Illinois Power Company

U-0669
0982-L
L30-83(09-22)-L

500 SOUTH 27TH STREET, P. O. BOX 511, DECATUR, ILLINOIS 62525-1805

Docket No. 50-461

September 22, 1983

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

Subject: Clinton Power Station Unit 1
SER Outstanding Issue #13 (NUREG-0853)
Remote Shutdown Panel

Dear Mr. Schwencer:

Reference: IP letter dated December 2, 1981 (U-0639),
J. D. Geier to J. R. Miller, NRC

The referenced letter provided the Illinois Power Company position relative to the remote shutdown capability. Subsequently, a meeting was held in Bethesda on March 30, 1982 to discuss with NRC personnel of the Instrumentation and Control Systems Branch the requirements for the Remote Shutdown Panel.

Recent telephone conversations were held with NRC Staff (Messrs. H. Abelson and R. A. Kendall) and IP personnel (Messrs. J. P. O'Brien and G. E. Wuller) to discuss resolution of SER Outstanding Issue #13, Remote Shutdown Panel. This transmittal provides the information for the Clinton remote shutdown panel which we understand will resolve the subject SER issue. Included are the following:

1) Material on remote shutdown system (RSS) used in the IP presentation at the 3/30/82 meeting.

2) Table (4 sheets) of Locations of Division I and II Remote Controls for Shutdown.

B001
1/1

3) Supplemental Information on the Qualification of the Instrumentation Mounted on the Remote Shutdown Panel (RSP).

4) General Arrangement (S&L Drawing M01-1109, Rev. C) showing the location of RSP and Backup MCCs and 4 Kv Breaker.

5) Clarifying Information on the operation of the Remote Shutdown Panel.

We trust that this information will resolve SER Outstanding Issue #13 for closeout in the next SER supplement. Copies of the RSP drawings will be submitted when they are finalized.

Sincerely,

R. M. Nelson
Director-Nuclear Licensing
and Configuration
Nuclear Station Engineering

GEW/lt

attachment

cc: H. Abelson, NRC Clinton Licensing Project Manager
R. A. Kendall, NRC ICSB
Illinois Department of Nuclear Safety
H. H. Livermore, NRC Senior Resident Inspector

REMOTE SHUTDOWN SYSTEM (RSS)

- SAFETY DESIGN BASES
  - RSS IS NOT A SAFETY SYSTEM
    - LOCA OR OTHER ABNORMAL EVENTS ARE NOT COINCIDENT WITH CONTROL ROOM EVACUATION
    - NOT REQUIRED TO MEET SINGLE FAILURE CRITERIA
    - NO OPERATOR ERROR IS ASSUMED
  - PROVIDED TO MEET REQUIREMENTS OF GDC 19
  - RSS COMPONENTS WHICH INTERFACE WITH OTHER SYSTEMS ASSUME THE DESIGN CRITERION OF THOSE SYSTEMS

- FUNCTION
  - THE RSS PROVIDES THE MEANS FOR A PROMPT CONTROLLED HOT SHUTDOWN BY MANUAL CONTROL OF
    - RCIC WATER MAKE-UP
    - RHR SUPPRESSION COOLING MODE
  - AND SUBSEQUENT COLD SHUTDOWN BY MANUAL CONTROL OF
    - RHR REACTOR SHUTDOWN COOLING MODE
    - NUCLEAR BOILER SYSTEM (3 SRV'S)

REMOTE SHUTDOWN SYSTEM (NSS)

(CONTINUED)

- SIGNIFICANT INSTRUMENTATION AND CONTROLS

  - INSTRUMENTATION, VALVE POSITION, REACTOR VESSEL LEVEL AND PRESS, RCIC AND RHR FLOW, CONTAINMENT PRESS AND TEMP, AND SUPPRESSION POOL LEVEL AND TEMP

  - USE OF THE RSS CAUSES AN ALARM IN THE CONTROL ROOM

  - CONTROL ROOM LOGIC, PERMISSIVES, AND INTERLOCKS FOR THE FUNCTIONS CONTROLLED BY THE RSS ARE BYPASSED BY MANUAL INITIATION OF VALVES AND PUMPS

Issue Title: Remote Shutdown Panel

Issue:

The remote shutdown capability should meet the following criteria:

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.

To Meet Appendix K (ECCS Requirements)

3. The design should be such that the manual transfer of control to the remote location(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 to effect cold shutdown from hot shutdown.

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 location(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:

General Design Criteria 19 in Appendix A of 10 CFR 50 reads as follows:

"Criterion 19 - Control Room. A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident.

Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures."

The control room and remote shutdown panel design for Clinton Power Station fully meet the requirements of GDC 19. The design bases used in the design of the remote shutdown capability to meet the requirements of GDC 19 are as follows:

1. The plant is operating initially at, or less than, design power.

2. The plant is not experiencing any transient situations. Even though the loss of off-site ac power is considered unlikely, the remote shutdown panel is powered from a Class 1E power system bus so backup ac power would be automatically supplied by the plant diesel generator. Manual controls of the diesel generator are also available outside the main control room.

3. The plant is not experiencing any accident situations. No design basis accident (including a LOCA) shall be assumed, so that complete control of engineered safeguard feature systems from outside the main control room is not required.

4. All plant personnel have evacuated the main control room.

5. The main control room continues to be inaccessible for several hours.

6. The initial event that causes the main control room to become inaccessible is assumed to be such that the reactor operator can manually scram the reactor before leaving the main control room. If this was not possible, the capability of opening the output breakers of the RPS logic from outside the main control room can be used as a backup means to achieve initial reactor reactivity shutdown.

7. The main turbine pressure regulators may be controlling reactor pressure via the bypass valves. However, in the interest of demonstrating that the plant can accommodate even loss of the turbine controls, it is assumed that this turbine generator control panel function is also lost. Therefore, main steam line isolation is assumed to occur at a specified low turbine inlet pressure and reactor pressure is relieved through the relief valves to the suppression pool.

8. The reactor feedwater system which is normally available is also assumed to be inoperable. Reactor vessel water inventory is made up by the RCIC system.

9. Dc power services are expected to be supplied from at least one plant dc power system for each essential system or equipment item in the remote shutdown system.

For remote shutdown operation, no off-normal operation is assumed. The remote shutdown capability, by itself, does not perform any safety related or protective function. This system interfaces with safety related systems, such as RHR and RCIC and meets the design criteria for those systems. No additional design criteria for the remote shutdown capability are necessary since they are already addressed in the respective design requirements.

The capability to achieve and maintain hot shutdown and subsequent attainment of cold shutdown is enumerated as follows:

1. The capability provides remote control for reactor systems needed to carry out the shutdown function from outside the main control room and bring the reactor to cold condition in an orderly fashion.

2. It provides a variation to the normal system used in the main control room permitting the shutdown of the reactor when the normal heat sinks (turbine and condenser) are assumed to be unavailable.

3. Automatic activation of relief valves and the Reactor Core Isolation Cooling (RCIC) system will bring the reactor to a hot shutdown condition after scram and isolation are achieved by removing Reactor Protection System power. During this phase of shutdown, the suppression pool will be cooled by operating the Residual Heat Removal (RHR) system in the suppression pool cooling mode. Reactor pressure will be controlled and core decay and sensible heat rejected to the suppression pool by relieving steam pressure through the relief valves. Reactor water inventory will be maintained by the RCIC system.

4. Manual operation of the certain safety relief valves will cool the reactor and reduce its pressure at a controlled rate until reactor pressure becomes so low that the RCIC system will discontinue operation. This condition will be reached at 50 to 100 psig reactor pressure.

5. The RHR system will then be operated in the shutdown cooling mode using the RHR system heat exchanger in the reactor water circuit to bring the reactor to the cold low pressure condition.

6. Essential equipment cubicles cooling systems will maintain the design basis environmental conditions for equipment operated from the remote shutdown panel.

The remote shutdown capability is designed to control the required shutdown systems from outside the main control room irrespective of shorts, opens, or grounds in the control circuit in the main control room that may have resulted from an event causing an evacuation. The functions needed for remote shutdown control are provided with manual transfer devices which override controls in the main control room and transfer the controls to the remote shutdown panel. All necessary power supplies are also transferred. Remote shutdown control is not possible without actuation of the transfer devices. Operation of the transfer devices causes an alarm in the main control room.

Access to areas in which the remote shutdown panel is located is under the control of the security system. Communications with other areas of the plant are being provided.

The following indicators are provided to enable the operator to monitor the status of the shutdown.

1. Reactor water level indactor.

2. Reactor pressure indicator.

3. Drywell temperature indications (two).

4. Suppression pool temperature (three - one near each of the three safety relief valves controlled from the remote shutdown panel).

5. RCIC Flow Controller and indicator.

6. RCIC Turbine Speed.

7. Indicating lights are provided for:

   a. Turbine tripped

   b. Turbine Bearing oil low pressure

   c. Turbine governor end bearing oil temperature high

   d. Turbine coupling end bearing oil temperature high

8. RCIC storage tank level.

9. Suppression pool level.

10. SSWS Strainer discharge pressure.

11. Indicating light for SSWS strainer high differential pressure.

In addition, status lights are provided for equipment operated from the panel and for other equipment important to the shutdown.

The following description of the shutdown operation identifies contingencies which provided for in the operation of the remote shutdown panel:

1. If evacuation becomes necessary, the operator will scram the reactor by depressing the scram switches at the Principal Plant Console as he leaves the main control room.

2. Under normal conditions, the main turbine pressure regulator will control the reactor pressure while rejecting heat (steam) through the turbine bypass valves, and the feedwater control system will control water level.

3. Opening the output breakers on feeders from the NSPS buses and the auxiliary 120 Vac bus to the Reactor Protection System trip logic channels can be used as a backup means of scramming the reactor and closing the containment and reactor vessel isolation valves. The controls for this function are located on the Reactor Protection System power distribution panel.

4. The remainder of the procedure assumes that the automatic pressure regulator is not available and the main steam line isolation valves are closed.

5. Operate transfer switches to transfer control to the remote shutdown panel.

6. Relief valves not used in the Remote Shutdown System may open automatically and cycle to control reactor pressure. Reactor level starts to drop rapidly or slowly depending on prior power level and elapsed time from scram.

7. The operator starts the RCIC system manually before the RCIC system comes on automatically on reactor vessel low water level initiation and monitors water level thereafter.

8. One relief valve is manually operated maintaining reactor pressure.

9. Reactor level reached RCIC initiation set point level if the RCIC system was initiated at low level. This is well above LPCS or RHR system initiation level. Level starts to rise as a result of RCIC system flow. Pressure relief is through one relief valve in manual intermittent operation.

10. Water level is returned to normal by operation of the RCIC system.

11. Start reduction of reactor pressure by manually actuating two relief valves.

12. While activating these relief valves, observe reactor level, reactor pressure, and suppression pool level and temperature. The relief valves are closed when level drops below the low level alarm point. The reactor cooldown rate shall not exceed 100°F per hour, as determined by observing reactor pressure.

13. Use the RHR system with one pump and one heat exchanger and associated water systems to cool the suppression pool. Operate the shutdown service water system to supply essential cooling water.

14. The operator activates two relief valves to maintain reduction of pressure while observing pool temperature.

15. Reduce reactor pressure to 100 psig.

16. Place the RHR system in the shutdown cooling mode. Flush the system for several minutes by pumping reactor water into the suppression pool. Then route reactor water back to the vessel, and continue cooldown until the reactor is in the cold low-pressure condition.

17. Hold reactor water level normal.

In addition to the RHR and RCIC controls required to perform the above functions, controls of shutdown service water and essential equipment cubicle HVAC systems are provided.

The following Shutdown Service Water System (SSWS) equipment/functions have transfer and control switches located at the remote shutdown panel for proper operation of the remote shutdown system:

One control switch is provided for each of the following:

SX01PA - SSWS Pump

SX014A - Motor Operated Valve (Plant Service Water/SSW Systems interconnection)

SX063A - Motor Operated Valve (diesel generator cooling water)

One control (selector) switch is provided which is common to the following:

SX003A - Motor Operated Valve (SSWS Strainer Inlet)

SX004A - Motor Operated Valve (SSWS Strainer Outlet)

SX008A - Motor Operated Valve (SSWS Strainer Bypass)

Controls for the strainer motor are available on a motor control center remote from the main control room.

The following essential equipment cubicle HVAC systems have transfer switches located on the remote shutdown panel. Controls are provided by local instrumentation remote from the main control room.

VH01CA - Fan (SSWS Pump Cubicle)

VY02C - Fan (RHR Pump Cubicle)

VY03C - Fan (RHR Heat Exchange Cubicle)

VY04C - Fan (RCIC Pump Cubicle)

VY01CA - Fan (Diesel Generator Cubicle)

VD02CA - Fan (Diesel Generator Cubicle)

VX03CA - Fan (Essential Switchgear Cubicle)

VX05CA - Fan (Battery Room)

Status (indicating) lights are provided on the remote shutdown panel for each of the fans listed.

One control switch is provided which is common to all of the following. This switch allows closing of all valves listed.

SX011A - Motor Operated Valve (SSWS Div. 1/2 Crosstie Isolation)

SX032A - Motor Operated Valve (RHR-A heat exchanger demineralized water inlet)

SX012A - Motor Operated Valve (Fuel Pool Heat Exchanger Inlet)

SX062A - MOV (Fuel Pool Heat Exchanger Outlet)

SX016A - MOV (Fuel Pool Make-Up Motor)

SX073A - MOV (SGTS Train A Charcoal Bed Water Supply)

SX076A - MOV (Control Room HVAC Unit A Deluge)

SX107A - MOV (Control Room HVAC Unit A Deluge)

Response to Issue Points

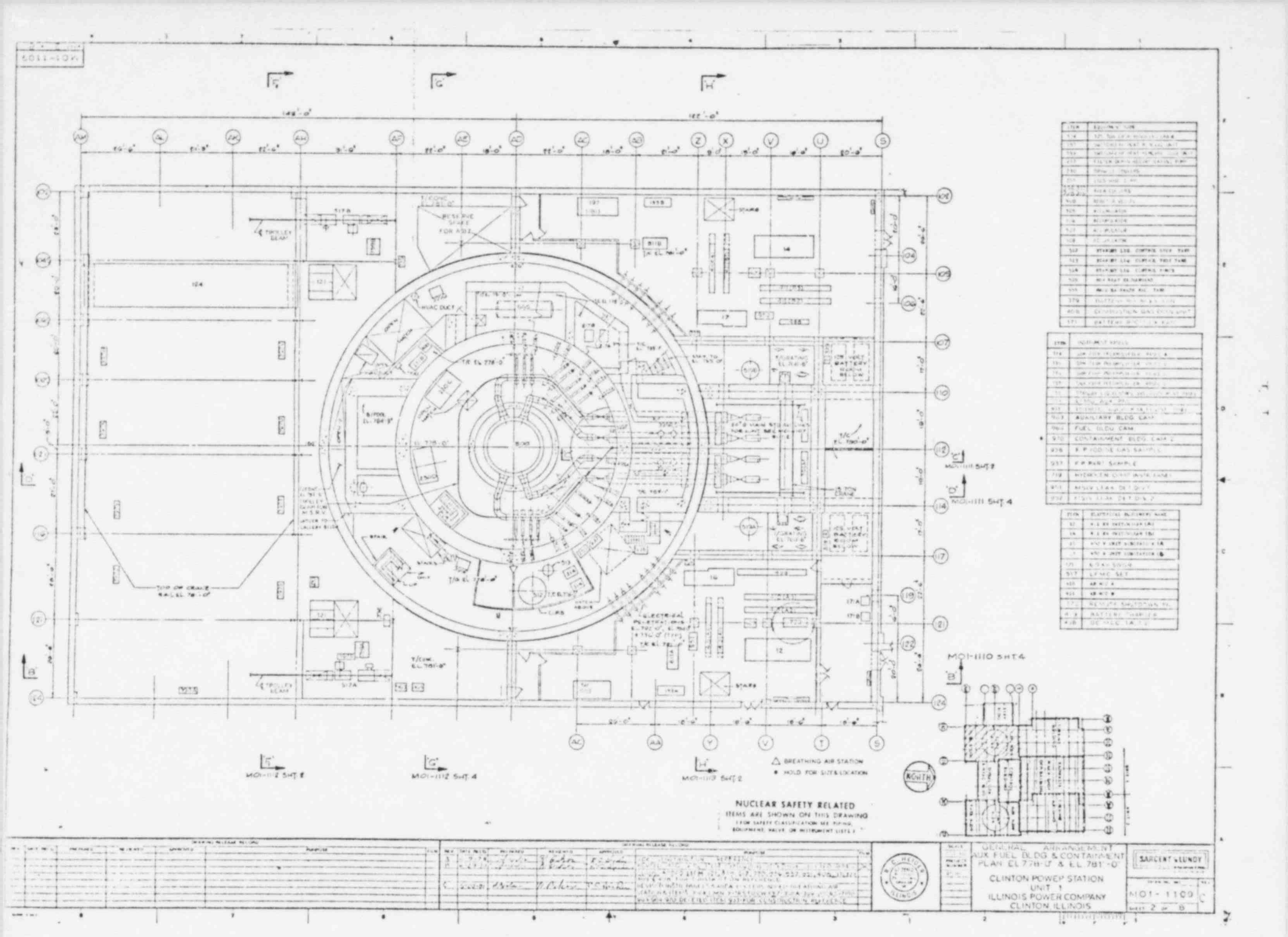
Issue 1: General Design Criteria No. 19 does not require that redundant safety grade shutdown capability remote from the control room be provided.

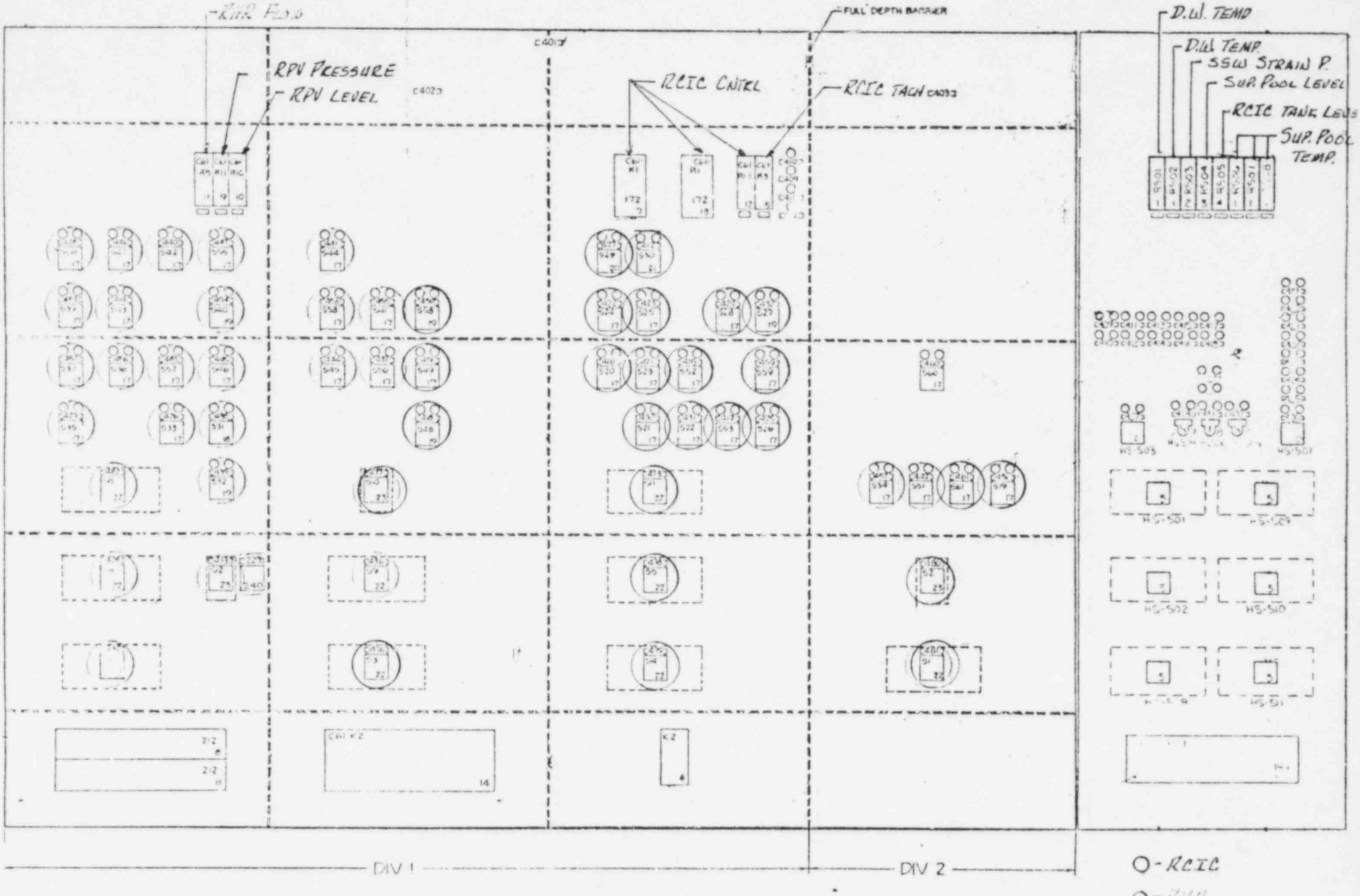
Issue 2: GDC No. 19 does not require redundant safety grade capability for attaining cold shutdown from outside the control room.

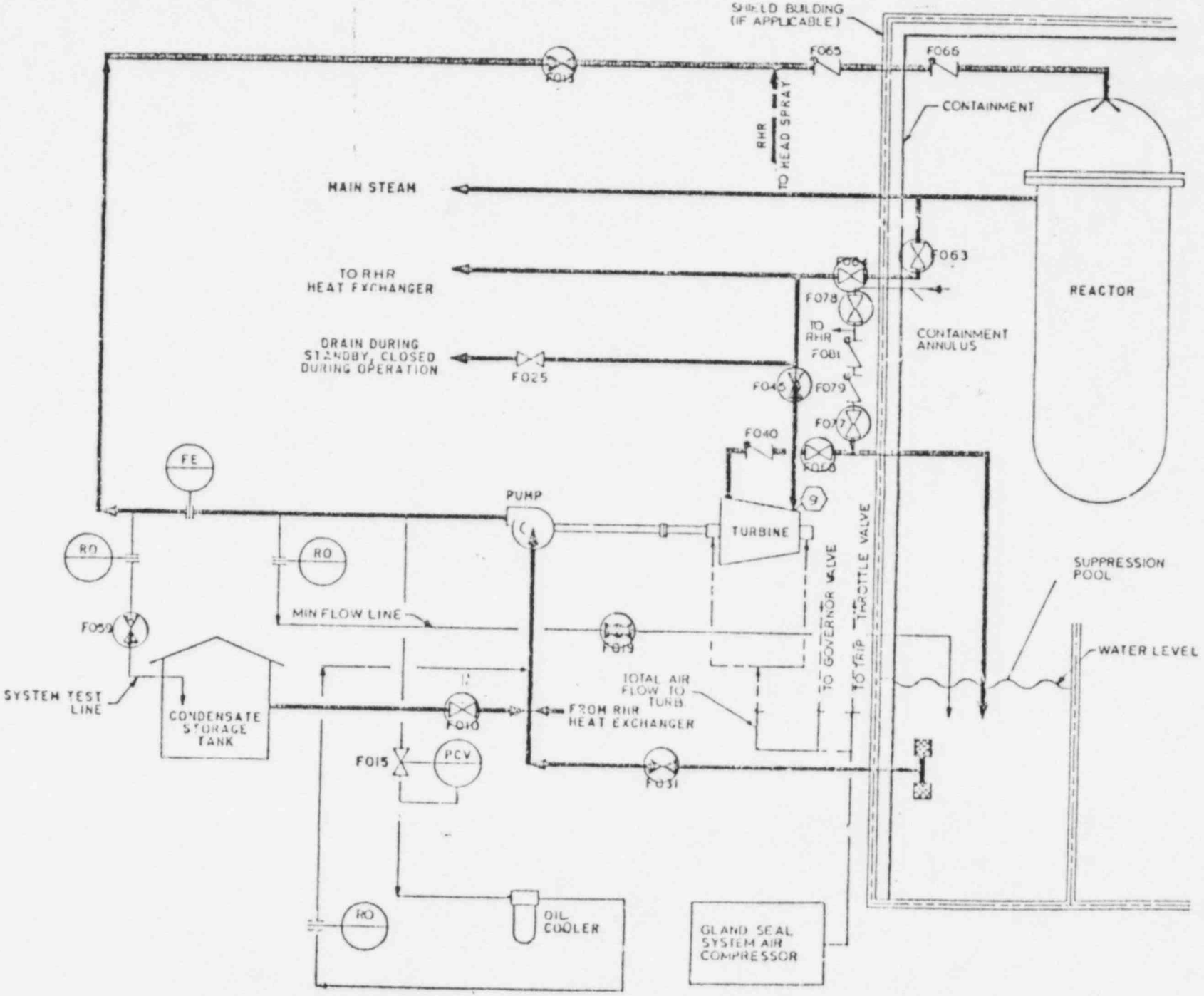
Issue 3: Operation of the transfer switches at the remote shut down panel transfers control of the system involved to the shutdown panel including power supply for these controls. This is done so failures in the control room such as shorts and/or opens will not affect manual operation of the shutdown equipment from shutdown panel.

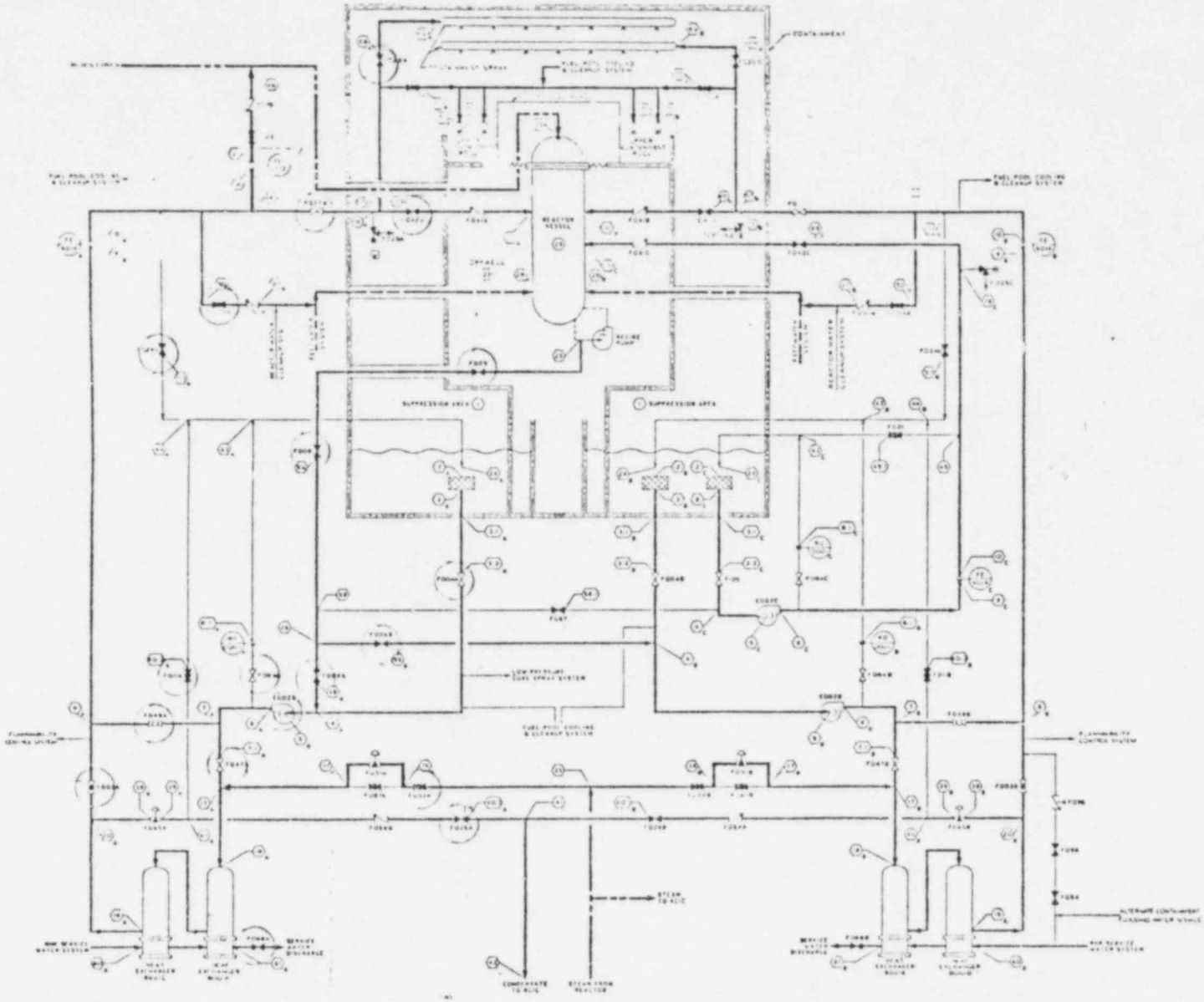
Issue 4: The design of the control room and the shutdown panel is such that they provide independent means of shutdown assuming a postulated fire at either location.

Issue 5: The design of the control room and the remote shut-down panel is such that they provide independent means of shutdown to the cold shutdown condition assuming a postulated fire at either location.

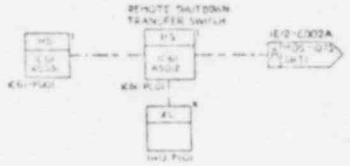

MO1-1110 SHT 4
MO1-1111 SHT 8
MO1-1111 SHT 4
MO1-1112 SHT 8
MO1-1112 SHT 4
MO1-1113 SHT 2
△ BREATHING AIR STATION
* HOLD FOR SIZE & LOCATION
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
(FOR SAFETY CLASSIFICATION SEE PIPING, EQUIPMENT, VALVE OR INSTRUMENT LISTS.)
GENERAL ARRANGEMENT
AUX FUEL BLDG & CONTAINMENT
PLAN EL 778'-0" & EL 781'-0"
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON ILLINOIS
SARGENT & LUNDY
M01-1109
C
SHEET 2 OF 5

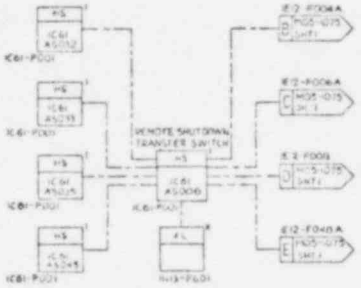

RHR F.D.B
FULL DEPTH BARRIER
D.W. TEMP
D.W. TEMP
SSW STRAIN P.
SUP. POOL LEVEL
RCIC TANK LEVEL
SUP. POOL TEMP
RPV PRESSURE
RPV LEVEL
RCIC CNTRL
RCIC TACH
C4023
C4033
DIV 1
DIV 2
O - RCIC
O - RHR
O - B21

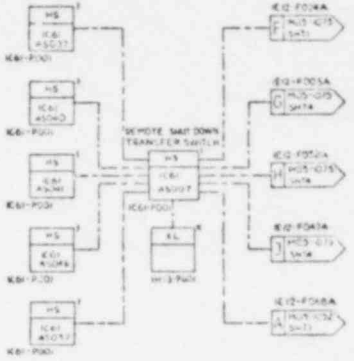

SHIELD BUILDING (IF APPLICABLE)
F065
F066
CONTAINMENT
RHR TO HEAD SPRAY
MAIN STEAM
TO RHR HEAT EXCHANGER
F063
REACTOR
F078
TO RHR
F081
CONTAINMENT ANNULUS
DRAIN DURING STANDBY, CLOSED DURING OPERATION
F025
F045
F079
F077
F040
F060
FE
PUMP
TURBINE
RO
RO
MIN FLOW LINE
F050
F019
SUPPRESSION POOL
WATER LEVEL
TO GOVERNOR VALVE
TO TRIP THROTTLE VALVE
SYSTEM TEST LINE
CONDENSATE STORAGE TANK
TOTAL AIR FLOW TO TURB.
FROM RHR HEAT EXCHANGER
F010
F015
PCV
F031
RO
OIL COOLER
GLAND SEAL SYSTEM AIR COMPRESSOR

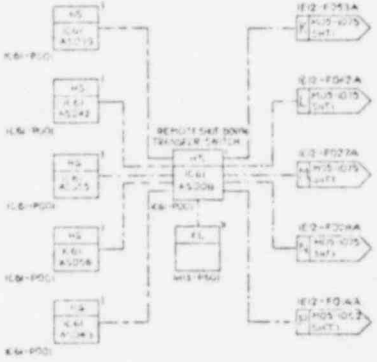


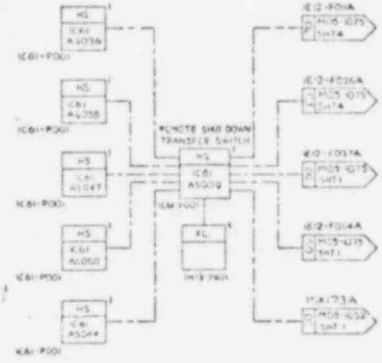
Residual Heat Removal System

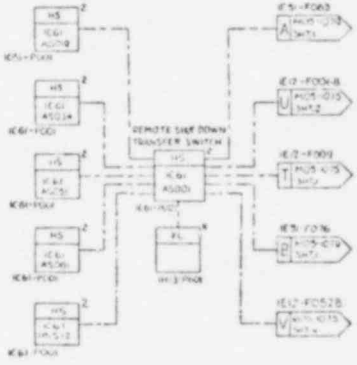








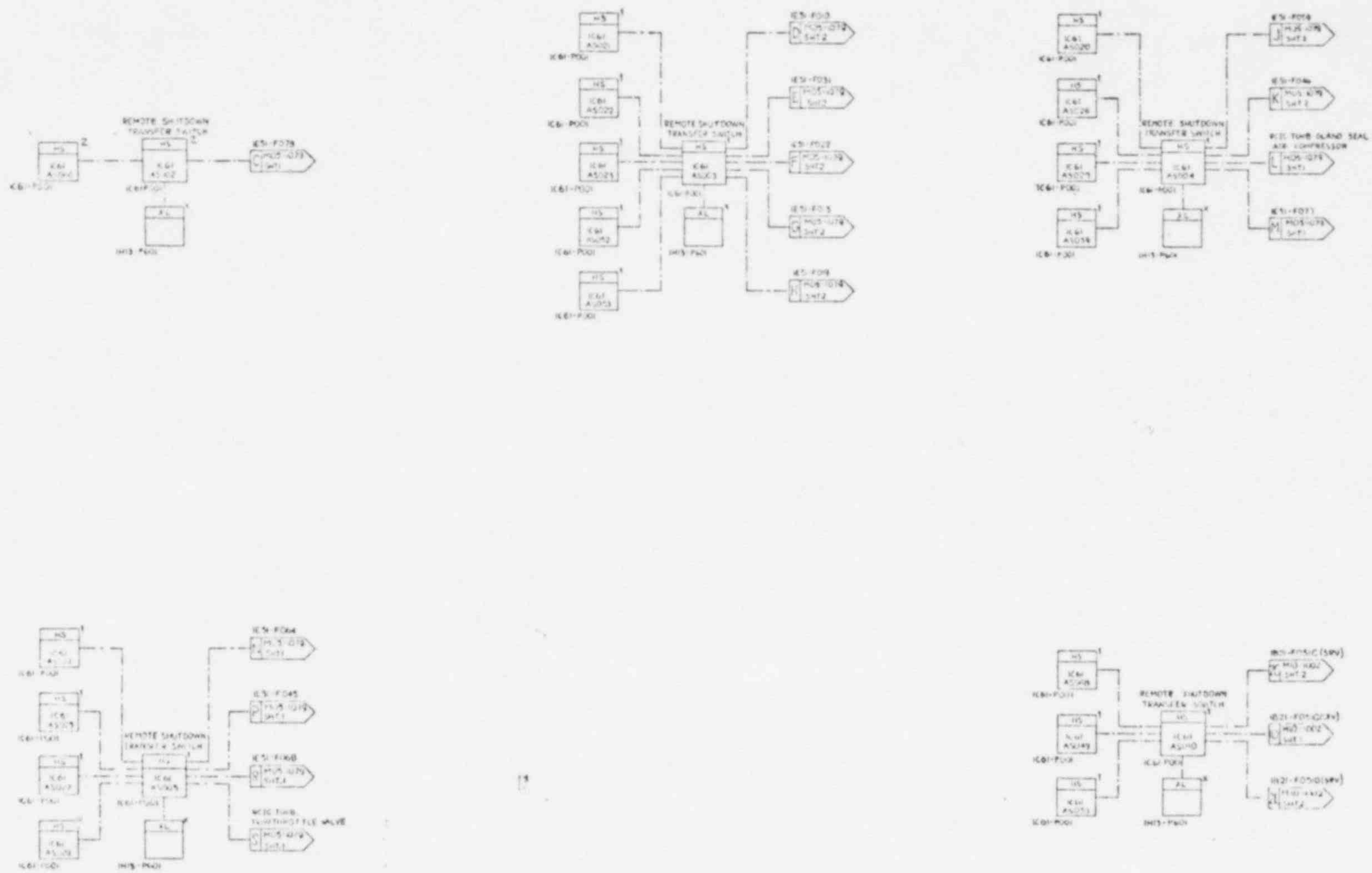




NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING

FINAL NUMERICAL REVISION WAS REV 2 1-23-79

P&ID REMOTE SHUT DOWN SYSTEM (RS)	SARGENT & LUNDY
CLINTON POWER STATION UNIT 1	M05-1068
ILLINOIS POWER COMPANY CLINTON ILLINOIS	



FINAL NUMERICAL DEVIATION WAS REV. 1 7-25-78

NUCLEAR SAFETY RELATED

ITEMS ARE SHOWN ON THIS DRAWING
(FOR SAFETY CLASSIFICATION SEE PIPING, EQUIPMENT, VALVE OR INSTRUMENT LISTS)

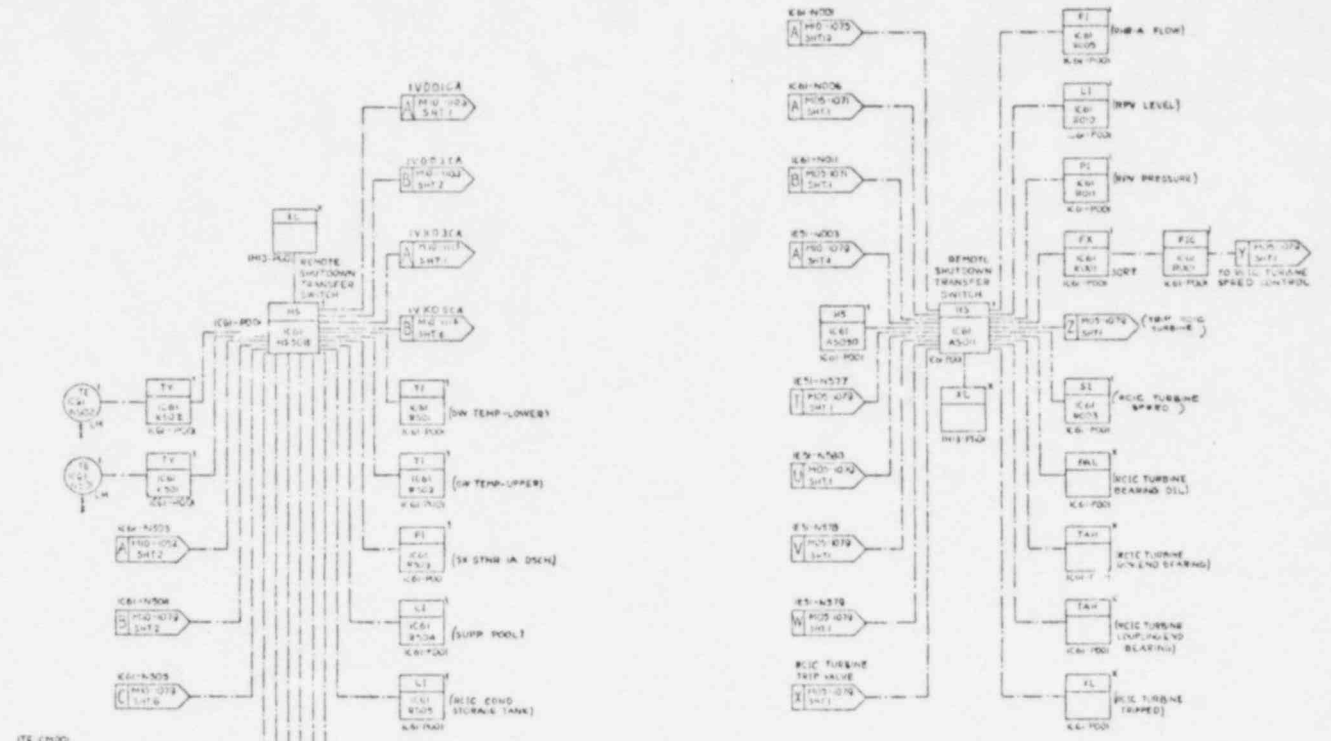
P&ID REMOTE SHUTDOWN SYSTEM (RS)

CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS

SARGENT & LUNDY

M05-1068

SHEET 2 OF 4



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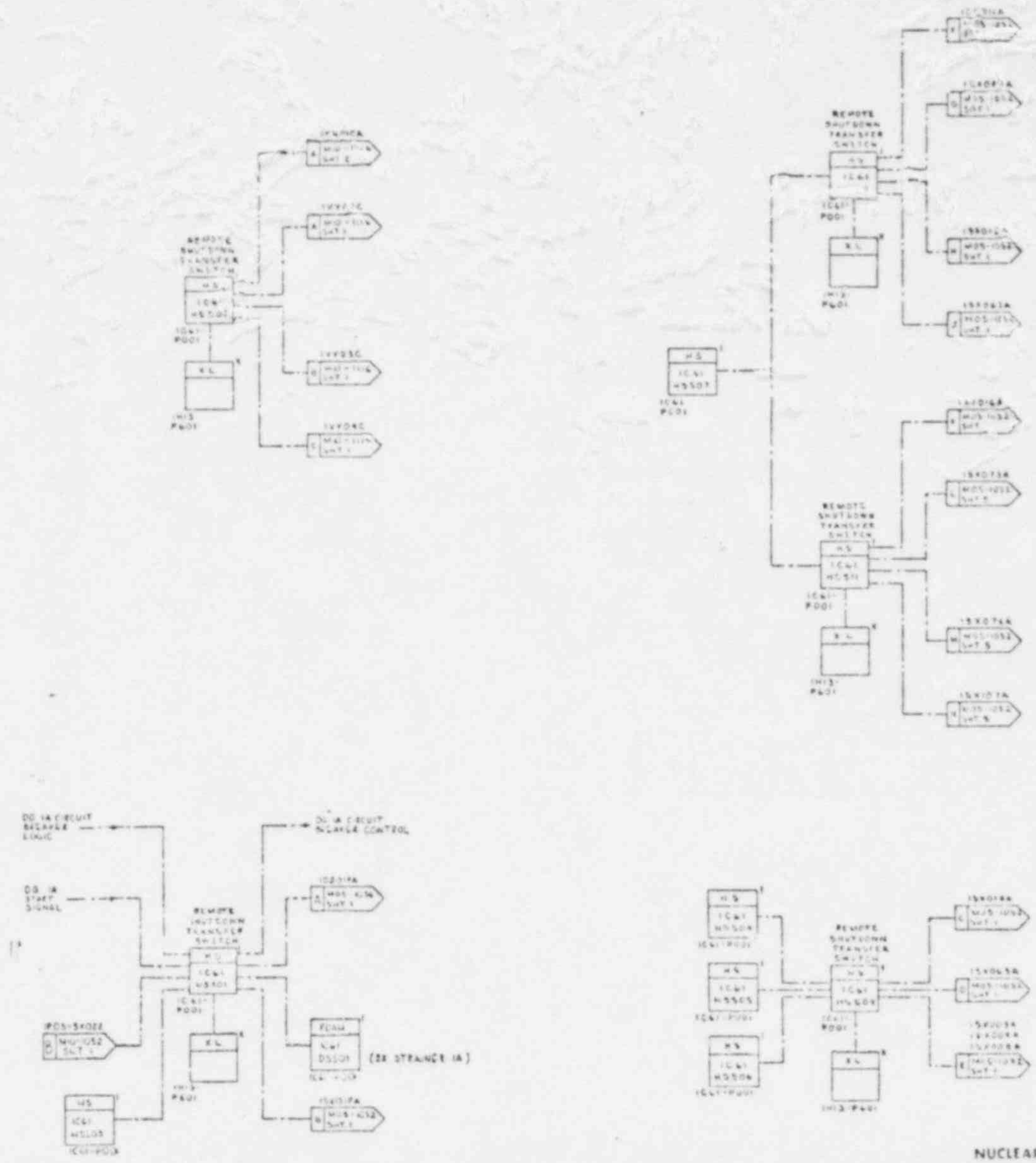
P&ID REMOTE SHUTDOWN SYSTEM (RS)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS

SARGENT & LUNDY

M05-1068



NUCLEAR SAFETY RELATED

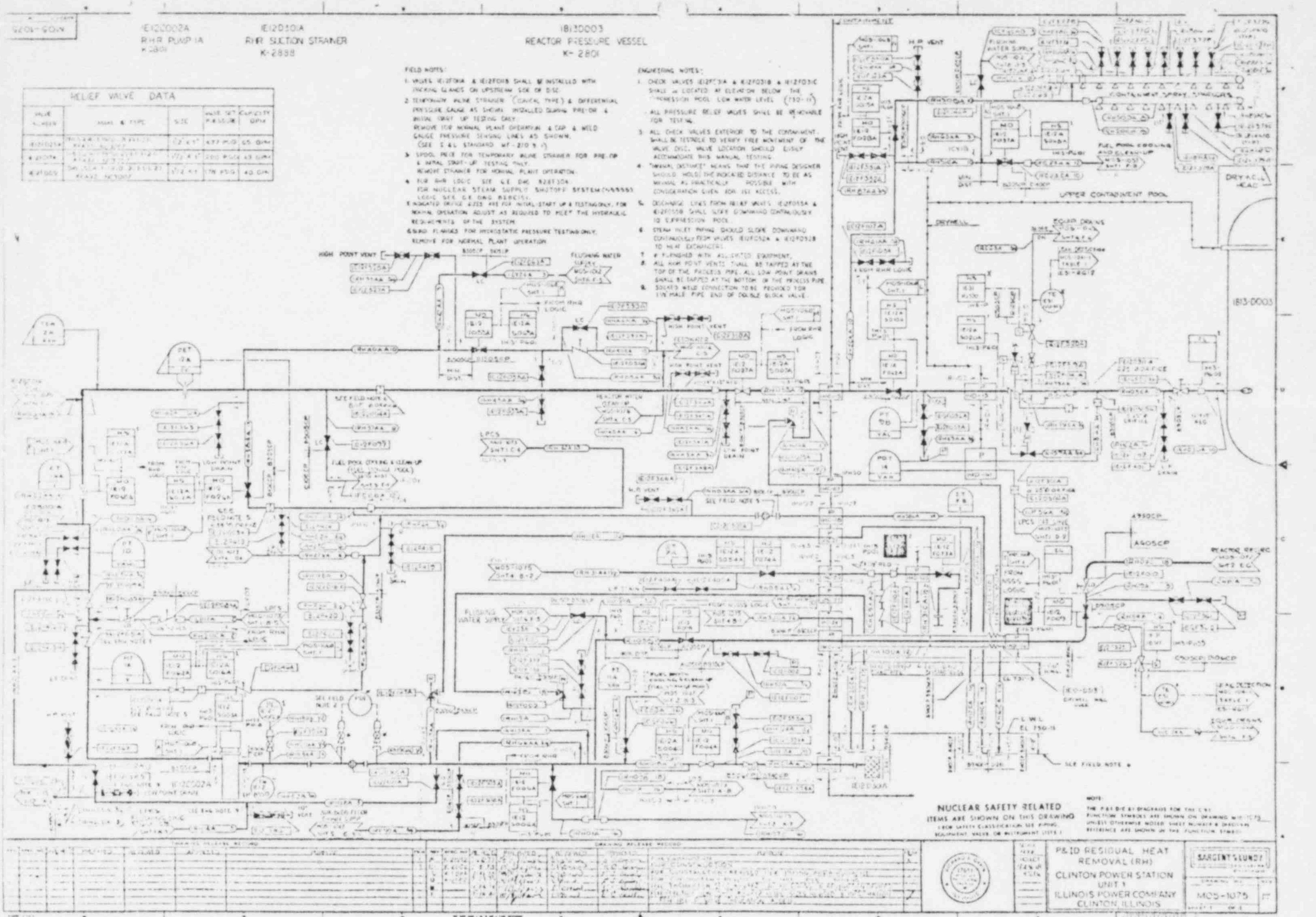
ITEMS ARE SHOWN ON THIS DRAWING

FINAL NUMERICAL REVISION WAS REV. 2

P&ID REMOTE SHUTDOWN SYSTEM (RS)
CLINTON POWER STATION
UNITS 1&2
ILLINOIS POWER COMPANY
CLINTON ILLINOIS

SARGENT & LUNDY

M05-1048 A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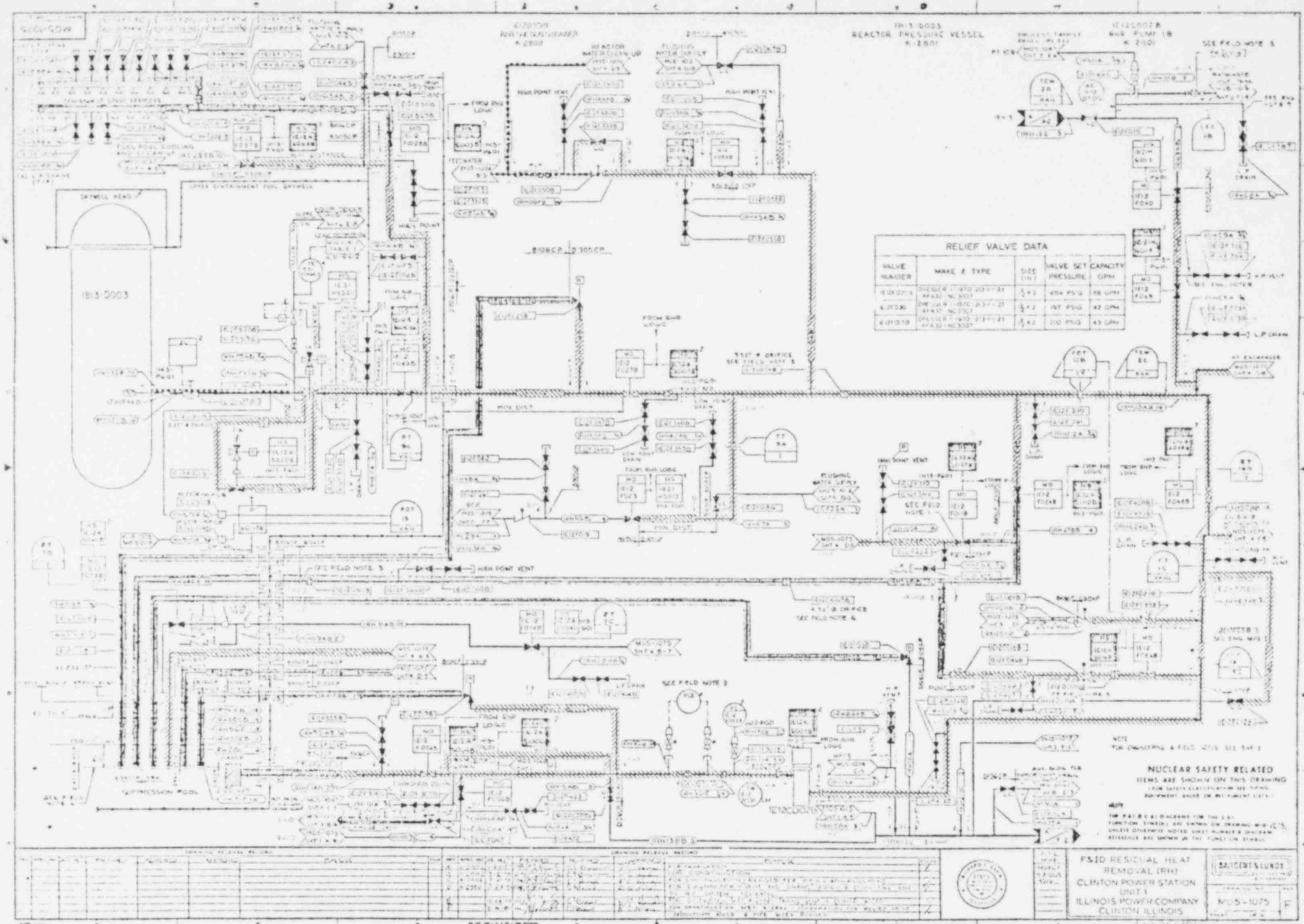
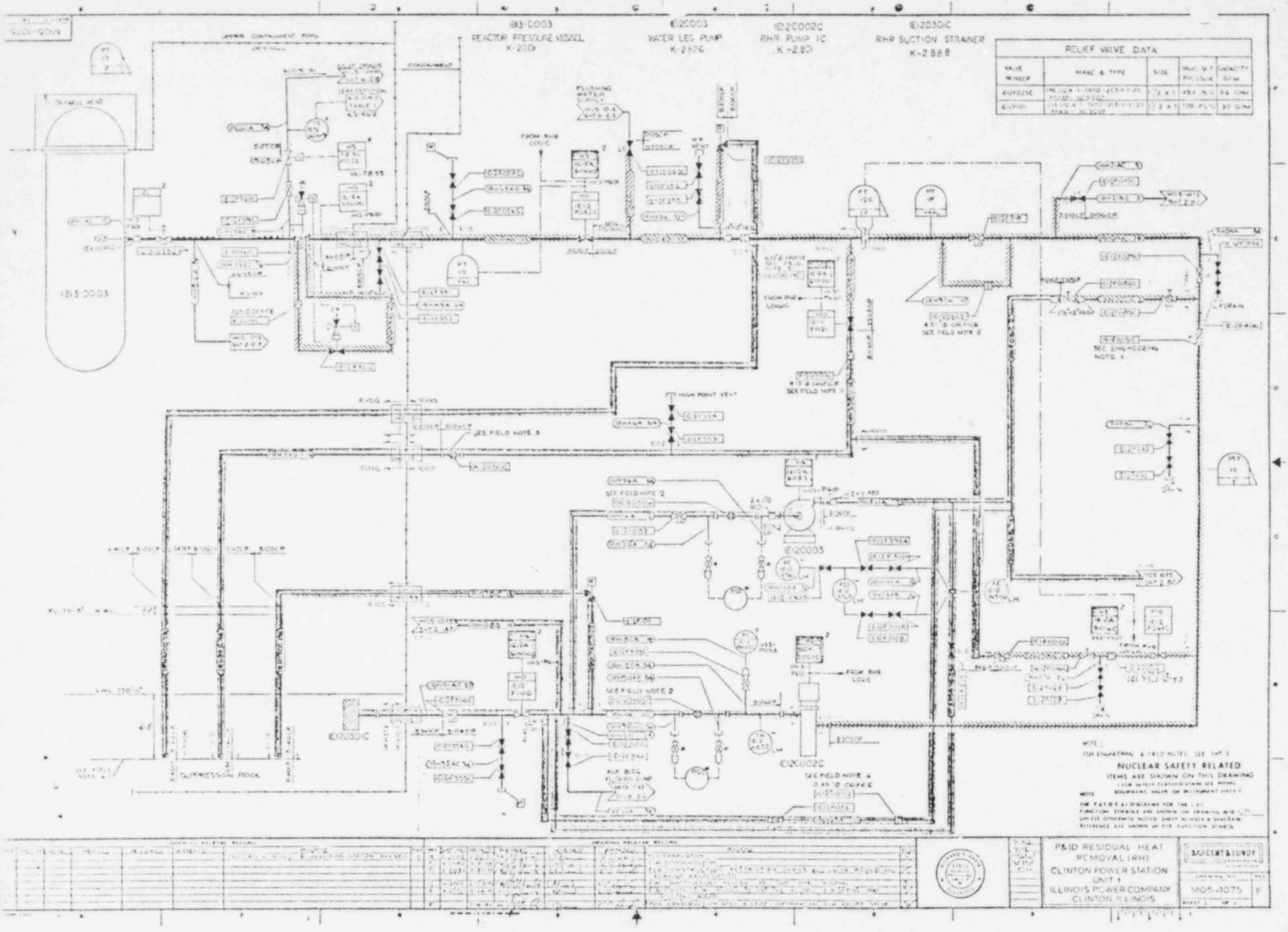
RHR PUMP 1A
1E12D101A
RHR SUCTION STRAINER
K-2888
1B13D003
REACTOR PRESSURE VESSEL
K-2801
RELIEF VALVE DATA
FIELD NOTES:
ENGINEERING NOTES:
HIGH POINT VENT
FLUSHING WATER SUPPLY
UPPER CONTAINMENT POOL
CONTAINMENT SPRAY SPARGERS
FUEL POOL COOLING AND CLEAN-UP
DRYWELL
DRYWELL HEAD
1B13-D003
LPCS
SEE FIELD NOTE 6
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
P&ID RESIDUAL HEAT REMOVAL (RH)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS
SARGENT & LUNDY
M05-1075


RELIEF VALVE DATA
VALVE NUMBER
MAKE & TYPE
SIZE (IN.)
VALVE SET PRESSURE
CAPACITY GPM
SEE FIELD NOTE 1
SEE FIELD NOTE 2
SEE FIELD NOTE 3
SEE FIELD NOTE 4
SEE FIELD NOTE 5
SEE FIELD NOTE 6
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
P&ID RESIDUAL HEAT REMOVAL (RH)
CLINTON POWER STATION UNIT 1
ILLINOIS POWER COMPANY
CLINTON ILLINOIS
SARGENT & LUNDY
M05-1075
F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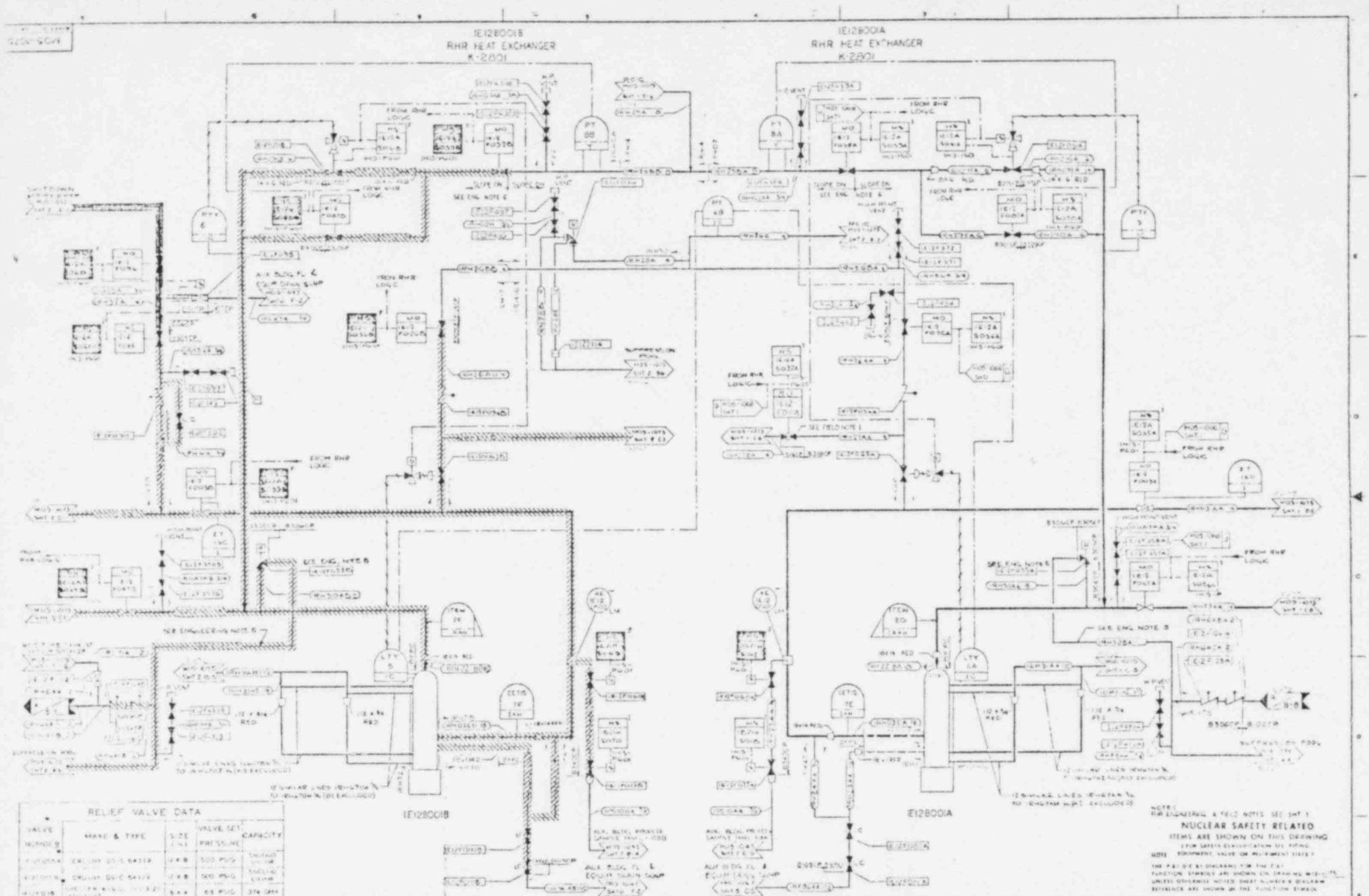
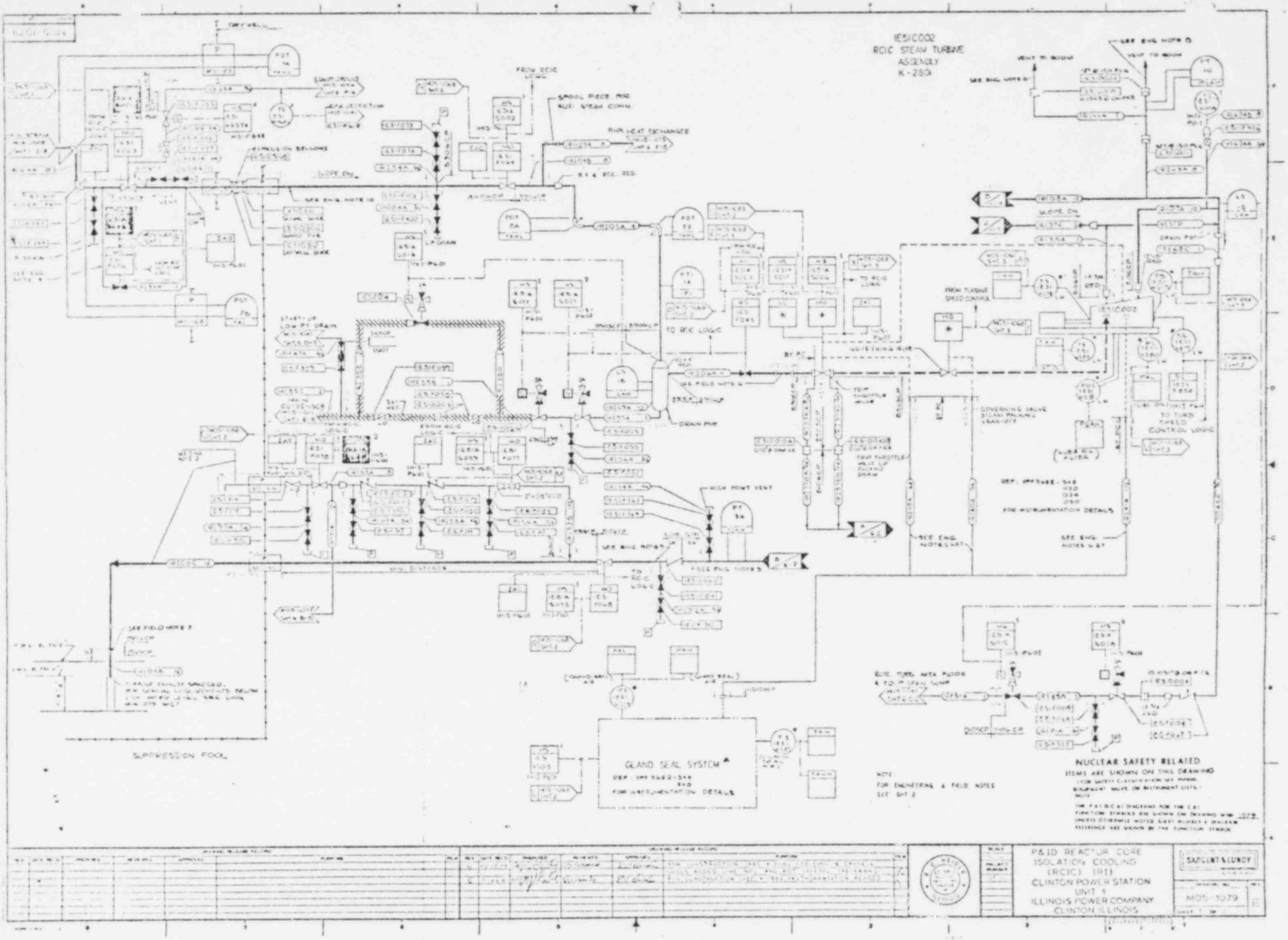
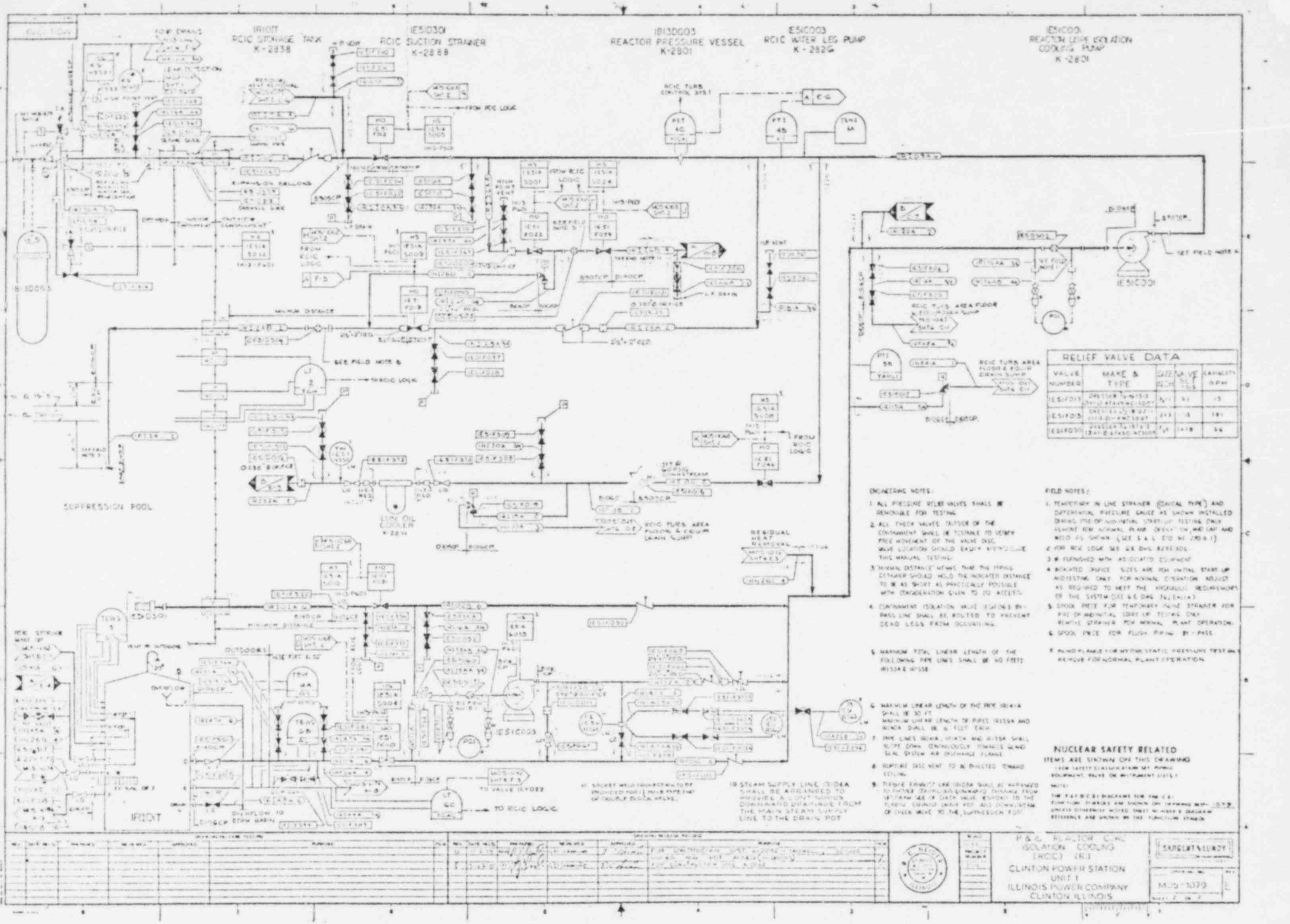
REACTOR PRESSURE VESSEL
K-2100
1E12C003
WATER LEG PUMP
K-2626
1E12C002C
RHR PUMP 1C
K-2801
1E12D01C
RHR SUCTION STRAINER
K-2888
RELIEF VALVE DATA
VALVE NUMBER
MAKE & TYPE
SIZE
SET PRESSURE
CAPACITY GPM
1B33-D003
1E12C003
1E12C002C
1E12D01C
SUPPRESSION POOL
SEE FIELD NOTE 3
SEE FIELD NOTE 2
SEE FIELD NOTE 4
0.40 ID ORIFICE
4.5 ID ORIFICE
SEE FIELD NOTE 5
SEE ENGINEERING NOTE 1
FROM RHR LOGIC
HIGH POINT VENT
FLUSHING WATER SUPPLY
AUX BLDG FLOOR DRAIN SUMP
NOTE:
FOR ENGINEERING & FIELD NOTES SEE SHT 1
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
(FOR SAFETY CLASSIFICATION OF PIPING, EQUIPMENT, VALVE OR INSTRUMENT LISTS)
P&ID RESIDUAL HEAT REMOVAL (RH)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS
SARGENT & LUNDY
M05-1075
F


1E12B001B
RHR HEAT EXCHANGER
K-2B01
1E12B001A
RHR HEAT EXCHANGER
K-2B01
1E12B001B
1E12B001A
RELIEF VALVE DATA
VALVE NUMBER
MAKE & TYPE
SIZE (IN)
VALVE SET PRESSURE
CAPACITY
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
P&ID RESIDUAL HEAT REMOVAL (RHR)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS
SARGENT & LUNDY
M05-1075


1E51C002
RCIC STEAM TURBINE
ASSEMBLY
K-280
FROM RCIC
SPOOL PIECE FOR
RHR STEAM CONN.
RHR HEAT EXCHANGE
TO RCIC LOGIC
FROM TURBINE
SPEED CONTROL
TO TURBINE
SPEED
CONTROL LOGIC
SUPPRESSION POOL
GLAND SEAL SYSTEM
NUCLEAR SAFETY RELATED
P&ID REACTOR CORE
ISOLATION COOLING
(RCIC) (H1)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON ILLINOIS
SARGENT & LUNDY
M05-1079

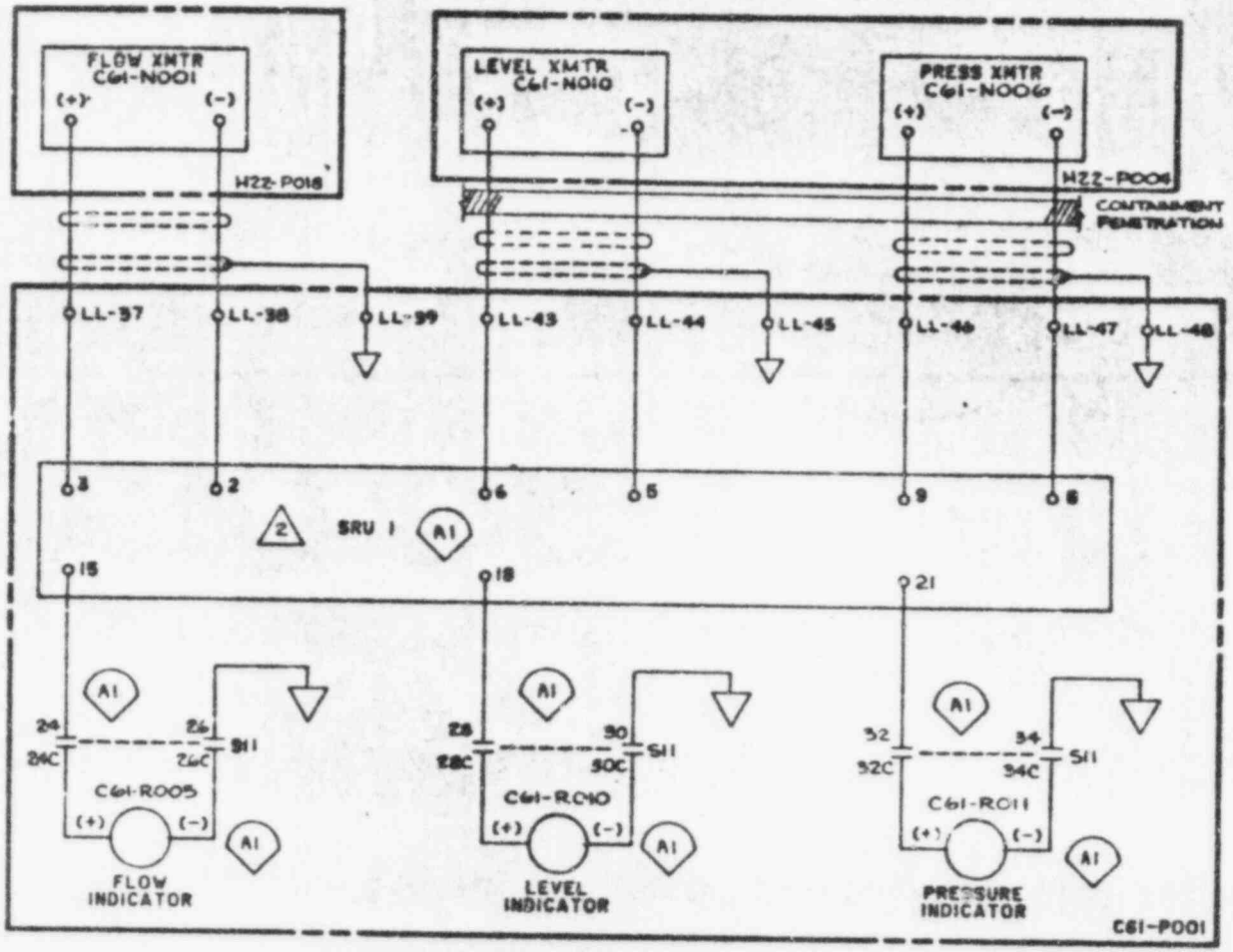

1R101T
RCIC STORAGE TANK
K-2838
1E51D301
RCIC SUCTION STRAINER
K-2888
1B13D003
REACTOR PRESSURE VESSEL
K-2801
1E51C003
RCIC WATER LEG PUMP
K-2826
1E51C001
REACTOR CORE ISOLATION
COOLING PUMP
K-2801
SUPPRESSION POOL
LUBE OIL COOLER
K-2811
TO RCIC LOGIC
FROM RCIC LOGIC
SEE FIELD NOTE 6
SEE FIELD NOTE 4
EXPANSION BELLOWS
OUTDOORS
OVERFLOW
RCIC TURB AREA FLOOR & EQUIP DRAIN SUMP
RESIDUAL HEAT REMOVAL
RELIEF VALVE DATA
VALVE NUMBER
MAKE & TYPE
CAPACITY GPM
ENGINEERING NOTES:
1. ALL PRESSURE RELIEF VALVES SHALL BE REMOVABLE FOR TESTING.
2. ALL CHECK VALVES OUTSIDE OF THE CONTAINMENT SHALL BE TESTABLE TO VERIFY FREE MOVEMENT OF THE VALVE DISC.
3. "MINIMAL DISTANCE" MEANS THAT THE PIPING DESIGNER SHOULD HOLD THE INDICATED DISTANCE TO BE AS SHORT AS PRACTICALLY POSSIBLE
4. CONTAINMENT ISOLATION VALVE 1E51F063 BY-PASS LINE SHALL BE ROUTED TO PREVENT DEAD LEGS FROM OCCURRING.
5. MAXIMUM TOTAL LINEAR LENGTH OF THE FOLLOWING PIPE LINES SHALL BE 40 FEET
6. MAXIMUM LINEAR LENGTH OF THE PIPE 1RI41A SHALL BE 30 FT.
7. PIPE LINES ... SHALL SLOPE DOWN CONTINUOUSLY TOWARDS GLAND SEAL SYSTEM AIR DISCHARGE FLANGE.
8. RUPTURE DISC VENT TO BE DIRECTED TOWARD CEILING.
10. STEAM SUPPLY LINE 1RI04A SHALL BE ARRANGED TO PROVIDE A CONTINUOUS DOWNWARD DRAINAGE FROM THE MAIN STEAM SUPPLY LINE TO THE DRAIN POT
FIELD NOTES:
1. TEMPORARY IN LINE STRAINER (CONICAL TYPE) AND DIFFERENTIAL PRESSURE GAUGE AS SHOWN INSTALLED
3. FURNISHED WITH ASSOCIATED EQUIPMENT
6. SPOOL PIECE FOR FLUSH PIPING BY-PASS
7. BLIND FLANGE FOR HYDROSTATIC PRESSURE TEST ONLY REMOVE FOR NORMAL PLANT OPERATION.
NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
P&ID REACTOR CORE ISOLATION COOLING (RCIC) (RI)
CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON ILLINOIS
SARGENT & LUNDY
M05-1079

GENERAL ELECTRIC 828E239AC

REMOTE SHUTDOWN SYSTEM

CLINTON

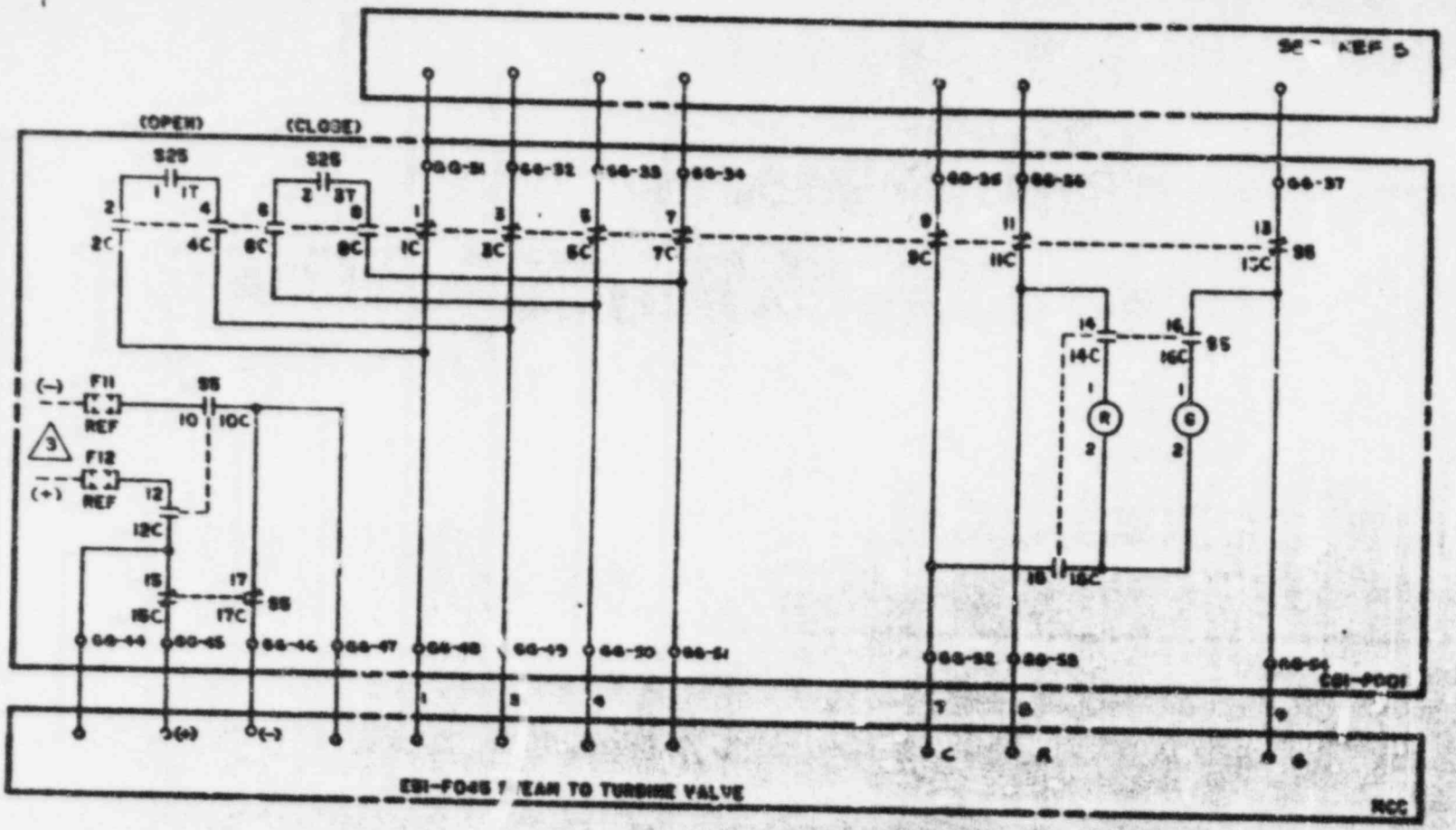
D1 UNLESS OTHERWISE INDICATED ON THIS SHEET

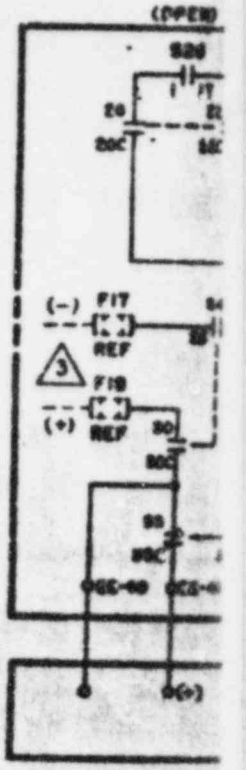


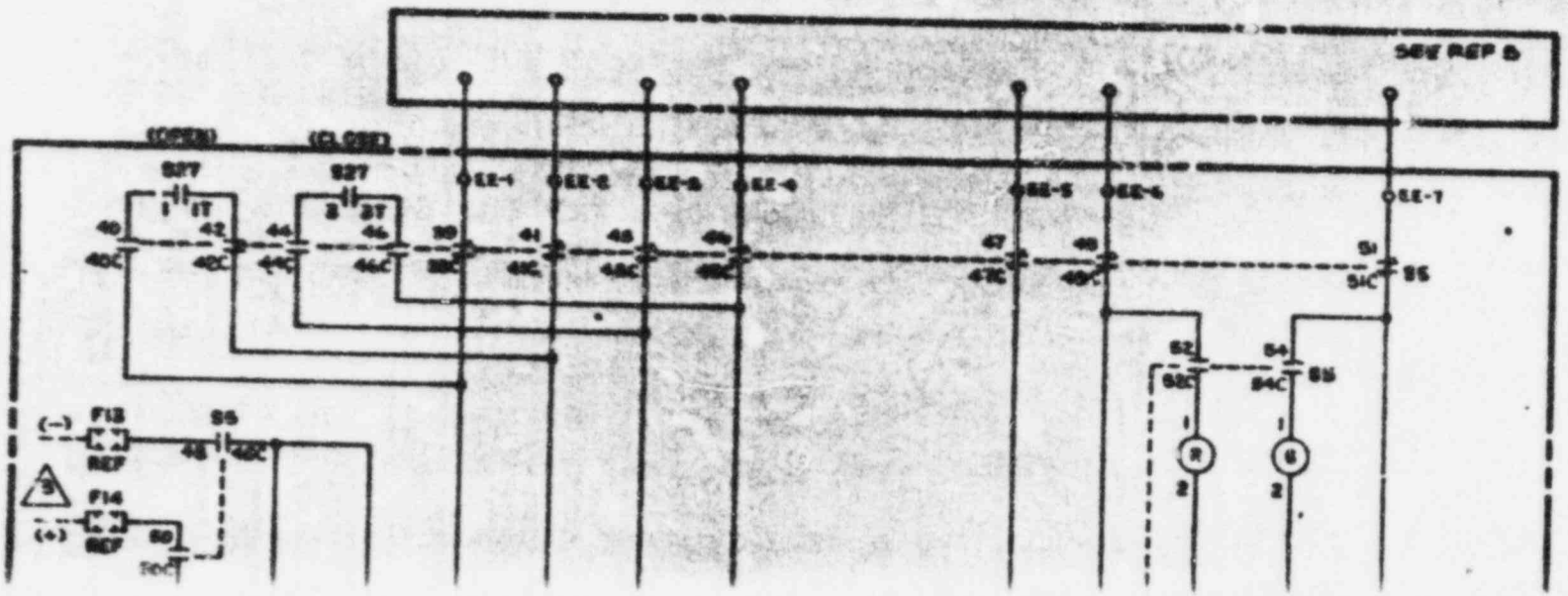
RHR FLOW INDICATION

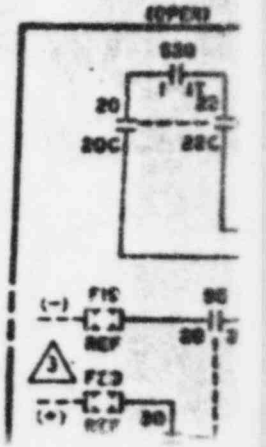
NUCLEAR BOILER INSTRUMENTATION

828E239AC

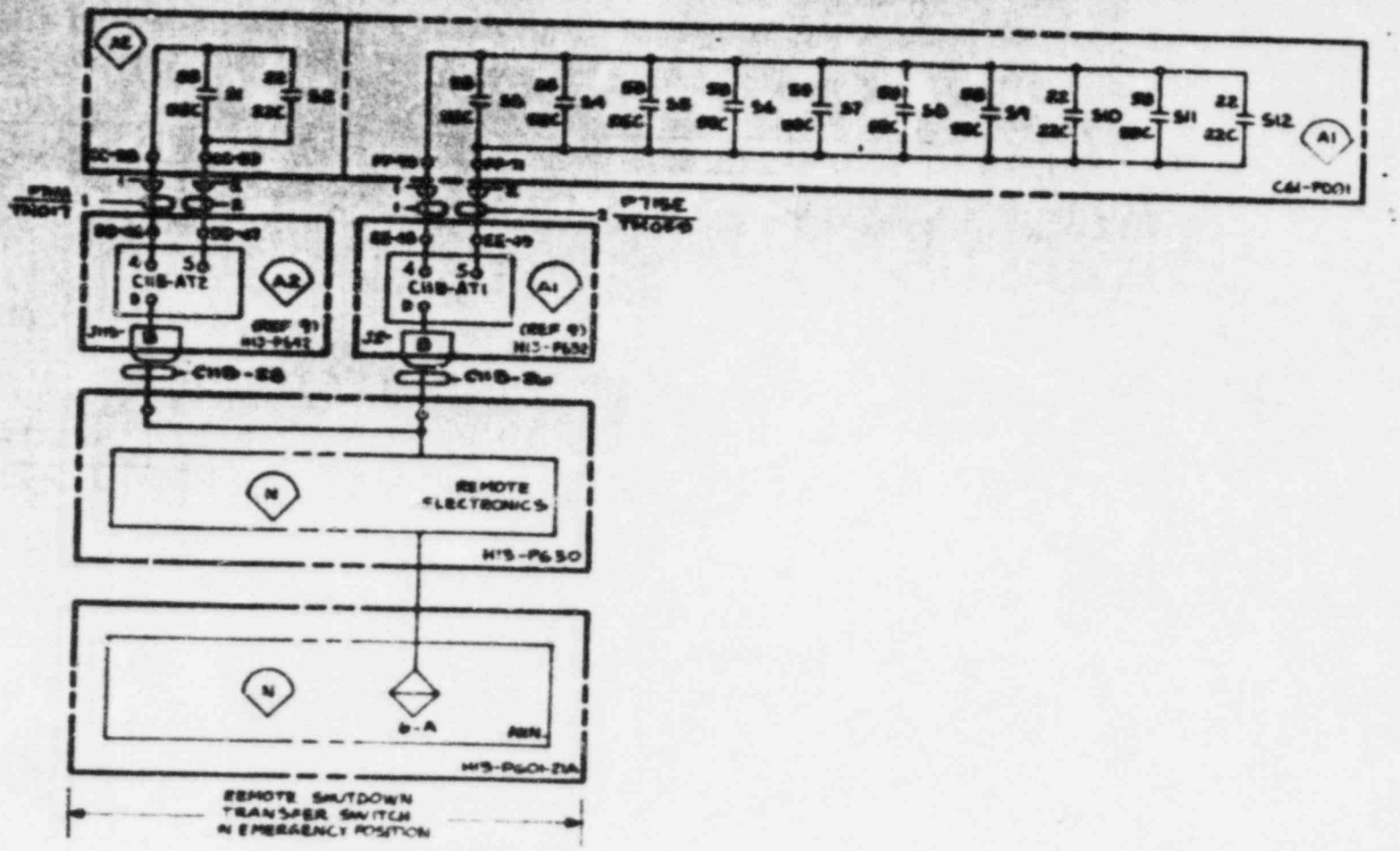

SEE REF 5
(OPEN)
(CLOSE)
S25
S26
1T
2T
2C
4C
6C
8C
1C
3C
5C
7C
9C
11C
13C
14C
16C
18C
17C
S5
S6
F11
F12
REF
(-)
(+)
10C
12C
15C
R
G
CSI-FOOT
CSI-FOOT TEAM TO TURBINE VALVE
RCC


(OPEN)
S20
F17
F18
REF
(-)
(+)


SEE REF 5
(OPEN)
(CLOSE)
S27
S27
1T
2T
40C
42C
44C
46C
48C
41C
43C
45C
47C
49C
51C
52C
54C
S5
S6
F13
F14
REF
(-)
(+)


(OPEN)
S30
F15
F16
REF
(-)
(+)

828E239AC SH. 11



LOCATIONS OF DIVISION I & II REMOTE CONTROLS
FOR SHUTDOWN

EQUIPMENT	DIV. I EQUIP. OPERATED AT RSP	DIV. II BACKUP EQUIPMENT	DIV. II BACKUP CONTROL LOCATION
Nuclear Boiler System			
Division I and Division II controls for three non-ADS air operated relief valves are provided on different sections of the panel to provide the capability to manually depressurize the reactor from either division. (The valves are 125 Vdc solenoid pilot operated.)	1B21-F051C 1B21-F051D 1B21-F051G	Yes	Div. II RSP
Reactor water level indicators (Div. I and II)	1C61-R010	1C61-R509	Div. II RSP
Reactor pressure indicators (Div. I and II)	1C61-R011	1C61-R510	Div. II RSP
Miscellaneous Instrumentation			
Drywell temperature indications (two)	Yes 1C61-R501 1C61-R502		
Suppresion pool temperature indicators (Three each in Division I and Division II associated with the three safety relief valves controlled from each division)	1C61-R506 -R507 -R508	1C61-R512 -R513 -R514	Div. II RSP
Indicating lights for: a. Diesel Generator Status b. Diesel Fuel Oil Transfer Pump Status	Yes 1C61-DS502	- -	

LOCATIONS OF DIVISION I & II REMOTE CONTROLS
FOR SHUTDOWN

EQUIPMENT	DIV. I EQUIP. OPERATED AT RSP	DIV. II BACKUP EQUIPMENT	CONTROL LOCATION
Residual Heat Removal (RHR) System			
Residual heat removal pump	E12-C002A	E12-C001B	4KV. Breaker 1B1
Heat exchanger shell side outlet MOV	E12-F003A	-	
RHR pump suction MOV	E12-F004A	-	
Shutdown cooling MOV	E12-F006A	E12-F006B	Div. II RSP
Outboard shutdown isolation MOV	E12-F008	-	
Inboard suction isolation MOV	E12-F009	-	
RHR heat exchanger flow to suppression pool MOV	E12-F011A	-	
Heat exchanger cooling water inlet MOV	E12-F014A	E12-F014B	MCC 1B2
RHR test line MOV	E12-F024A	E12-F024B	MCC 1B2
RHR heat exchanger flow to RCIC MOV	E12-F026A	-	
Injection shutoff MOV	E12-F027A	-	
Containment spray MOV	E12-F028A	-	
Shutoff upper pool cooling MOV	E12-F037A	-	
RHR injection MOV	E12-F042A	E12-F042B	MCC 1B3
Heat exchanger shell side inlet MOV	E12-F047A	-	
Heat exchanger shell side bypass MOV	E12-F048A	E12-F048B	MCC 1B2
Steam line isolation MOV	E12-F052A	-	
RHR injection MOV	E12-F053A	-	
RHR pump minimum flow MOV	E12-F064A	-	
Heat exchanger cooling water outlet MOV	E12-F068A	E12-F068B	MCC 1B2
RHR Flow indicator	1C61-R005	-	

LOCATIONS OF DIVISION I & II REMOTE CONTROLS
FOR SHUTDOWN

EQUIPMENT	DIV. I EQUIP. OPERATED AT RSP	DIV. II BACKUP EQUIPMENT	CONTROL LOCATION
Shutdown Service Water System			
SSWS Pump	SW01PA	-	
SSWS Div. 1/2 Crosstie Isolation MOV	SX011A	-	
RHR-A heat exchanger demineralized water inlet MOV	SX082A	-	
Fuel Pool Heat Exchanger Inlet MOV	SX012A	-	
Fuel Pool Heat Exchanger Outlet MOV	SX062A	-	
Fuel Pool Make-Up Motor MOV	SX016A	-	
SGTS Train A Charcoal Bed Water Supply MOV	SX073A	-	
Control Room HVAC Unit A Deluge MOV	SX076A	-	
Control Room HVAC Unit A Deluge MOV	SX107A	-	
Plant Service Water/SSW Systems Interconnection MOV	SX014A	-	
Diesel Generator Cooling Water MOV	SX063A	-	
SSWS Strainer Inlet MOV	SX003A	-	
SSWS Strainer Outlet MOV	SX004A	-	
SSWS Strainer Bypass MOV	SX008A	-	
SSWS Strainer Discharge Pressure Indicator	1C61-R503	-	
Indicating Light for Strainer High Differential Pressure	1C61-DS501		
Reactor Core Isolation Cooling (RCIC) System			
Pump suction MOV from condensate storage	E51-F010	-	
RCIC injection shutoff MOV	E51-F013	-	
Minimum flow to suppression pool MOV	E51-F019	-	
Test bypass to condensate storage MOV	E51-F022	-	
Gland Seal System Air Compressor			
Pump suction from suppression pool MOV	E51-F031	-	
Steam to turbine MOV	E51-F045	-	
Lube oil cooling MOV	E51-F046	-	
Test bypass to condensate storage	E51-F059	-	

LOCATIONS OF DIVISION I & II REMOTE CONTROLS
FOR SHUTDOWN

EQUIPMENT	DIV. I EQUIP. OPERATED AT RSP	DIV. II BACKUP EQUIPMENT	CONTROL LOCATION
Reactor Core Isolation Cooling (RCIC) System (cont'd)			
Steam supply line isolation inboard MOV	E51-F063	-	
RHR cond heat exch steam line isolation MOV	E51-F064	-	
Turbine exhaust to suppression pool MOV	E51-F068	-	
Steam line warm up line isolation MOV	E51-F076	-	
Vacuum breaker isolation outboard MOV	E51-F077	-	
Vacuum breaker isolation inboard MOV	E51-F078	-	
Turbine trip and throttle valve MOV	E51-C002	-	
RCIC Flow Controller and indicator	1C61-R001	-	
RCIC Turbine Speed Indicator	1C61-R003	-	
Indicating lights are provided for:			
a. Turbine tripped	Yes	-	
b. Turbine Bearing oil low pressure	Yes	-	
c. Turbine governor end bearing oil temperature high	Yes	-	
d. Turbine coupling end bearing oil temperature high	Yes	-	
RCIC storage tank level indicator	1C61-R505	-	
Suppression pool level indicator (Div. I and II)	1C61-R504	1C61-R511	Div. II RSP
Essential Equipment Cubicle HVAC Systems			
SSWS Pump Cubicle Fan	VH01CA	-	
RHR Pump Cubicle Fan	VY02C	-	
RHR Heat Exchange Cubicle Fan	VY03C	-	
RCIC Pump Cubicle Fan	VY04C	-	
Diesel Generator Cubicle Fan	VY01CA	-	
Diesel Generator Cubicle Fan	VD02CA	-	
Essential Switchgear Cubicle Fan	VX03CA	-	
Battery Room Fan	VX05CA	-	

Illinois Power Company
Clinton Power Station Unit 1

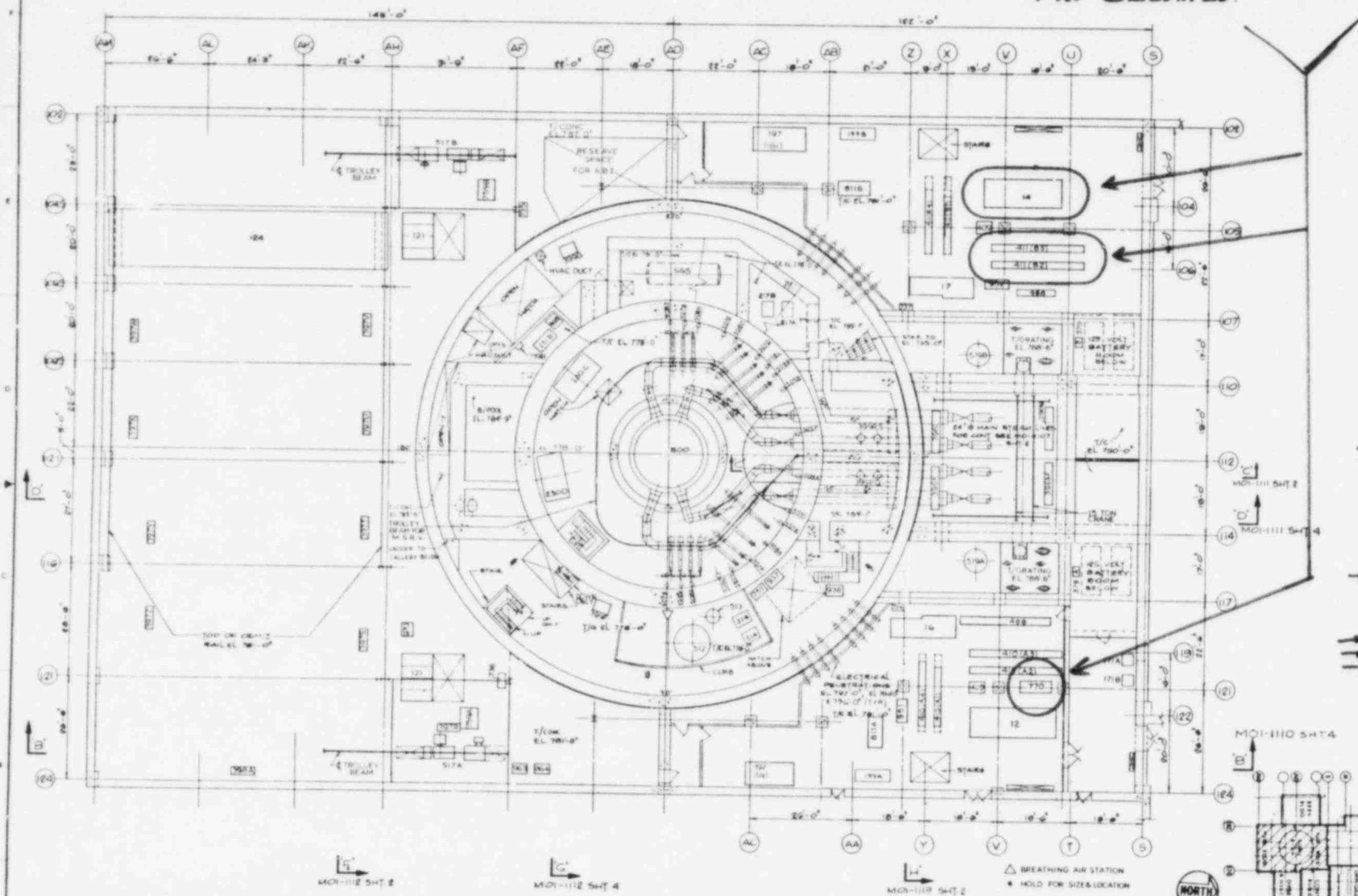
Supplemental Information on the Qualification of the Instrumentation Mounted on the Remote Shutdown Panel (RSP)

The CPS FSAR contains the statement "The components of the remote shutdown panel were designed and purchased to the requirements of the interfacing systems." To be more specific regarding qualification, all of the switches on the panel are classified as essential items that have active safety functions. The power supplies, DC-AC inverter, square-root converter and RCIC flow controller are classified as essential items with active safety functions. The RCIC tach, RHR flow, RCIC storage tank level and RPV pressure and level indicators are classified as essential items that have no active safety function. The RHR flow and the RPV pressure and level transmitters dedicated to the RSP are classified as essential items that have no active safety classification. The RCIC flow indicator is classified as a non-essential device.

Instrumentation which is classified as essential and having an active safety function has a seismic classification, during the seismic event, of Category I and shall be operable after the seismic or design event. Non-essential devices are Seismic Category I and have no safety function.

In general, the switches and indicators, with the exception of the transfer switches, are the same devices as used in the main control room. There are no main control room applications which use the transfer switches.

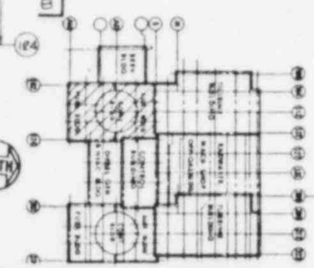
GENERAL ARRANGEMENT SHOWING LOCATION OF RSP AND BACKUP MCC'S AND 4KV BREAKER



ITEM	EQUIPMENT NAME
124	125 TON CASK HANDLING CRANE
197	SWITCHGEAR HEAT REMOVAL UNIT
199	SWITCHGEAR HEAT REMOVAL COND UNIT
217	FILTER DEMIN RECIRCULATING PUMP
250	DRYWELL COOLERS
251	CGCS HYD. COMP.
[illegible]	AREA COOLERS
500	REACTOR VESSEL
505	ACCUMULATOR
506	ACCUMULATOR
507	ACCUMULATOR
508	ACCUMULATOR
512	STANDBY LIQ CONTROL STOR TANK
513	STANDBY LIQ CONTROL TEST TANK
514	STANDBY LIQ CONTROL PUMPS
519	RHR HEAT EXCHANGERS
595	RWCU BACKWASH REC. TANK
379	BATTERY ROOM EX FAN
408	COMBUSTION GAS COOL UNIT
171	BATTERY ROOM EX FAN

ITEM	INSTRUMENT PANELS
734	SRM/IRM PREAMPLIFIER PANEL A
735	SRM/IRM PREAMPLIFIER PANEL B
736	SRM/IRM PREAMPLIFIER PANEL C
737	SRM/IRM PREAMPLIFIER PANEL D
751	STANDBY LIQ CONTROL SYS INSTRUMENT PANEL
759	LFMG AUX PNL
811	[illegible]
963	AUXILIARY BLDG CAM
964	FUEL BLDG CAM
* 970	CONTAINMENT BLDG CAM 2
976	F P IODINE GAS SAMPLE
937	F P PART SAMPLE
719	HYDROGEN COMP INSTR PANEL
951	MSIV LEAK DET DIV 1
952	MSIV LEAK DET DIV 2

ITEM	ELECTRICAL EQUIPMENT NAME
12	4.16 KV SWITCHGEAR 1A1
14	4.16 KV SWITCHGEAR 1B1
16	480 V UNIT SUBSTATION 1A
17	480 V UNIT SUBSTATION 1B
501	6.9 KV SWGR
517	LFMG SET
410	AB MCC A
411	AB MCC B
770	REMOTE SHUTDOWN PNL
419	BATTERY CHARGER
496	DC MCC 1A, 1B



△ BREATHING AIR STATION
• HOLD FOR SIZE & LOCATION

NUCLEAR SAFETY RELATED
ITEMS ARE SHOWN ON THIS DRAWING
(FOR SAFETY CLASSIFICATION SEE PIPING EQUIPMENT VALVE OR INSTRUMENT LISTS)

GENERAL ARRANGEMENT
AUX FUEL BLDG & CONTAINMENT
PLAN EL 778'-0" & EL 781'-0"

CLINTON POWER STATION
UNIT 1
ILLINOIS POWER COMPANY
CLINTON, ILLINOIS

SARGENT & LUNDY

DRAWING NO. M01-1109 REV. C
SHEET 2 OF 8

Illinois Power Company
Clinton Power Station Unit 1

Additional Clarifying Information on Operation of the Remote Shutdown Panel

I. Division 2 equipment, that does not automatically operate when required, includes the following:

Equipment	Operating Location
B RHR Pump	4KV 1B1 - Auxiliary Building 781, NW
1E12-F024B	AB MCC 1B2 - Auxiliary Building 781, NW
1E12-F042B	AB MCC 1B3 - Auxiliary Building 781, NW
1E12-F048B	AB MCC 1B2 - Auxiliary Building 781, NW
1E12-F014B	AB MCC 1B2 - Auxiliary Building 781, NW
1E12-F068B	AB MCC 1B2 - Auxiliary Building 781, NW
SRV's	Will be added to Remote Shutdown Panel

This Division 2 equipment is operated from the MCC's or switchgear listed above in an area on the opposite side of the Auxiliary Building from the Remote Shutdown Panel, at the same elevation. The ventilation system serving both of these areas is independent from the Control Room HVAC system and communications would consist of hand-held radios and the plant Gai-tronics System. While reliance is placed on automatic operation of Division 2 and Division 3 equipment and on normal valve line-ups, if it becomes necessary to override such operation, Division 2 equipment can be operated from the MCC's and switchgear already described. Division 3 equipment can be operated on 781 Control Building, an area in close proximity to the Remote Shutdown Panel and also independent from the Control Room HVAC. Furthermore, most of the equipment that might be operated locally from MCC's is located outside containment and could be manually operated.

II. The existing remote shutdown procedure will be revised to require transfer of functional capabilities to the Remote Shutdown Panel only as they are needed, unless damage to circuitry is anticipated, such as a fire. In that case, all transfer switches will be operated immediately. The procedure will also be revised to address remote shutdown with Division 1 inoperable. This will generally consist of monitoring and controlling reactor pressure from the Remote Shutdown Panel, as it will be modified. Automatic systems in the remaining operable divisions will maintain reactor vessel level, which can be monitored at the Remote Shutdown Panel as modified; the reactor will be depressurized using SRV's. Suppression pool cooling will be effected through operation of the equipment listed above and when the reactor is sufficiently depressurized a mode of shutdown cooling will be entered, again, through operation of the equipment listed above. Monitoring will be accomplished from the

II. (continued)

Remote Shutdown Panel, as modified, no continuous function of any component remote from the Remote Shutdown Panel will be required, and the plant will be maintained in cold shutdown.

III. The commitment to test the existing remote shutdown capability is in subsection 14.2.12.2.25 of the FSAR. Additionally, operators will be trained on remote shutdown with Division 1 inoperable; each operating shift will conduct a procedure walk-through of this capability during the startup test program.