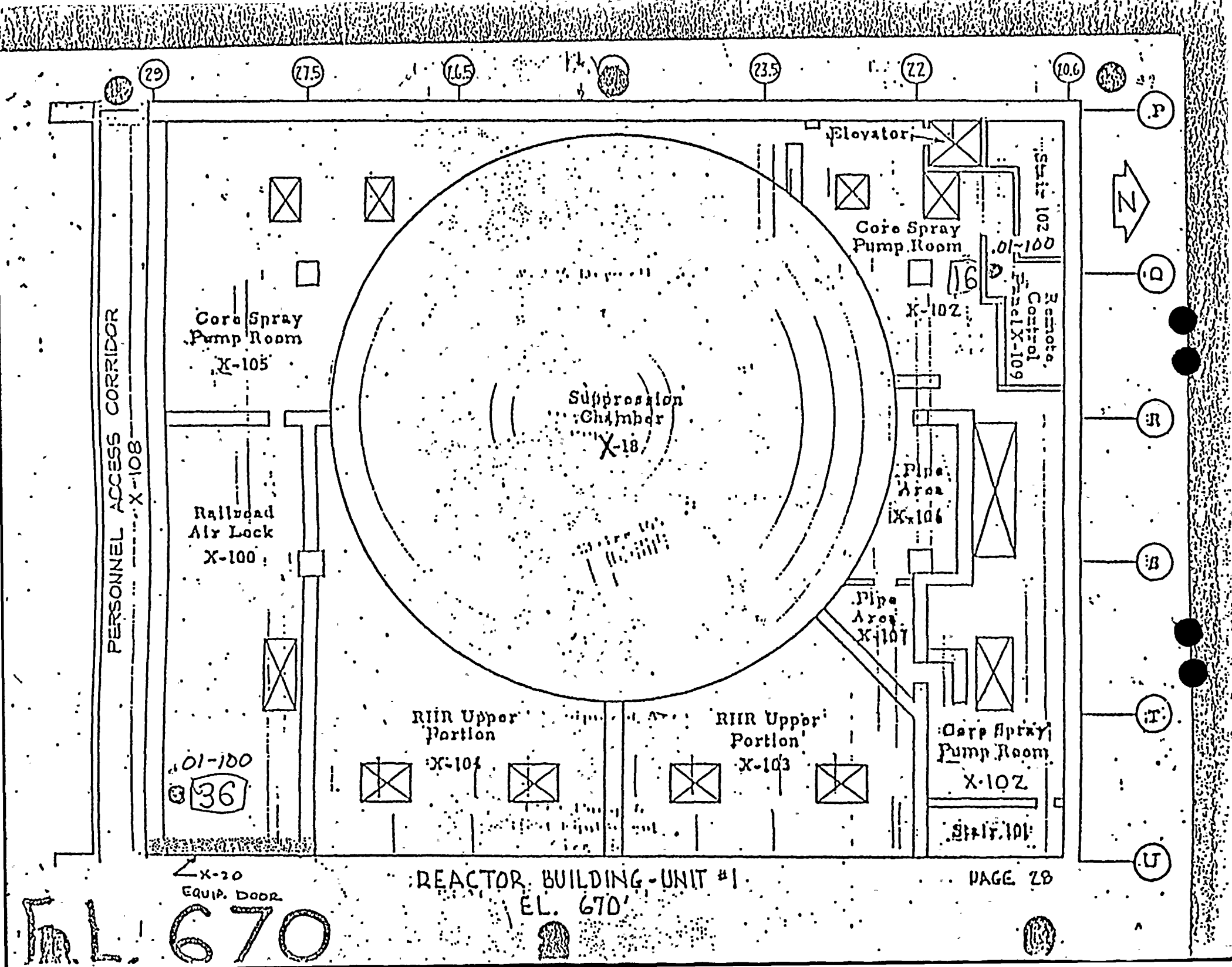
EL. 719

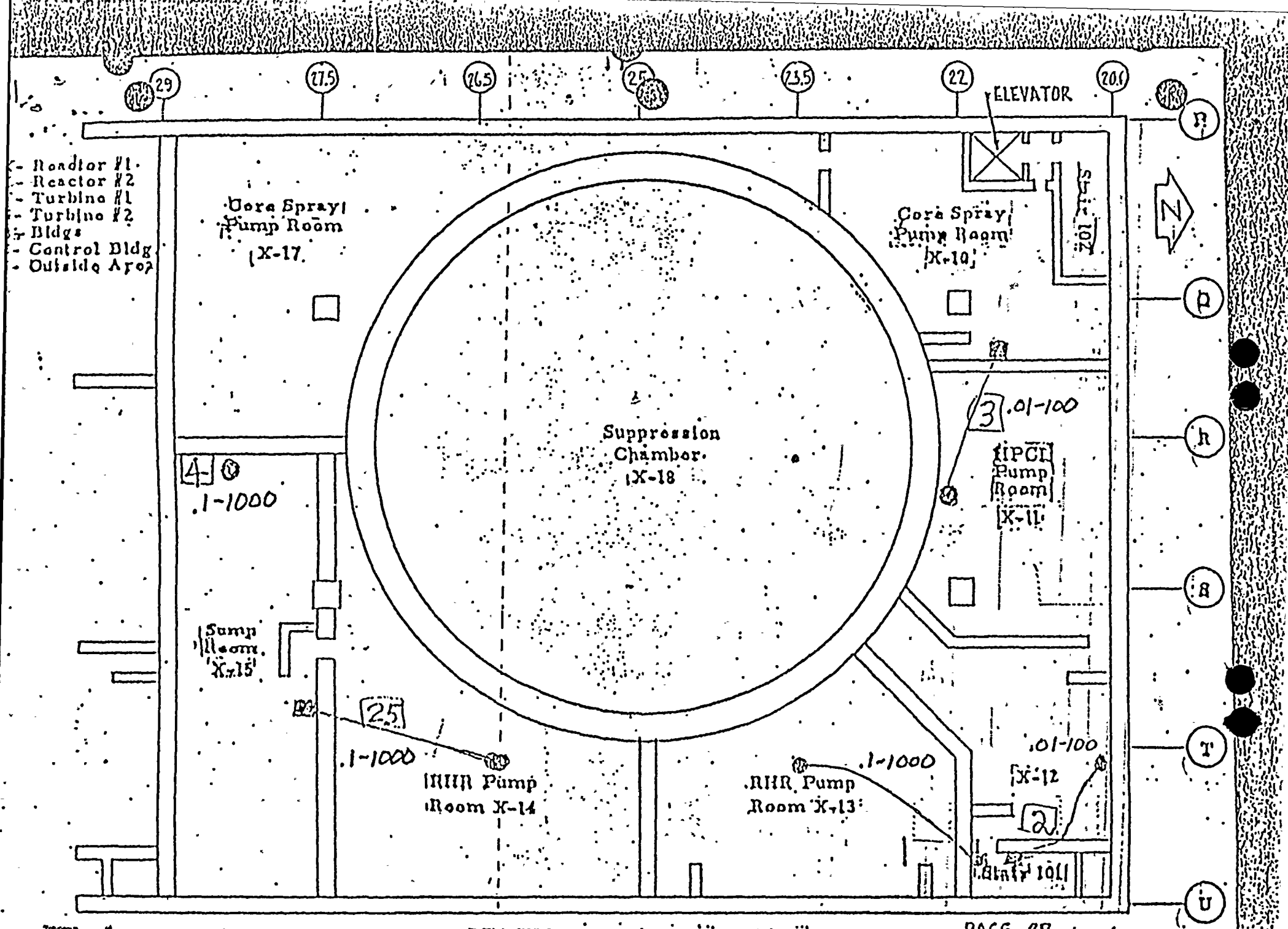
REACTOR BUILDING
EL. 719'

EL. 683



REACTOR BLDG UNIT 1 El. 683'


29
27.5
16.5
23.5
22
10.6
P
N
R
B
T
U
Elevator
Stair 102
Core Spray Pump Room
X-102
.01-100
16
Remote Control Panel X-109
Core Spray Pump Room X-105
Suppression Chamber X-18
PERSONNEL ACCESS CORRIDOR X-108
Railroad Air Lock X-100
Pipe Area X-106
Pipe Area X-107
RIIR Upper Portion X-104
RIIR Upper Portion X-103
Core Spray Pump Room X-102
Stair 101
.01-100
36
X-20 EQUIP. DOOR
REACTOR BUILDING - UNIT #1
EL. 670'
PAGE 28
EL. 670



REACTOR BLDG UNIT 1 El. 645'

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