Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

December 15, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Zion Station Units 1 and 2
Fire Protection
NRC Docket Nos. 50-295 and 50-304

References (a): February 8, 1982, letter from S. A. Varga to L. O. DelGeorge.

(b): April 16, 1982, letter from F. G. Lentine to H. R. Denton.

(c): May 19, 1982, letter from F. G. Lentine to H. R. Denton.

(d): July 30, 1982, letter from F. G. Lentine to H. R. Denton.

Dear Mr. Denton:

Reference (a) transmitted the Technical Evaluation Report (TER) on Zion Station's "Post Fire Shutdown Capability", prepared by Brookhaven National Laboratory. That report contained a request for additional information regarding procedures and equipment required to meet Section III.G.3 of 10 CFR 50, Appendix R. References (b), (c) and (d) provided Commonwealth Edison's responses to that request.

On November 4 and 5, 1982, a meeting was held with members of your staff and Brookhaven National Laboratory which included a discussion of the remaining open items from the TER. Attachment A to this letter provides documentation of the information provided by Commonwealth Edison at that meeting. Attachments B and C provides corresponding revisions to the Zion Fire Protection Associated Cable Report.

Three (3) copies of this letter and the Attachment are provided for your use.

Please address questions regarding this matter to this office.

A006
S
1/3

Very truly yours,

F. G. Lentine

F. G. Lentine
Nuclear Licensing Administrator

A/PER Dist.
SEND encl. Drwgs to:
REG F:/ES
BC (2 Advanced)

lm

Attachment

5591N

ATTACHMENT A

COMMONWEALTH EDISON COMPANY

ZION STATION UNITS 1 and 2

Additional responses to Fire Protection TER open items

5591N

TER Item 3.2.3

"How will pressure control be maintained with the auxiliary spray, while valve VC-8146 is closed due to the fire, prior to its being manually opened?"

Response

With the unit in hot shutdown, reactor coolant temperature and pressure are maintained at their desired no-load valves by control of decay heat removal by the steam generators. As described in our response of April 16, 1982, decay heat removal can be provided by the operation of the steam generator atmospheric relief valves, given any fire. With this method of temperatue and pressure control available, the reactor can be maintained in the hot shutdown condition indefinitely.

If it is desired to go to cold shutdown, a method of reducing reactor coolant pressure must be provided. As described in the Zion Safe Cold Shutdown Analysis (May 29, 1980), pressure reduction capability can be provided by the auxiliary spray valve VC-8146, given any fire other than at the valve itself. This valve is an air-operated valve whose ability to be remotely operated could be affected by a fire at the valve. However, after the fire was extinguished, the valve could be manually operated. As described above, the reactor could be maintained in the hot shutdown condition by control of decay heat removal until valve VC-8146 could be operated manually.

5591N

TER Item 3.2.5

"The licensee has not provided instrumentation to monitor the reactor coolant system cold leg temperature. A direct cold leg temperature reading is necessary."

Response

Indication of reactor coolant temperature is required for two purposes:

(1) To verify continued maintenance of subcooling and natural circulation.

(2) To monitor the bulk cooldown rate of the reactor coolant system.

Zion Station accomplishes these functions using the following instrumentation:

(a) Subcooling - Since it is desired to verify that adequate subcooling margin exists in all regions of the reactor coolant system, temperature measurements from the hottest region of the RCS are used for this determination. The preferred method of measurement is provided by a computer average of the ten highest core exit thermocouples. These thermocouples can also be read manually. If the thermocouples are unavailable, the RCS hot leg RTD's are used as the method of next priority.

(b) Natural circulation - To verify natural circulation, the ΔT across the core must be determined. While the RCS hot and cold leg RTD's could be used for this purpose, the fact that these instruments have a wide range compared to the ΔT of interest and a recorder display of low resolution make them undesirable for this application. The most accurate determination of the core exit temperature is provided by the core exit thermocouples. The most accurate determination of cold leg temperature is provided by the saturation temperature corresponding to steam generator pressure (T sat. closely follows cold leg termperature at all but very low steam pressures 30 psig). If core exit thermocouples are unavailable, hot leg RTD's could be used. As described in our July 30, 1982, response, steam generator pressure will always be available, given any fire.

(c) Bulk cooldown rate - Some indication of cooldown rate is necessary to follow the progress of the cooldown. Any parameter that is indicative of bulk RCS temperature is sufficient for this purpose (e.g., RCS hot leg RTD's or Tsat steam generator).

A copy of the Zion's procedure for Verification and Maintenance of Natural Circulation is attached. It should be emphasized that when this procedure was developed in 1980, instruments were chosen on their abiiity to provide the most accurate and conservative measurements of the desired quantities. This resulted in reactor coolant system cold leg RTD's not being used for these measurements.

5591N

APPENDIX A

VERIFICATION AND MAINTENANCE OF NATURAL CIRCULATION

1.1. Establish Natural Circulation

1. Maintain pressurizer level at 50% or greater through the use of the charging or SI pumps.

2. Maintain at least one steam generator level in the narrow range through the use of aux. feedwater.

3. Monitor degrees of RCS subcooling (computer address U0918) and verify that at least 50°F of subcooling is maintained. It is recommended that this address should be placed on a strip chart recorder or computer window for constant observation.

   a. Utilize pressurizer heaters to maintain the required 50°F of subcooling discussed above.

CAUTION

During a natural circulation cooldown, a steam bubble may form in the reactor vessel head area. This may cause pressurizer level indication to act erratically.

1.2 Verification of Heat Removal Via Natural Circulation

1. Determine T cold from S/G pressure using Figure 1 or steam tables.

NOTE

If S/G pressure falls below 30 psig, T cold will not be accurately determined.

2. Determine T hot from the average of the ten highest incore T/C. (Computer address U0916)

3. The core ΔT should be less than 60°F if natural circulation has been established.

4. Verify that steam generator pressure is following RCS hot leg temperatures. (U0916) e.g. If U0916 is decreasing, then steam pressure should also be decreasing.

5. Repeat step 1.2.1 - 1.2.4 as often as necessary to accurately monitor core status. The following is a summary of the indications of natural circulation:

   a. U0916 (RCS hot leg temp.) constant or decreasing.

   b. Core ΔT is less than 60°F.

   c. Steam generator pressure is following RCS hot leg temperatures.

6. If natural circulation has not been established, repeat step 1.1.

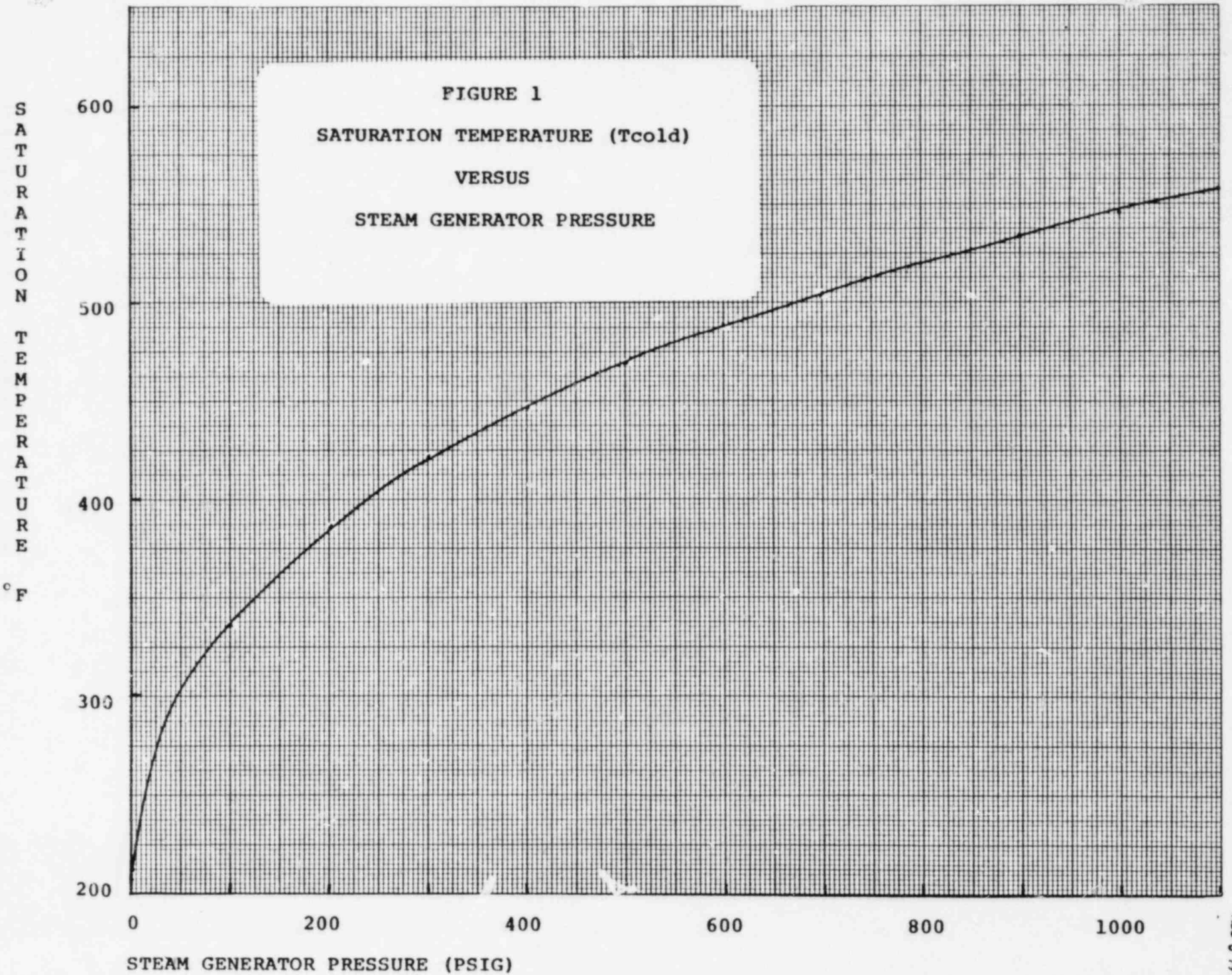


FIGURE 1
SATURATION TEMPERATURE (Tcold)
VERSUS
STEAM GENERATOR PRESSURE
SATURATION TEMPERATURE °F
600
500
400
300
200
0
200
400
600
800
1000
STEAM GENERATOR PRESSURE (PSIG)

TER Item 3.2.5

"The licensee has not provided instrumentation to monitor...the neutron flux in the source range. Source range monitoring is necessary and manual sampling is not acceptable."

Response

It is Commonwealth Edison's position that manual sampling and analysis of reactor coolant system boron concentration provides an acceptable method of verifying adequate shutdown margin. Manual sampling and analysis can be performed at a frequency that provides sufficient resolution that, in the event of an inadvertant dilution at the maximum possible rate, the condition will be detected and corrected before the reactor can attain criticality.

Immediately following reactor shutdown, the shutdown margin provided by the control rods will result in a time to criticality for the hypothetical dilution accident in excess of 3 hours. For the next 20 hours following shutdown, increased levels of Xenon will provide additional shutdown margin, and the time to criticality will be longer. The Zion FSAR provides a conservative analysis under worst-case assumptions, which yields a minimum time to criticality of 2.3 hours.

As described in our April 16, 1982, response, procedures exist and sufficient manpower will be available to perform the sampling and analysis. Sampling and analysis can be performed at least every 2 hours to provide the necessary shutdown margin verification.

Commonwealth Edison has investigated the feasibility of modifying the existing source range monitoring system to meet Safe Shutdown requirements. Because the detector high voltage power supplies and other key components are located in instrumentation cabinets in the main control room, modification of the existing system is not practical. Replacement of the system with one of newer design is estimated to require significant expenditures. In view of the fact that manual sampling and analysis provides adequate monitoring capability, such expenditures cannot be justified.

TER Item

"Discussion on How Associated Circuits Are Isolated to Resolve the Common Power Source, Spurious Operation and Common Enclosure Problems at the Zion Station 1&2."

Response

The associated circuits problem referred to as the "common power source" is not a problem in the auxiliary power systems for Zion, Units 1 and 2. The safety related buses were designed to have circuit breakers and associated protective relaying which provide coordinated tripping of the feeders on the various 4 kV and 480 volt buses and motor control centers.

Protection for dc power is provided by means of a combination of coordinated circuit breakers and fused circuits.

In view of this coordinated protective tripping, it is assured that associated circuits which may experience fault conditions will be de-energized before affecting circuits required for the operation of safe shutdown equipment.

Protection against fire induced spurious operation of valves which may adversely affect shutdown capability will be provided by placing the circuit breakers for the power feeds to those valves in the disconnect position. The circuit breakers will be manually operated when required at the circuit breaker location. This procedure for energizing and operating the valves will assure that fire induced spurious operation will not occur and jeopardize the safe shutdown of the units.

The associated cable "common enclosure" problem does not exist during normal operating conditions at Zion, Units 1 and 2. The power, control and instrument cables are all IEEE 323 qualified cables. The cable sizing and circuits have been designed such that fault conditions which may develop as a result of a fire during normal operating conditions (i.e., startup and shutdown using the system auxiliary transformer (SAT) or continuous operation with the auxiliary load shared between the unit auxiliary transformer and the SAT) will not produce short circuit currents sufficient to cause the cables to propagate a fire or damage adjacent cables outside the fire zone in which the fire occurs.

In view of this and the coordinated protective tripping previously discussed, it is assured that associated circuits, damaged as the result of a fire, will not jeopardize the operation of redundant and/or alternative safe shutdown equipment.

ATTACHMENT B

SUPPLEMENT NO. 1 TO

ZION FIRE PROTECTION ASSOCIATED CABLE REPORT

ZION 1&2

COMMOMWEALTH EDISON COMPANY

JULY 1982

Page 1.0-1, Paragraph 1.0, Introduction; add the following:
Delete all detailed "Requests for Exemptions" in this report and refer to Exemption Request Addendum, dated November 29, 1982. The exemption requests have been rewritten on the basis of Fire Areas, instead of a system basis as presented herein.

Page 1.2-6, Paragraph 1.2.9, Add the following sentence to the end of the first paragraph: If control power is not available, all 480 volt circuit breakers will be manually operated.

Page 2.1-1, Paragraph 2.1.2.1, Add the following sentence to Subparagraph 3: The conduit for cable 45874 will be protected with a three-hour fire barrier in this area.

Paragraph 2.1.2.1, Subparagraph 4, Request for Exemption, delete this paragraph in its entirety and replace with "None requested based on this modification."

Page 3.1-2, Paragrph 3.1.2.5, Add the following to Subparagraph 1: Cables 42263, 42264, 42265, the power feed to Division 19 MCC 1393A and Cables 14516, 14517, and 14518, the power feeds to Divison 19 MCC 1393C, will be protected in conduits with a three-hour fire barrier. The protection will start at the point at which the cables leave fire zone 11.2E-1 at Column Row M23 and continue to MCC 1393A. Cables 12956, 12957, and 12958, the power feed to Division 18 MCC 1383 will be rerouted in three-hour fire protected conduit from approximate Column/Row H/26 to MCC 1383A.

Page 3.5-4, Paragraph 3.5.2.3, third paragraph of Subparagraph 1, Delete the last sentence and replace with: The combination starters for Valves OMOV-SW0007 and OMOV-SW0008 will be placed in the disconnect position during normal operation to prevent any malfunction of the valves due to fire induced faults or cable failures.

Page 3.8-1, Paragraph 3.8.2.1, Add the following after the tabulation of Cable Separation Distances in Subparagraph 1: Power cables for the component cooling pump motors will be re-routed in conduit having a three-hour fire wrap in accordance with the following table:

Cable No.	From Riser	Location	To Pump	Location
02304	R21	H/30	0E	H/22
02303	R17	H/30	0D	H/21
02301	R506	H/14	0A	H/18
02300	R509	H/14	0B	H/19

Page 3.9-1, Paragraph 3.9.2.1, Power Cables: Add "fire area 11.2" in the first sentence.

Paragraph 3.9.2.1, Power Cables, Revise the wording of the last sentence of Subparagraph 1 to read: Cable 42295, the power feed to centrifugal charging Pump 1A will be rerouted in a conduit having a three-hour fire wrap.

Page 3.10-1, Paragraph 3.10.2.1, Power and Control Cables, Subparagraph 1: Delete the last sentence and replace with: To ensure cable isolation for one pump train, there will be a modification to reroute cables into another fire area

or into conduit with a three-hour fire wrap.

As a result of this modification, all previous exemption requests are now deleted.

Page 3.10-2, Auxiliary Feedwater Stop Valve listing, Delete listing and replace with the following:

1MOV-FW0050	1MOV-FW0054
1MOV-FW0051	1MOV-FW0055
1MOV-FW0052	1MOV-FW0056
1MOV-FW0053	1MOV-FW0057

Page 5.1-3, Paragraph 5.1.2.5, Motor Control Centers (MCCs) Feeds, Subparagraph 2., Delete the last sentence in this paragraph and replace with: There is a modification to reroute and add a three-hour fire barrier for cable group 32263, 32264, 32265.

As a result of this modification, all previous exemption requests are now deleted.

Paragraph 5.1.2.5, Motor Control Centers (MCCs) Feeds, Subparagraph 4., Delete the last sentence in the second paragraph of this subparagraph and replace with the following: There is a modification to reroute and add a three-hour fire barrier for cable group 32263, 32264, 32265.

As a result of this modification, all previous exemption requests are now deleted.

Page 5.5-3, Table 5.5-1, Cables in Fire Areas/Zones: Delete Valve Numbers OMOV-SW0007 and OMOV-SW0008 and all associated information from the table.

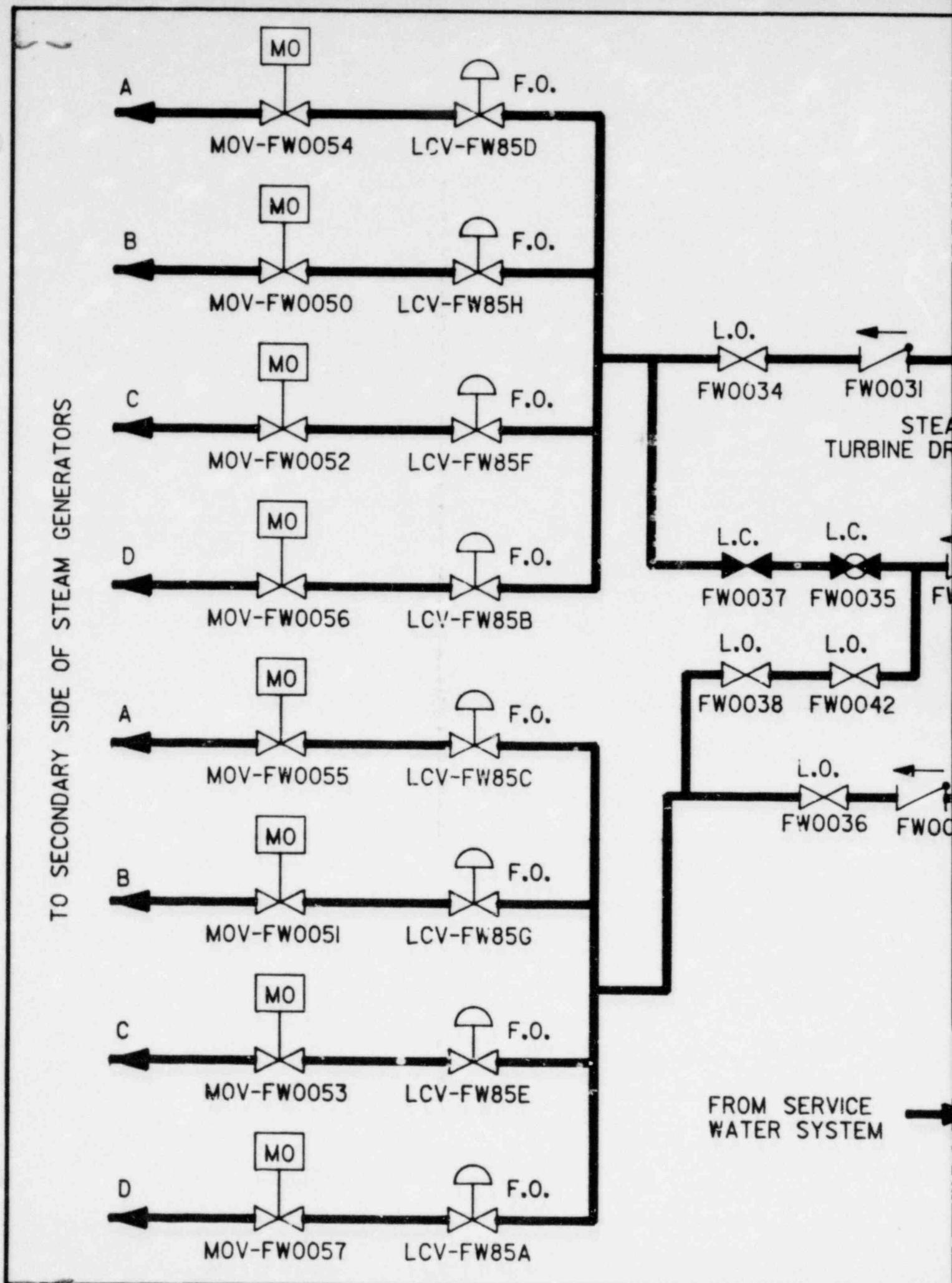
Page 5.5.4, Paragraph 5.5.2.3, second and fourth paragraphs of Subparagraph 1., Delete and replace with the following: The combination starters for normally open valves 2MOV-SW009 and 2MOV-SW010 will be placed in the disconnect position during normal operation to prevent any malfunction of the valves due to fire induced faults or cable failures.

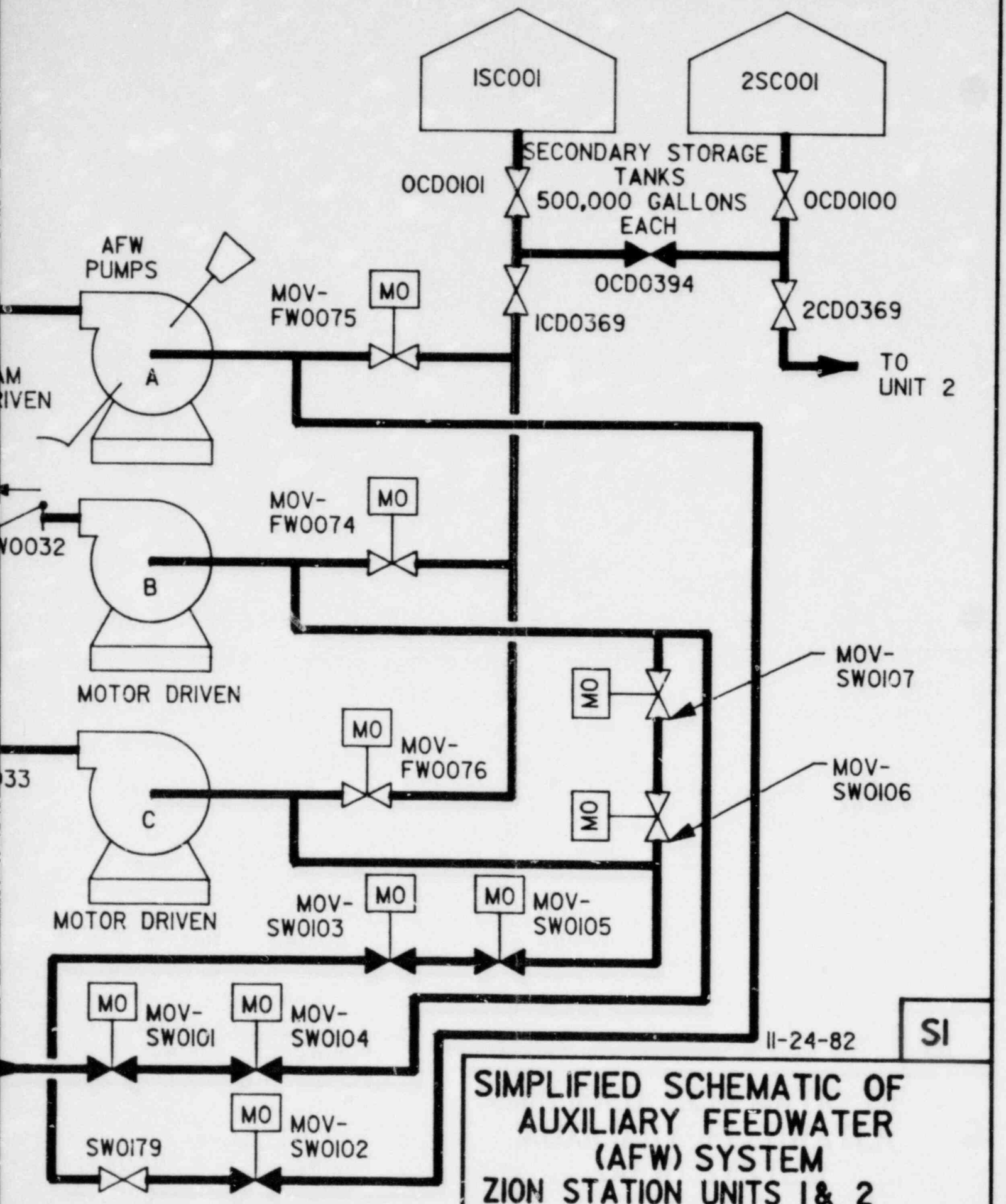
Page 5.9.1, Paragraph 5.9.2.1, Power Cables, Subparagraph 3.1., Add the following sentence at the end of this subparagraph: Power feed cables, 32274 through 32277, for 2A Centrifugal Charging Pump room unit cooler fans will be rerouted in conduit having a three-hour fire wrap from the point at which cable 32274 leaves the wall at Column/Row H/17 to the fan motors.

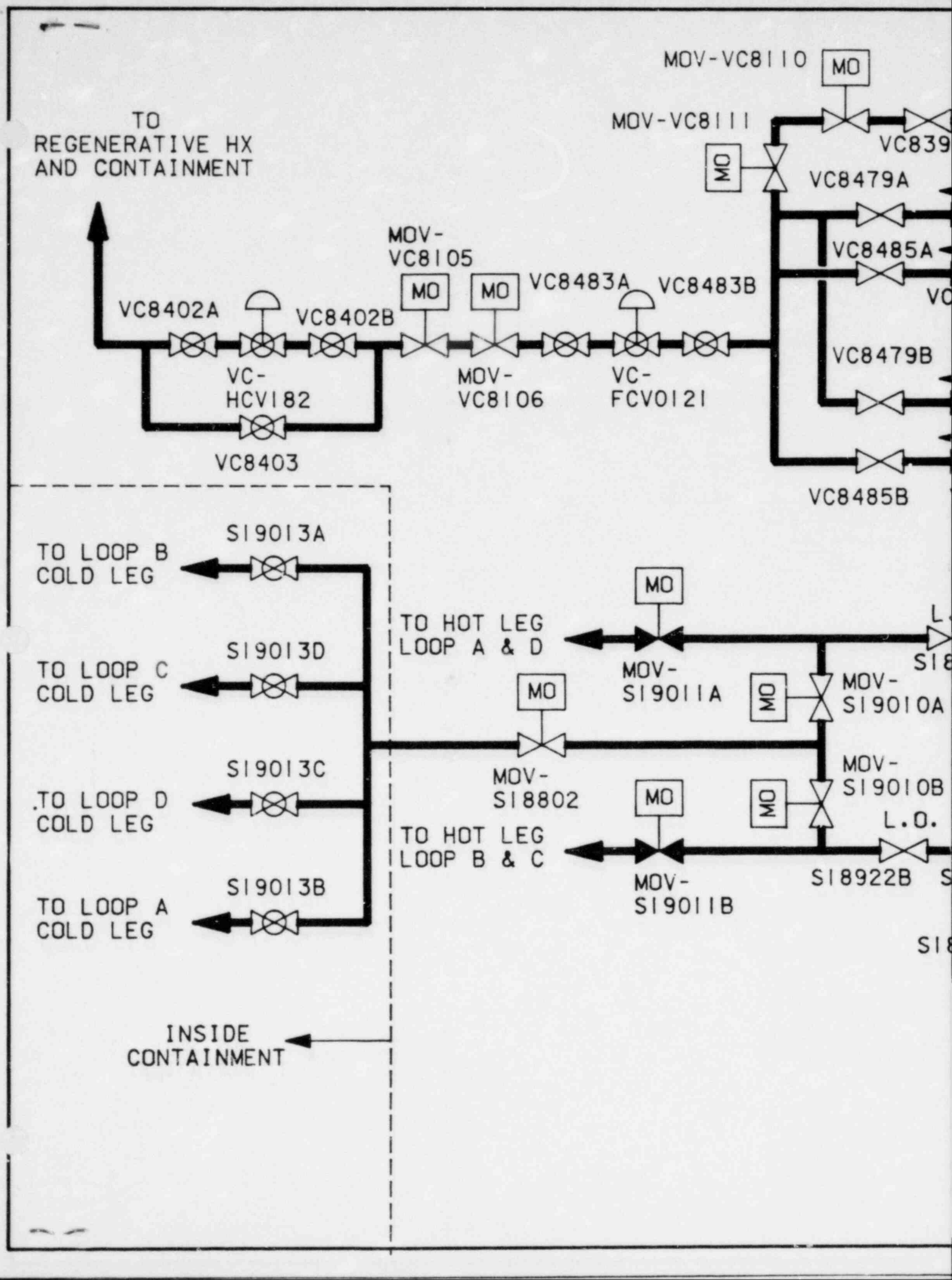
Page 5.10-1, Paragraph 5.10.2.1, Power Cables, Subparagraphs 1, 2, 4 and 5 are deleted. Replace with the following: Except for fire area 11.4-0, in which an exemption is requested, to ensure cable isolation for one pump train, there will be a modification to reroute cables into another fire area or into conduit with a three-hour fire wrap.

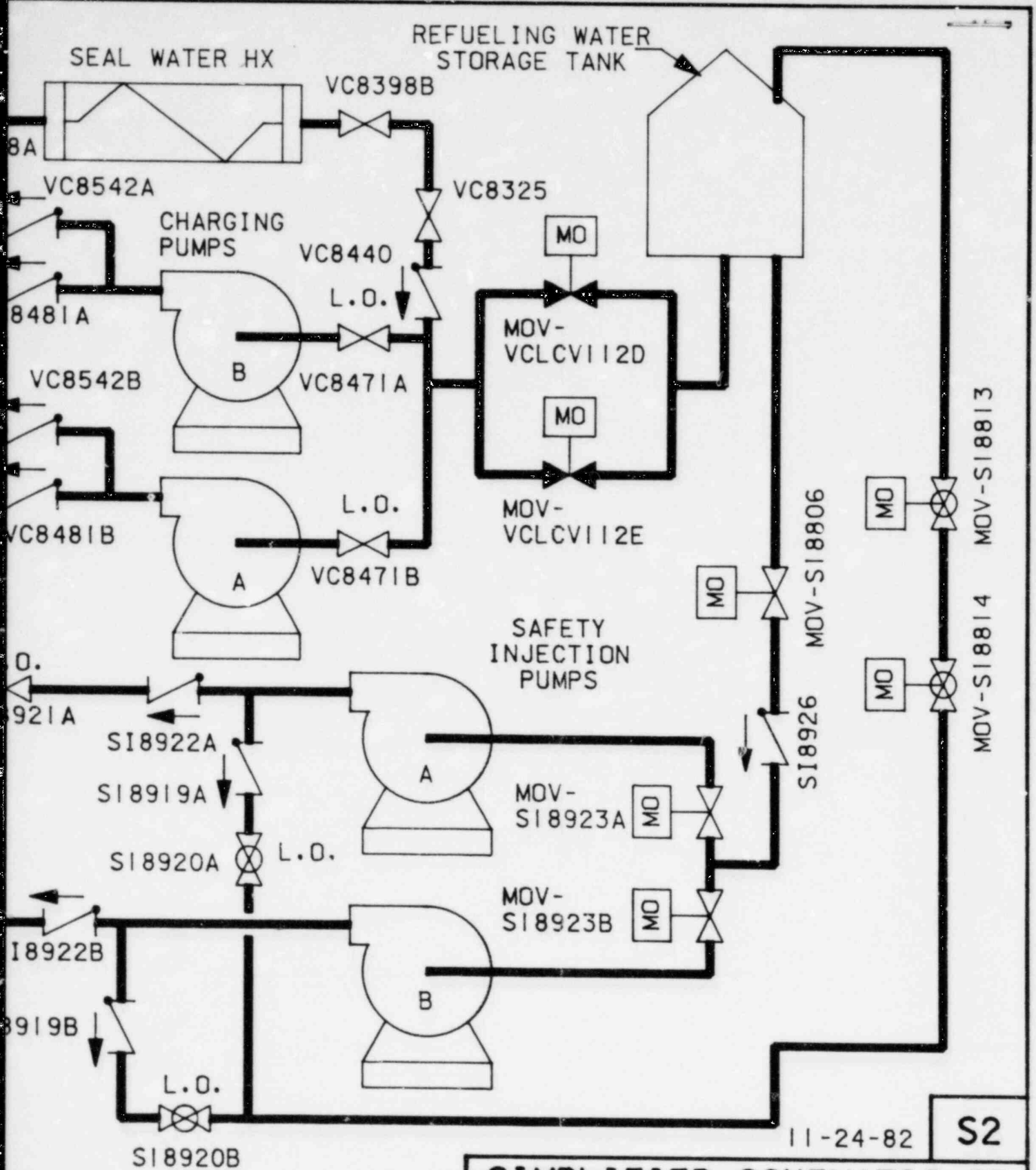
As a result of this modification, all previous exemption requests, except for fire area 11.4-0, are now deleted.

ATTACHMENT C

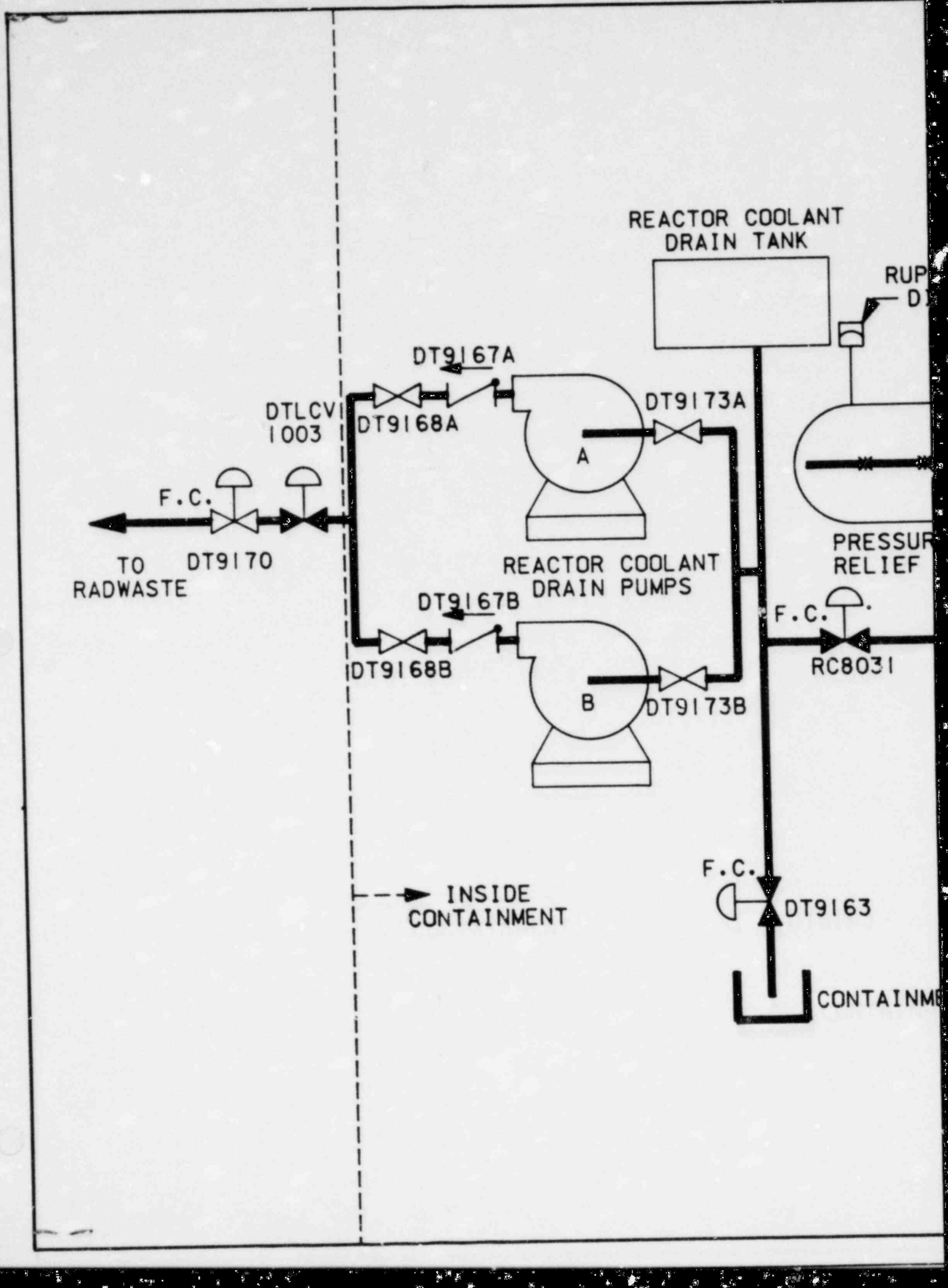

TO SECONDARY SIDE OF STEAM GENERATORS
A
MO
MOV-FW0054
F.O.
LCV-FW85D
B
MO
MOV-FW0050
F.O.
LCV-FW85H
C
MO
MOV-FW0052
F.O.
LCV-FW85F
D
MO
MOV-FW0056
F.O.
LCV-FW85B
A
MO
MOV-FW0055
F.O.
LCV-FW85C
B
MO
MOV-FW0051
F.O.
LCV-FW85G
C
MO
MOV-FW0053
F.O.
LCV-FW85E
D
MO
MOV-FW0057
F.O.
LCV-FW85A
L.O.
FW0034
FW0031
STEA
TURBINE DR
L.C.
FW0037
L.C.
FW0035
L.O.
FW0038
L.O.
FW0042
L.O.
FW0036
FROM SERVICE
WATER SYSTEM

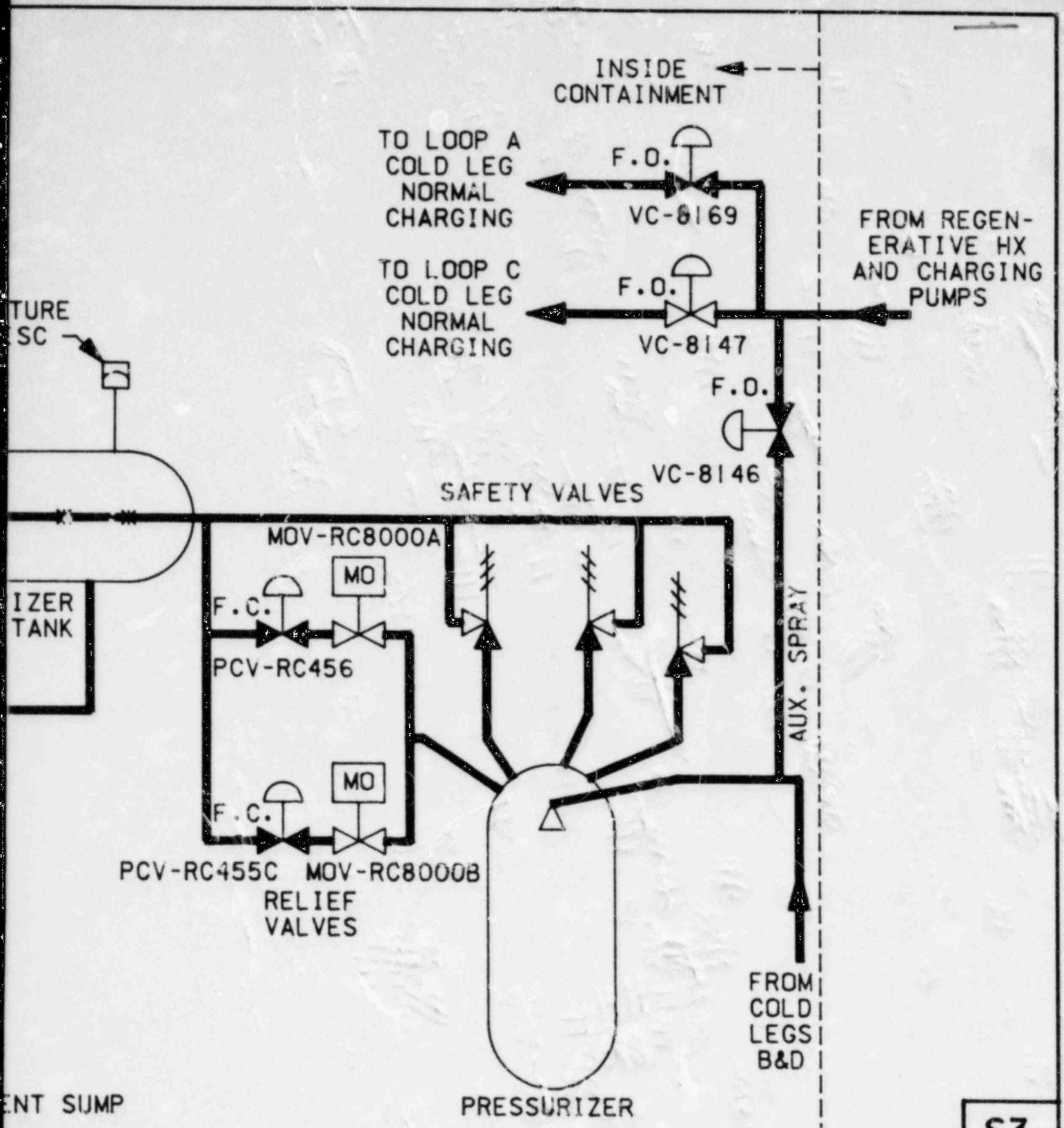

1SC001
2SC001
SECONDARY STORAGE TANKS 500,000 GALLONS EACH
OCD0101
OCD0100
OCD0394
1CD0369
2CD0369
TO UNIT 2
AFW PUMPS
A
MOV-FW0075
MO
B
MOV-FW0074
MOTOR DRIVEN
C
MOV-FW0076
MOV-SW0107
MOV-SW0106
MOV-SW0103
MOV-SW0105
MOV-SW0101
MOV-SW0104
MOV-SW0102
SW0179
11-24-82
SI
SIMPLIFIED SCHEMATIC OF AUXILIARY FEEDWATER (AFW) SYSTEM
ZION STATION UNITS 1& 2
COMMONWEALTH EDISON CO.


MOV-VC8110
MO
MOV-VC8111
MO
VC8479A
VC839
TO
REGENERATIVE HX
AND CONTAINMENT
MOV-
VC8105
MO
MO
VC8483A
VC8483B
VC8485A
VC8402A
VC8402B
VC-
HCV182
MOV-
VC8106
VC-
FCV0121
VC8479B
VC8403
VC8485B
S19013A
TO LOOP B
COLD LEG
MO
TO HOT LEG
LOOP A & D
MOV-
S19011A
MO
MOV-
S19010A
S19013D
TO LOOP C
COLD LEG
MO
MOV-
S18802
S19013C
TO LOOP D
COLD LEG
MO
MO
MOV-
S19010B
L.O.
TO HOT LEG
LOOP B & C
MOV-
S19011B
S18922B
S19013B
TO LOOP A
COLD LEG
INSIDE
CONTAINMENT



SIMPLIFIED SCHEMATIC OF CENTRIFUGAL CHARGING AND SAFETY INJECTION (SI) SYSTEMS
ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.


REACTOR COOLANT
DRAIN TANK
RUP
DI
DT9167A
DTLCV
1003
DT9168A
DT9173A
A
F.C.
TO
RADWASTE
DT9170
REACTOR COOLANT
DRAIN PUMPS
PRESSUR
RELIEF
DT9167B
F.C.
DT9168B
RC8031
B
DT9173B
F.C.
INSIDE
CONTAINMENT
DT9163
CONTAINM



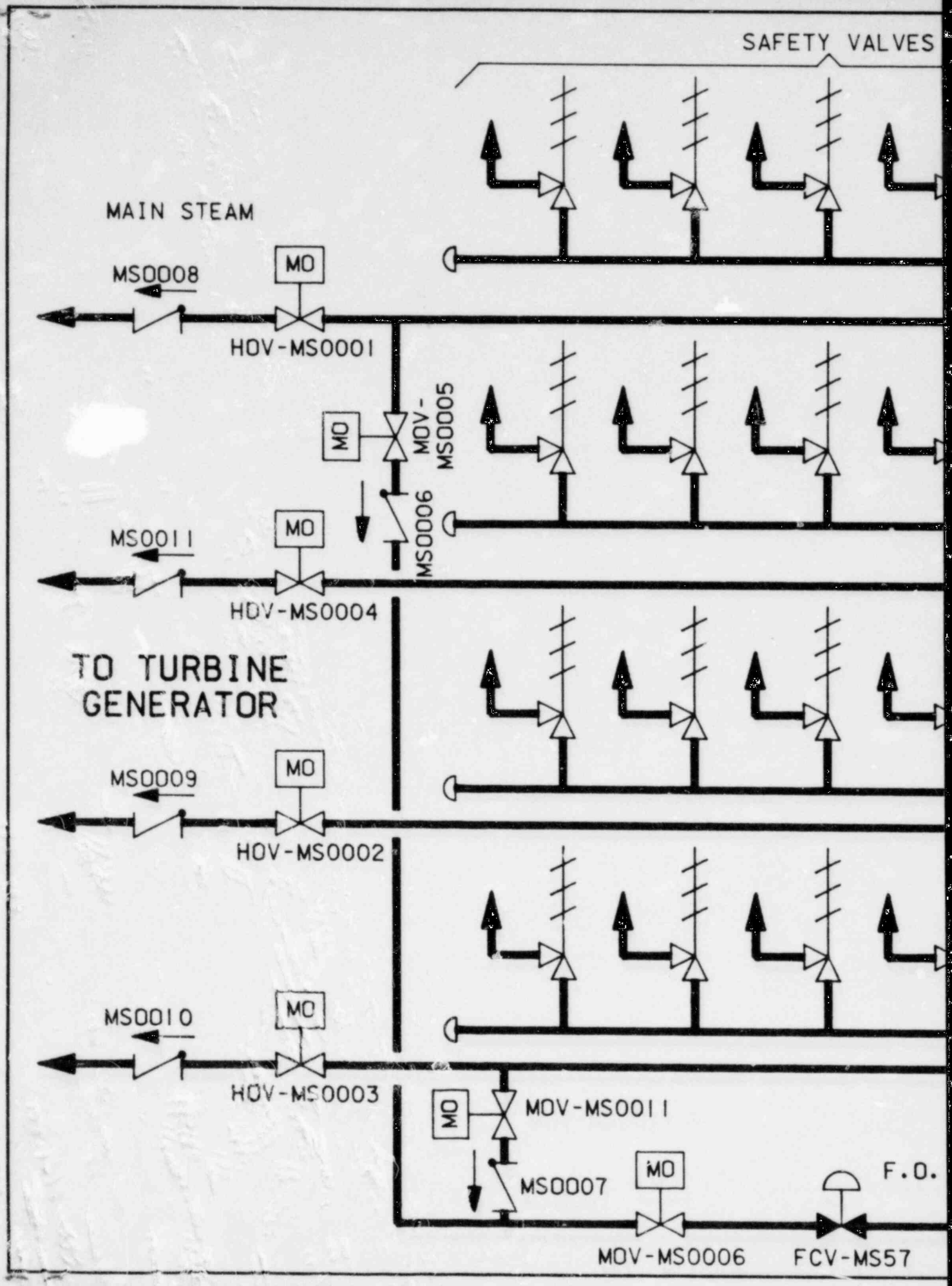
11-24-82

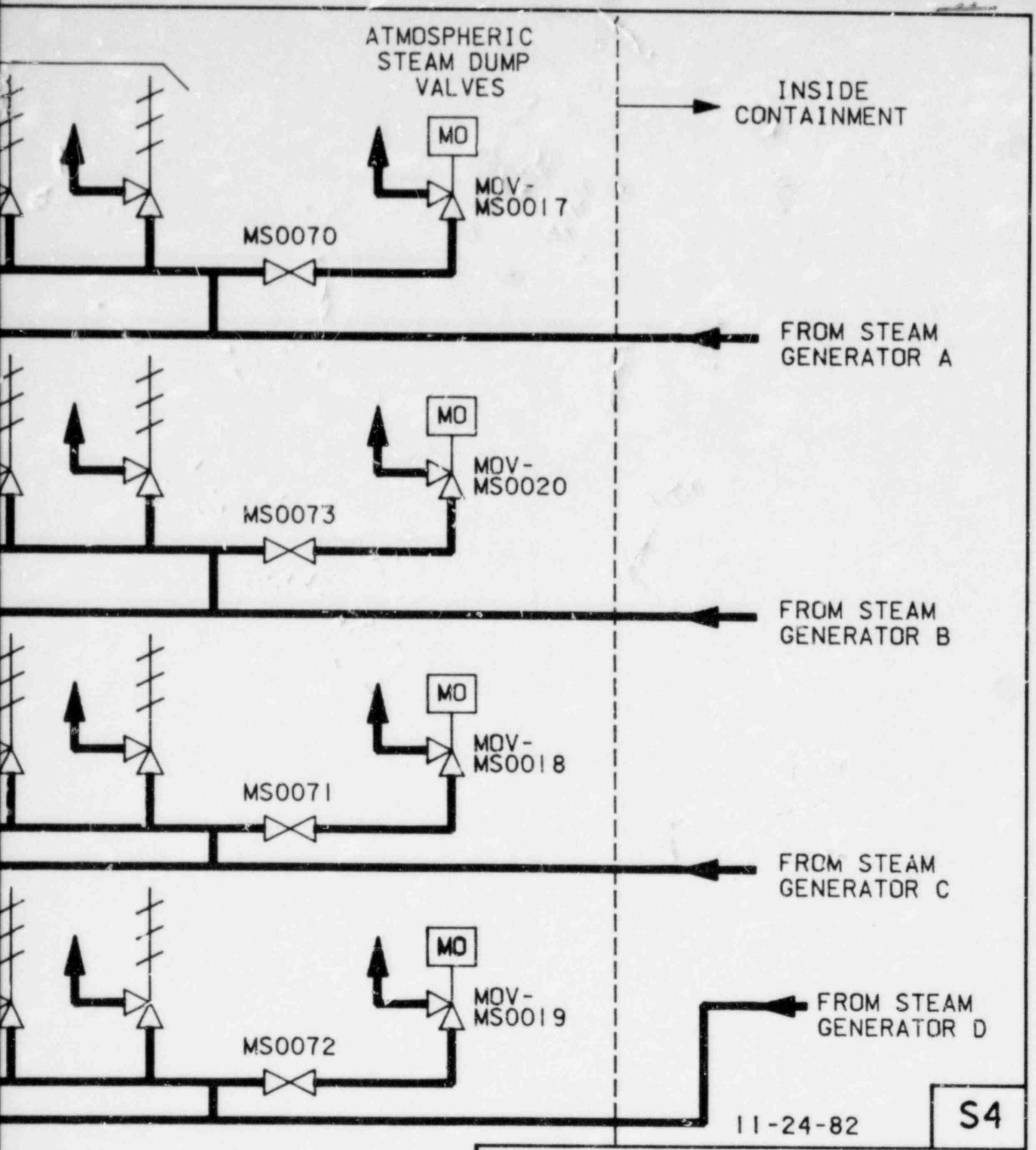
S3

SIMPLIFIED SCHEMATIC OF PRESSURIZER, AUX. SPRAY SAFETY & RELIEF VALVE SYS.

ZION STATION UNITS 1 & 2

COMMONWEALTH EDISON CO.


SAFETY VALVES
MAIN STEAM
MS0008
MO
HOV-MS0001
MO
MOV-MS0005
MS0006
MS0011
MO
HOV-MS0004
TO TURBINE GENERATOR
MS0009
MO
HOV-MS0002
MS0010
MO
HOV-MS0003
MO
MOV-MS0011
MS0007
MO
F.O.
MOV-MS0006
FCV-MS57

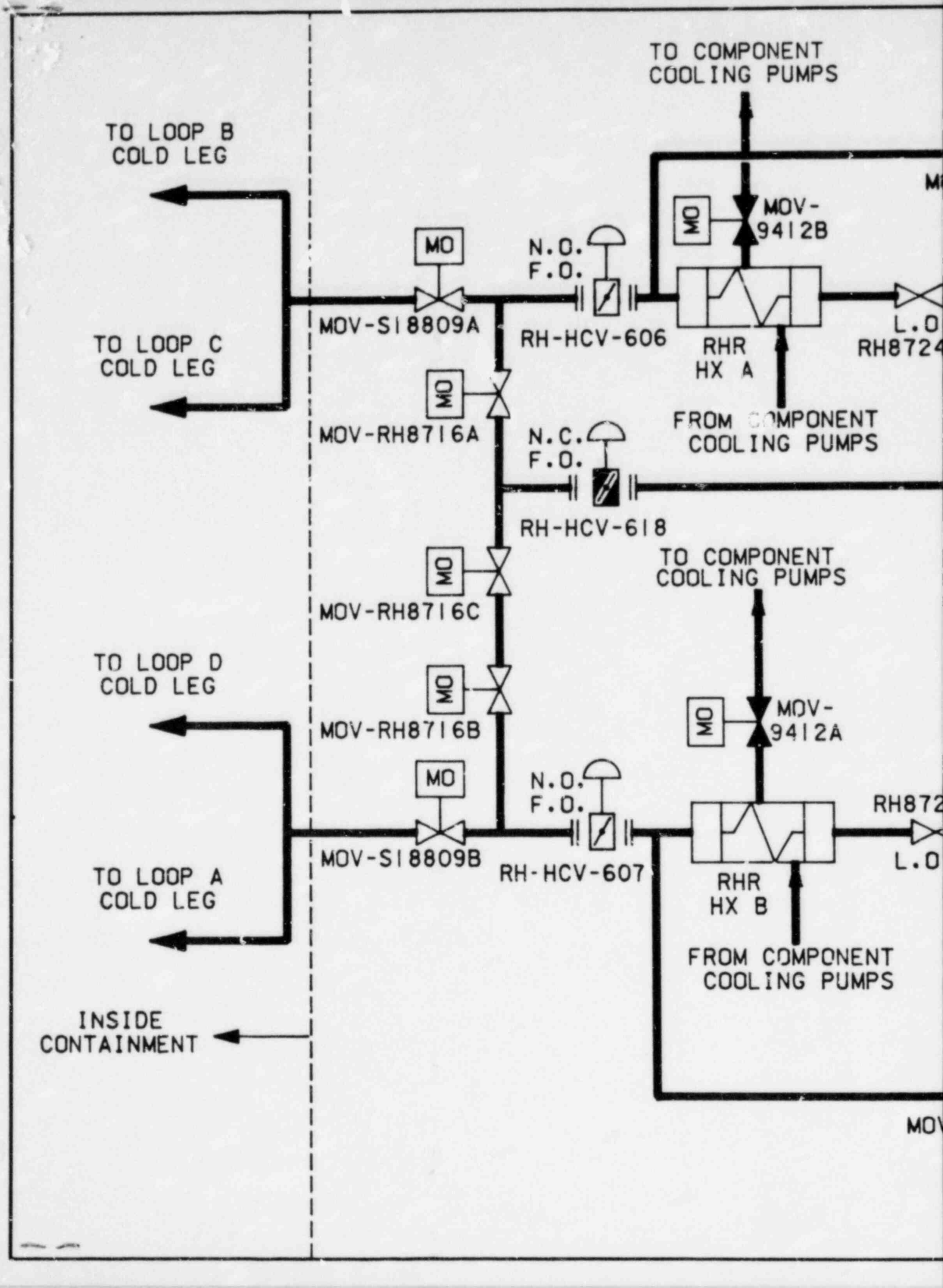


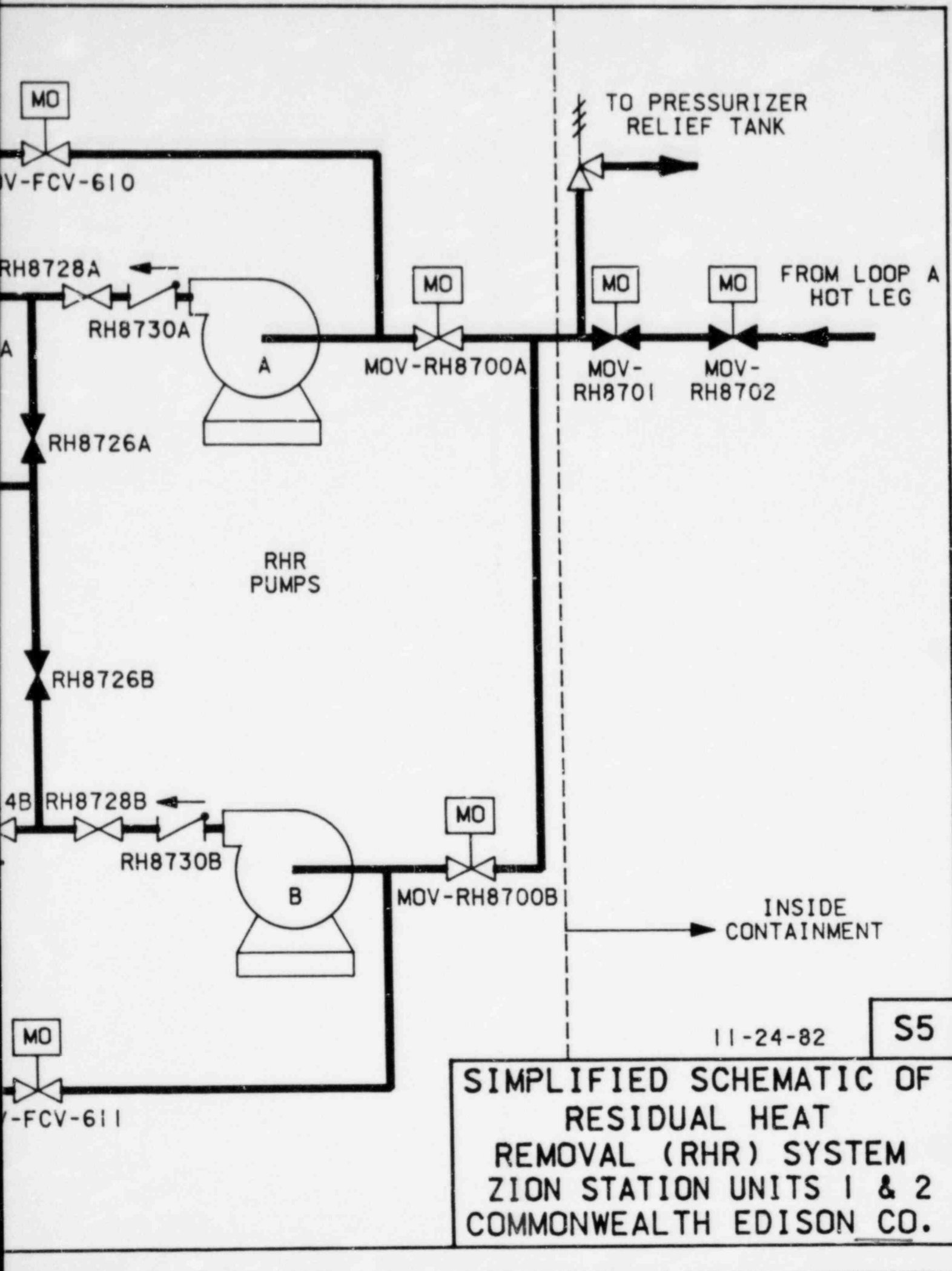
11-24-82

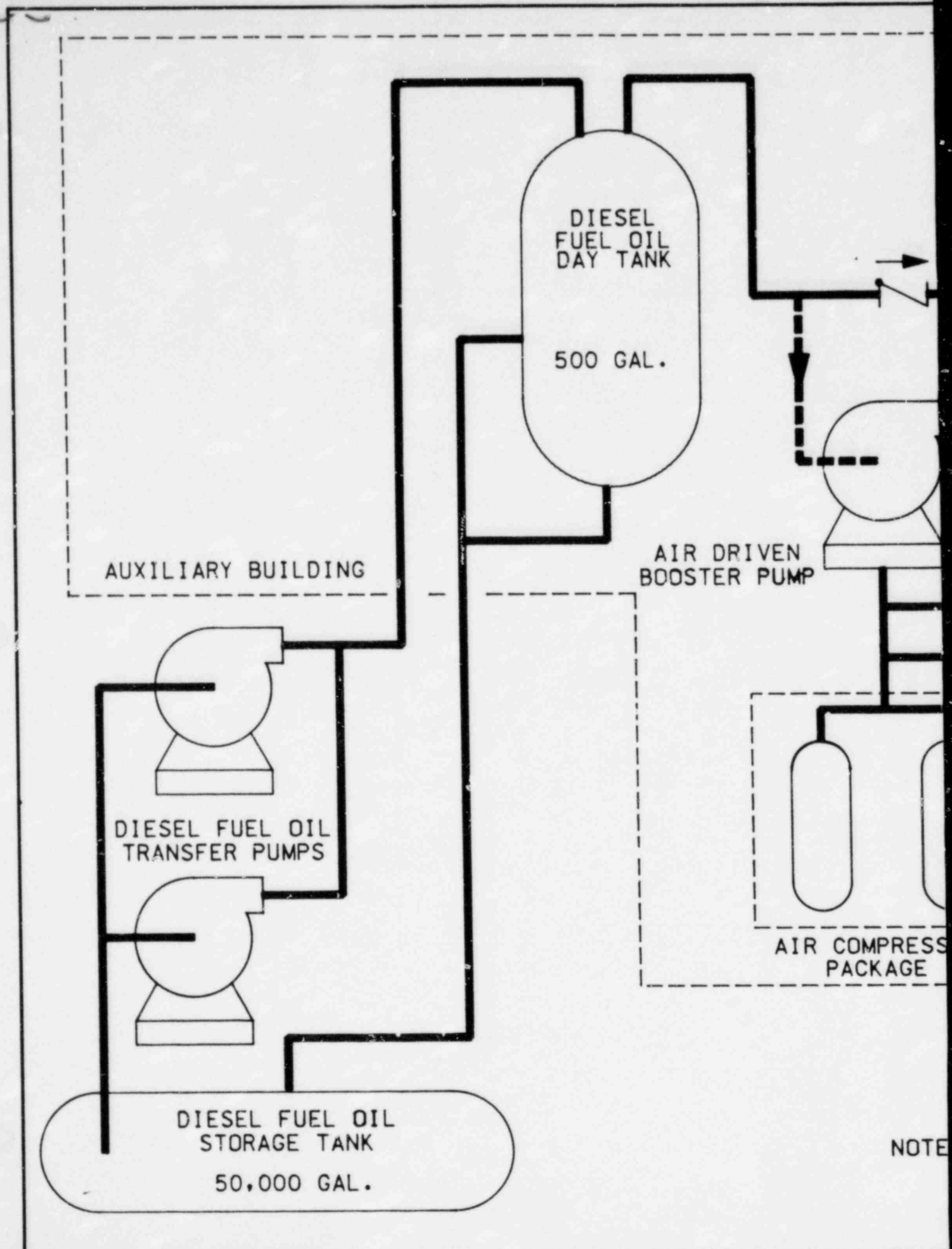
S4

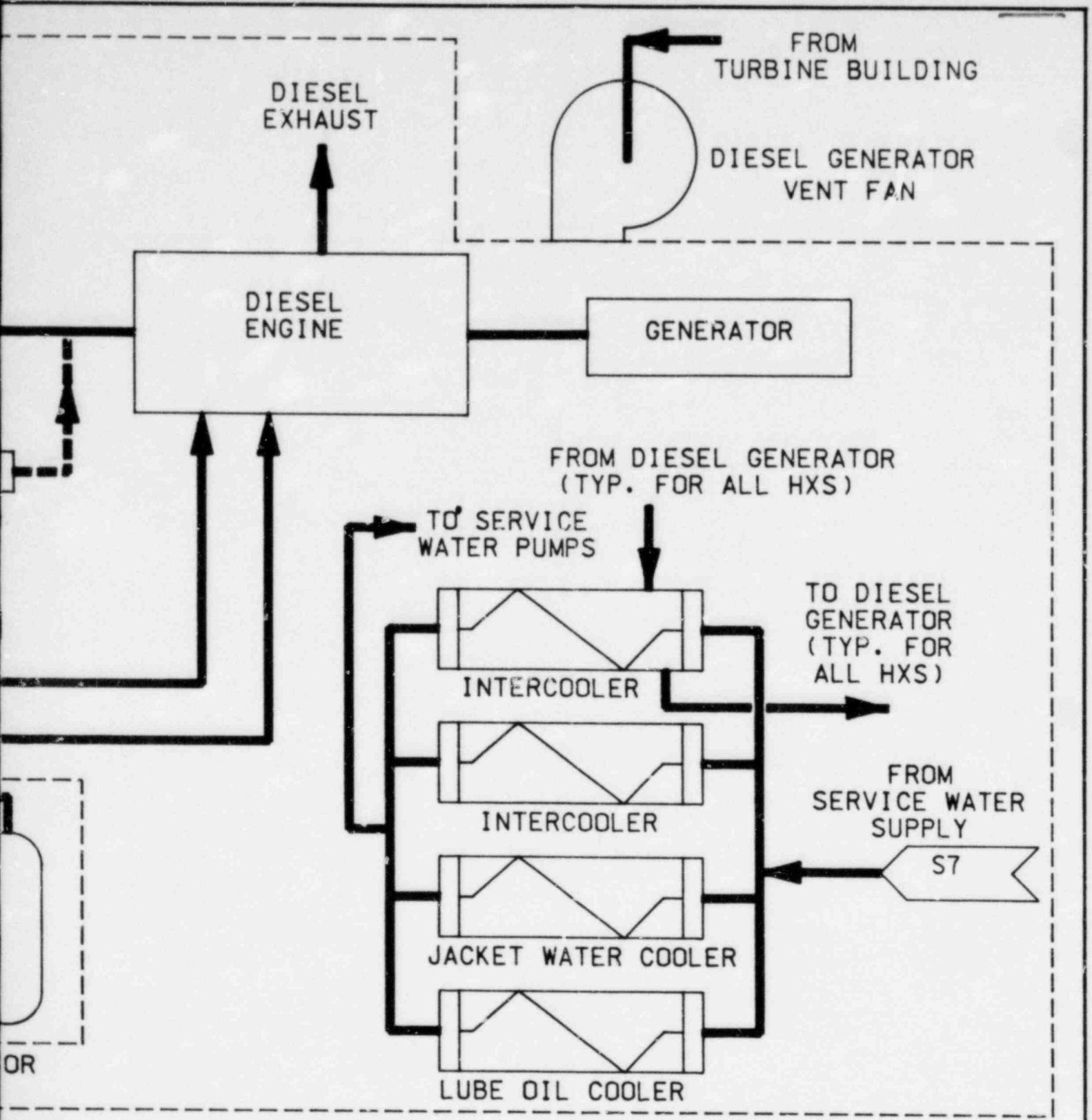
SIMPLIFIED SCHEMATIC OF STEAM GENERATOR SAFETY VALVES & ATMOSPHERIC RELIEF SYSTEM

ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.


TO COMPONENT COOLING PUMPS
TO LOOP B COLD LEG
TO LOOP C COLD LEG
TO LOOP D COLD LEG
TO LOOP A COLD LEG
INSIDE CONTAINMENT
MO
MOV-9412B
MOV-S18809A
N.O.
F.O.
RH-HCV-606
RHR HX A
FROM COMPONENT COOLING PUMPS
MOV-RH8716A
N.C.
F.O.
RH-HCV-618
MOV-RH8716C
MOV-RH8716B
MOV-9412A
MOV-S18809B
RH-HCV-607
RHR HX B


MO
V-FCV-610
TO PRESSURIZER
RELIEF TANK
RH8728A
RH8730A
A
MO
MO
MO
FROM LOOP A
HOT LEG
MOV-RH8700A
MOV-
RH8701
MOV-
RH8702
RH8726A
RHR
PUMPS
RH8726B
4B
RH8728B
RH8730B
B
MO
MOV-RH8700B
INSIDE
CONTAINMENT
MO
-FCV-611
11-24-82
S5
SIMPLIFIED SCHEMATIC OF
RESIDUAL HEAT
REMOVAL (RHR) SYSTEM
ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.


DIESEL
FUEL OIL
DAY TANK
500 GAL.
AUXILIARY BUILDING
AIR DRIVEN
BOOSTER PUMP
DIESEL FUEL OIL
TRANSFER PUMPS
AIR COMPRESS
PACKAGE
DIESEL FUEL OIL
STORAGE TANK
50,000 GAL.
NOTE

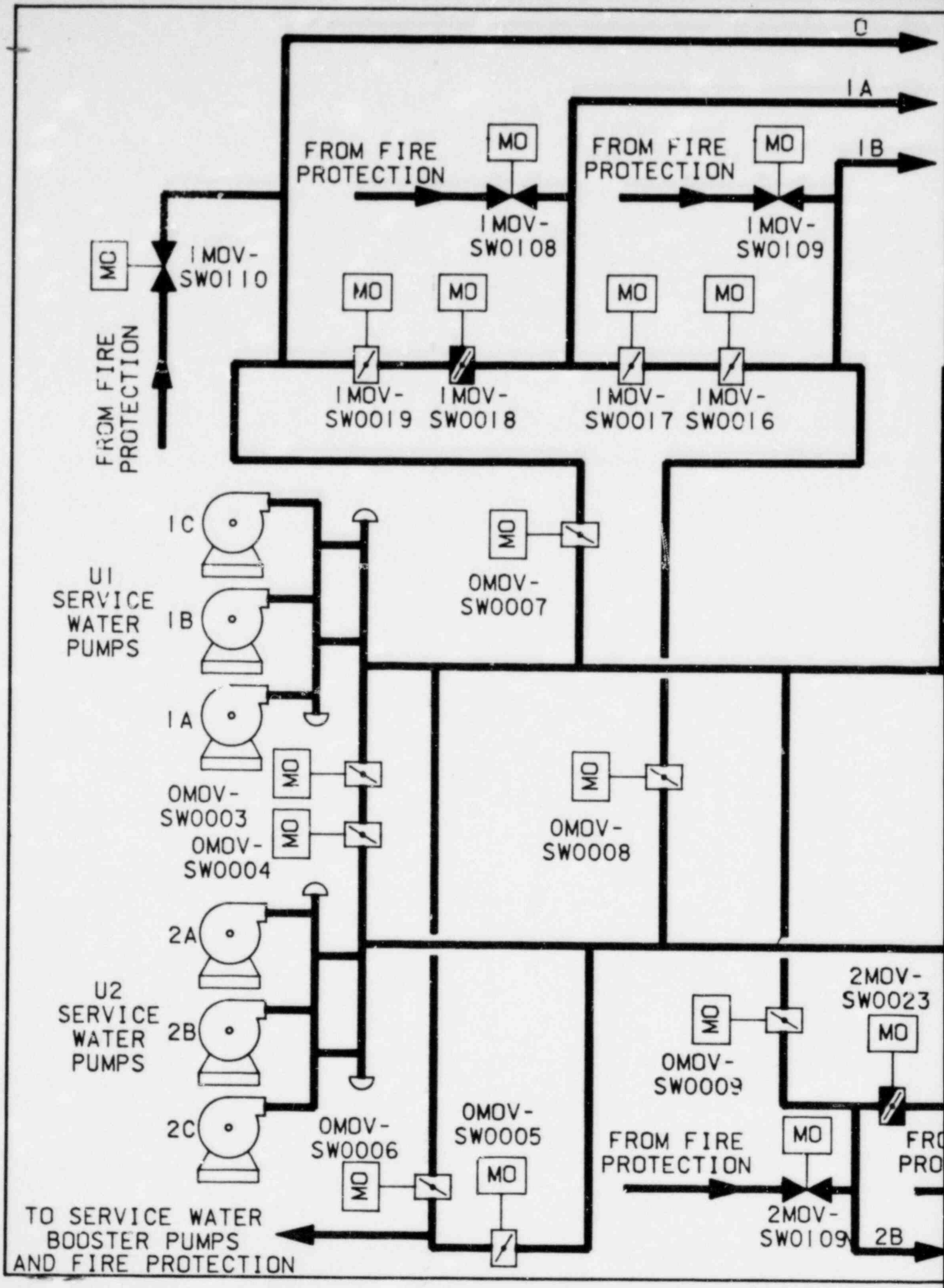


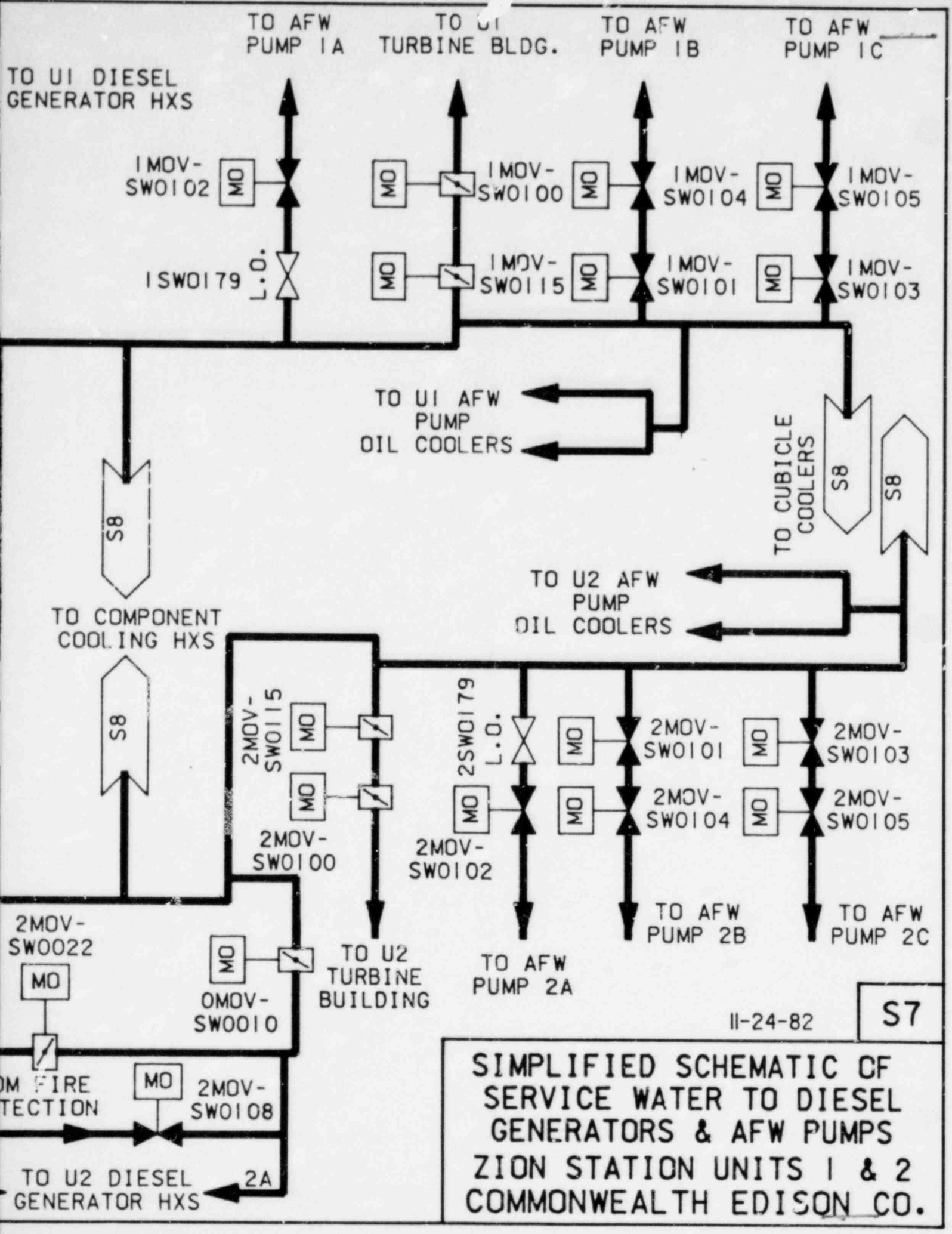
11-24-82 **S6**

SIMPLIFIED SCHEMATIC OF DIESEL GENERATOR

: ZION STATION HAS 5 IDENTICAL DIESEL GENERATORS:
2 PER UNIT "A" & "B"
1 SWING "O"

ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.

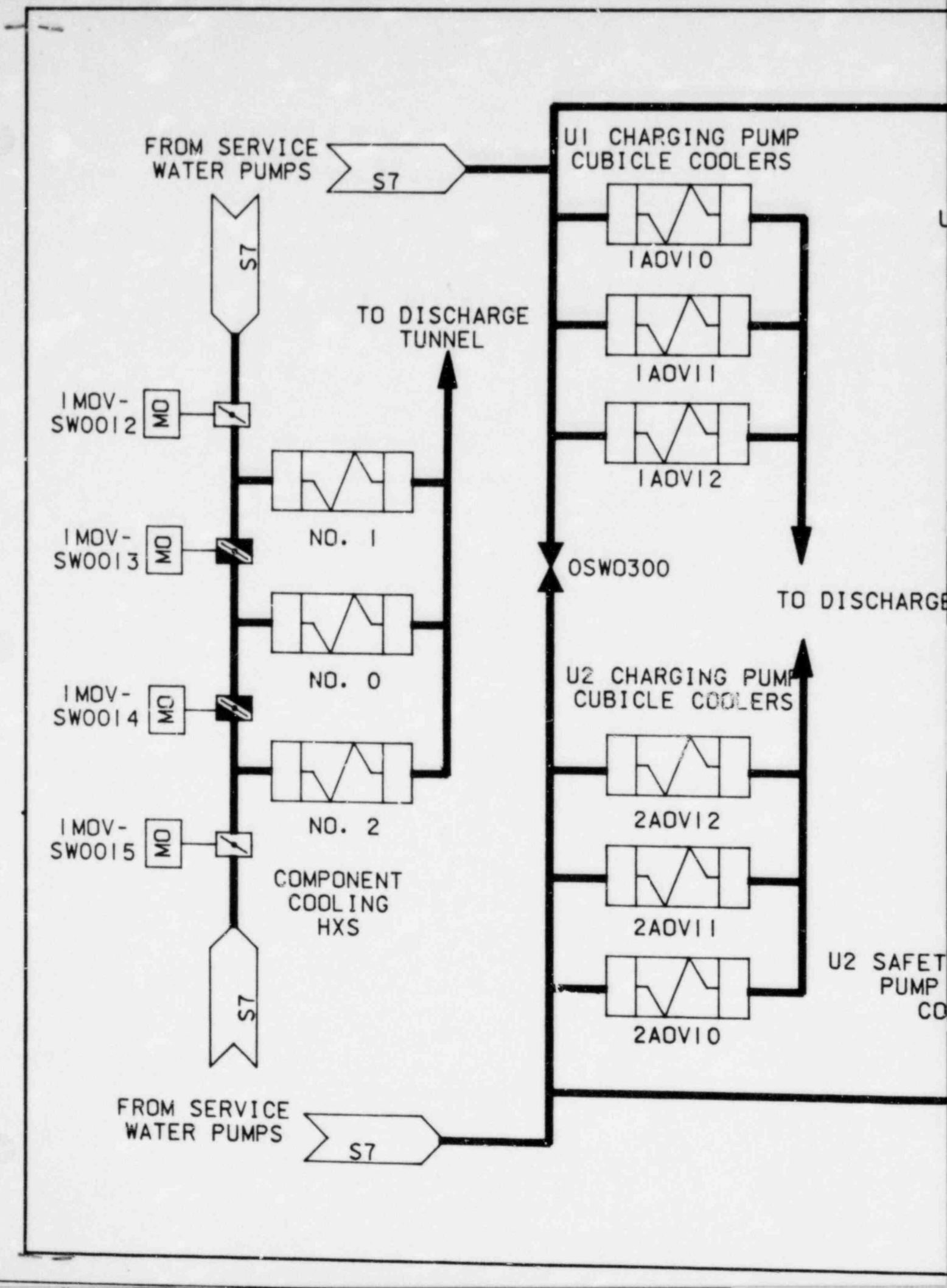

0
1A
1B
FROM FIRE PROTECTION
MO
1MOV-SW0108
FROM FIRE PROTECTION
MO
1MOV-SW0109
MO
1MOV-SW0110
FROM FIRE PROTECTION
MO
MO
MO
MO
1MOV-SW0019
1MOV-SW0018
1MOV-SW0017
1MOV-SW0016
1C
U1 SERVICE WATER PUMPS
1B
1A
MO
0MOV-SW0007
MO
0MOV-SW0003
MO
0MOV-SW0004
MO
0MOV-SW0008
2A
U2 SERVICE WATER PUMPS
2B
2C
MO
0MOV-SW0009
2MOV-SW0023
MO
MO
0MOV-SW0006
MO
0MOV-SW0005
FROM FIRE PROTECTION
MO
2MOV-SW0109
2B
TO SERVICE WATER BOOSTER PUMPS AND FIRE PROTECTION

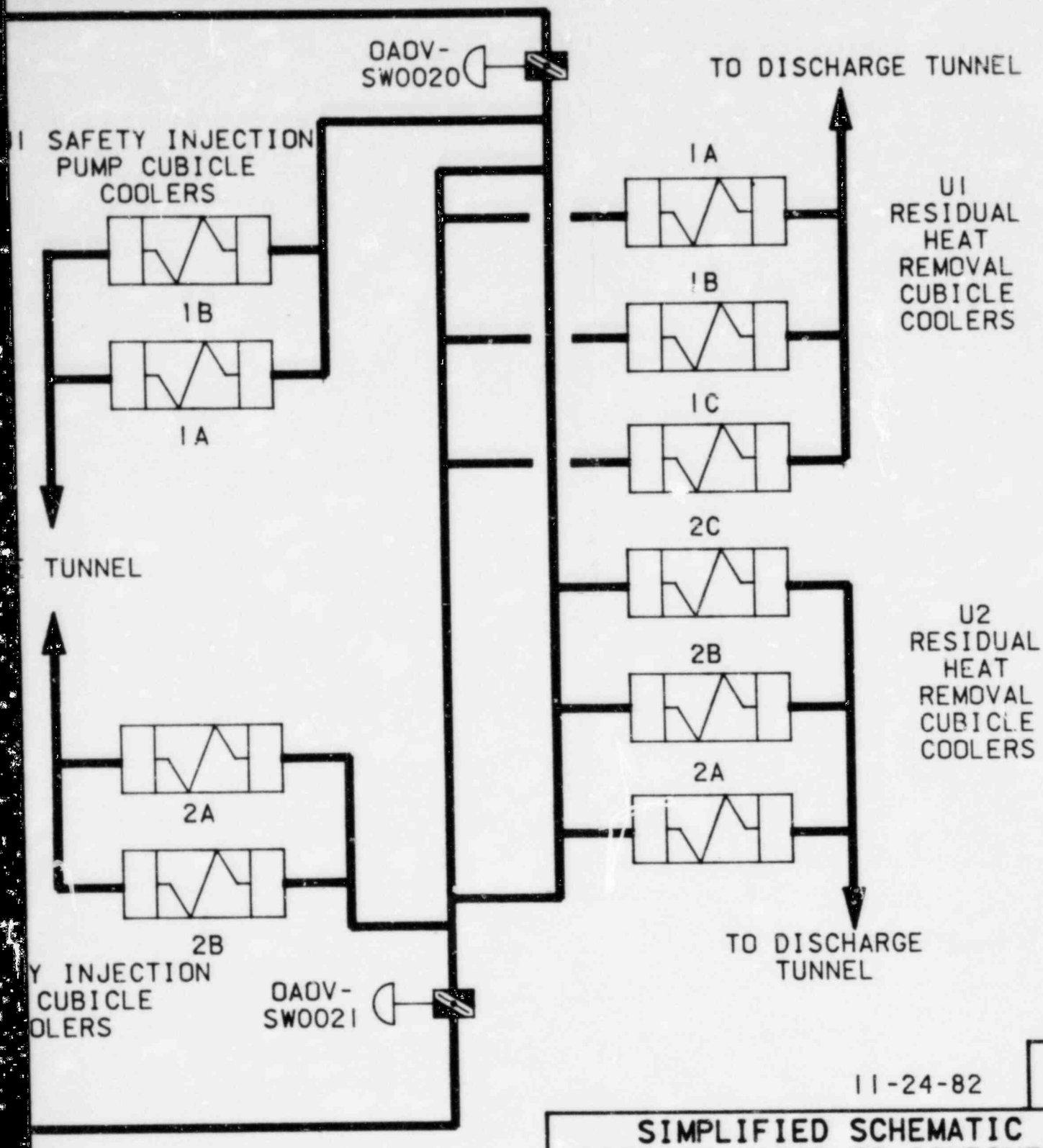


11-24-82

S7

SIMPLIFIED SCHEMATIC OF SERVICE WATER TO DIESEL GENERATORS & AFW PUMPS ZION STATION UNITS 1 & 2 COMMONWEALTH EDISON CO.

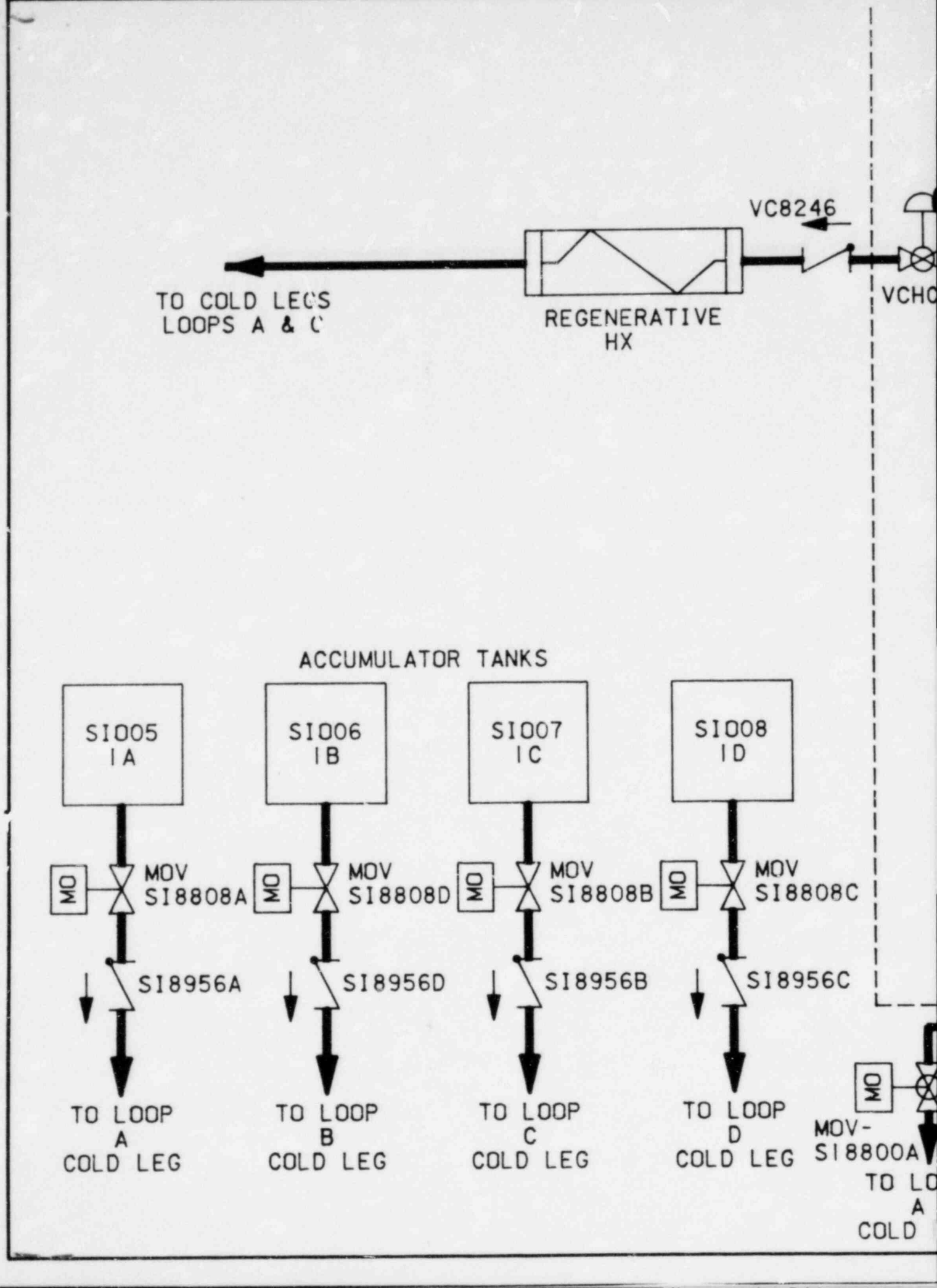

FROM SERVICE WATER PUMPS
S7
S7
TO DISCHARGE TUNNEL
U1 CHARGING PUMP CUBICLE COOLERS
1AOV10
1AOV11
1AOV12
1MOV-SW0012
MO
1MOV-SW0013
MO
1MOV-SW0014
MO
1MOV-SW0015
MO
NO. 1
NO. 0
NO. 2
COMPONENT COOLING HXS
OSW0300
TO DISCHARGE
U2 CHARGING PUMP CUBICLE COOLERS
2AOV12
2AOV11
2AOV10
U2 SAFET
PUMP
CO
S7
FROM SERVICE WATER PUMPS
S7

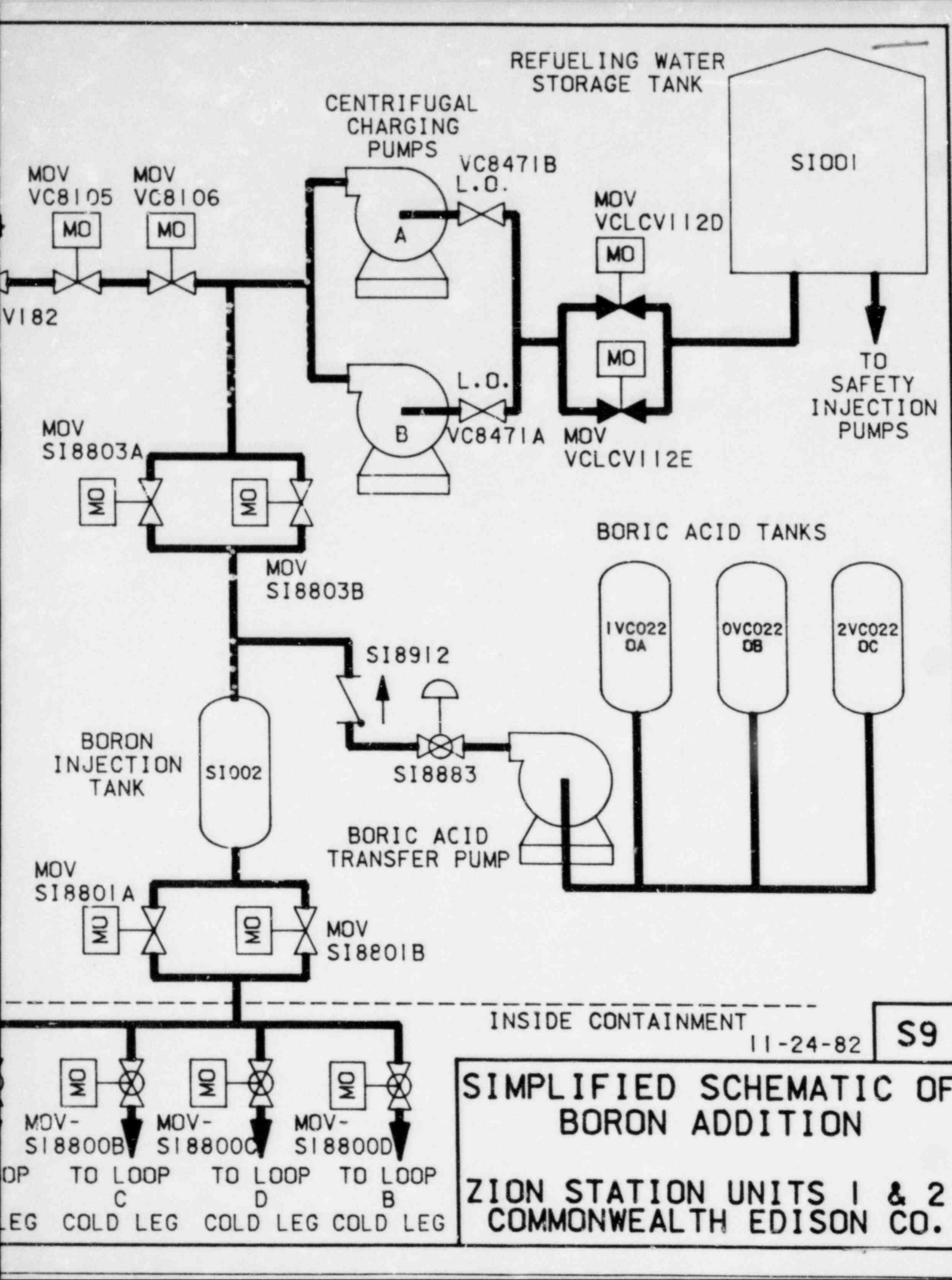


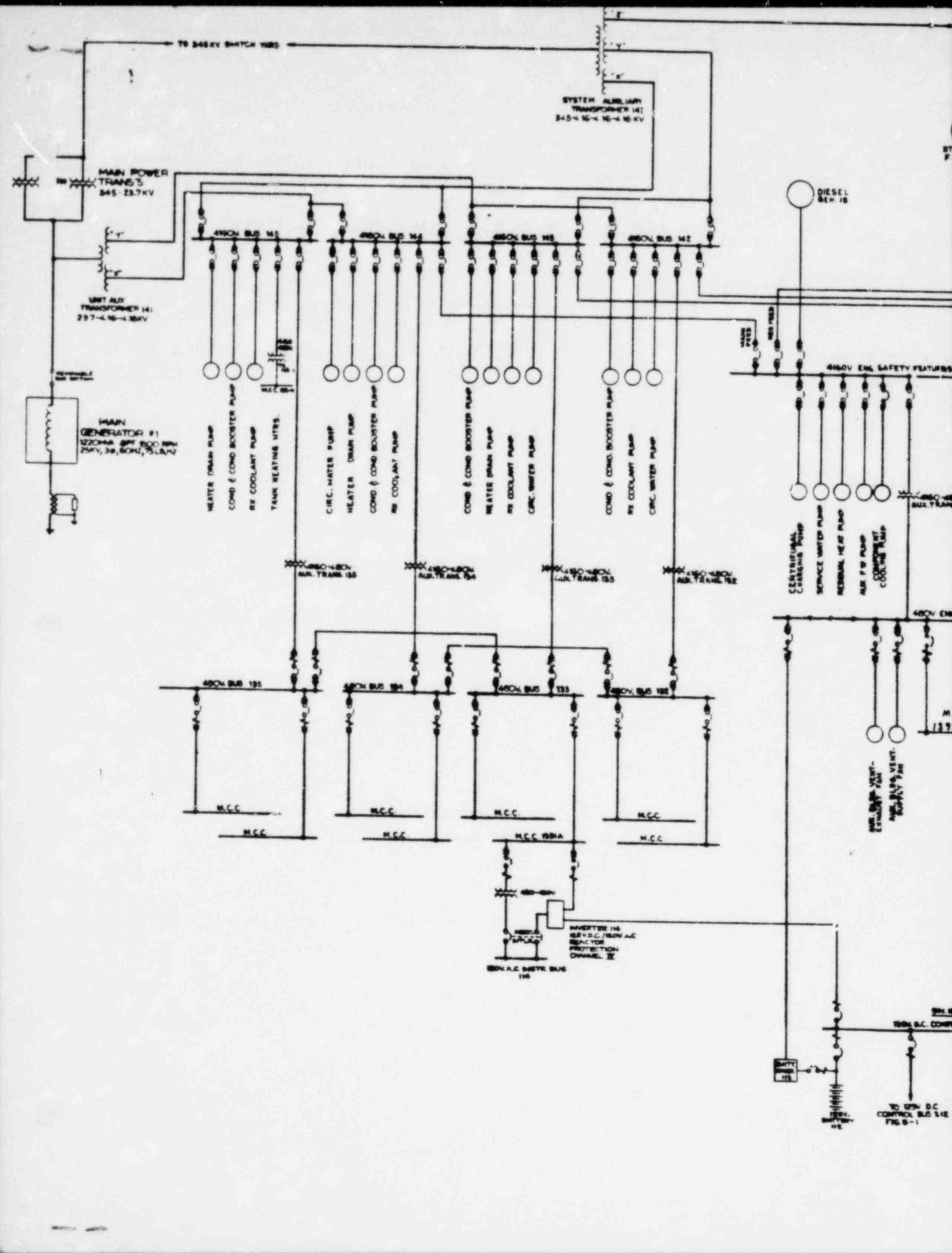
11-24-82

S8

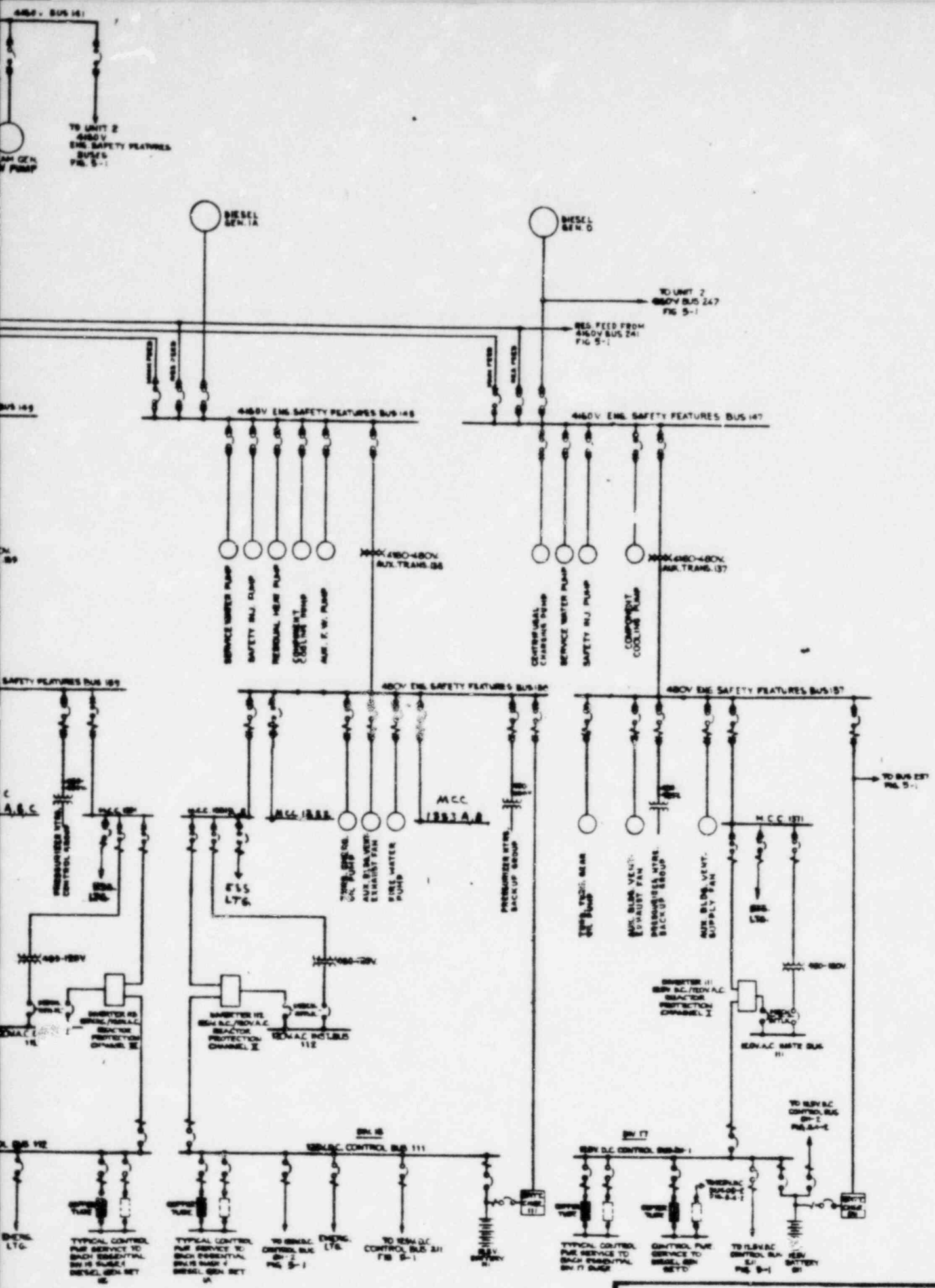
SIMPLIFIED SCHEMATIC
SERVICE WATER TO COMPONENT
COOLING HEAT EXCHANGERS CENT.
CHARGING RHR & SI CUBICLES COOLERS
ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.


VC8246
TO COLD LEGS
LOOPS A & C
REGENERATIVE
HX
VCHO
ACCUMULATOR TANKS
SI005
1A
SI006
1B
SI007
1C
SI008
1D
MO
MOV
SI8808A
MOV
SI8808D
MOV
SI8808B
MOV
SI8808C
SI8956A
SI8956D
SI8956B
SI8956C
TO LOOP
A
COLD LEG
TO LOOP
B
COLD LEG
TO LOOP
C
COLD LEG
TO LOOP
D
COLD LEG
MOV-
SI8800A
TO LO
A
COLD


REFUELING WATER STORAGE TANK
SI001
CENTRIFUGAL CHARGING PUMPS
A
B
VC8471B L.O.
L.O. VC8471A
MOV VC8105
MOV VC8106
MO
V182
MOV VCLCV112D
MOV VCLCV112E
TO SAFETY INJECTION PUMPS
MOV SI8803A
MOV SI8803B
BORIC ACID TANKS
1VC022 0A
0VC022 0B
2VC022 0C
SI8912
SI8883
BORON INJECTION TANK
SI002
BORIC ACID TRANSFER PUMP
MOV SI8801A
MOV SI8801B
INSIDE CONTAINMENT
MOV-SI8800B
MOV-SI8800C
MOV-SI8800D
TO LOOP C COLD LEG
TO LOOP D COLD LEG
TO LOOP B COLD LEG
11-24-82
S9
SIMPLIFIED SCHEMATIC OF BORON ADDITION
ZION STATION UNITS 1 & 2
COMMONWEALTH EDISON CO.

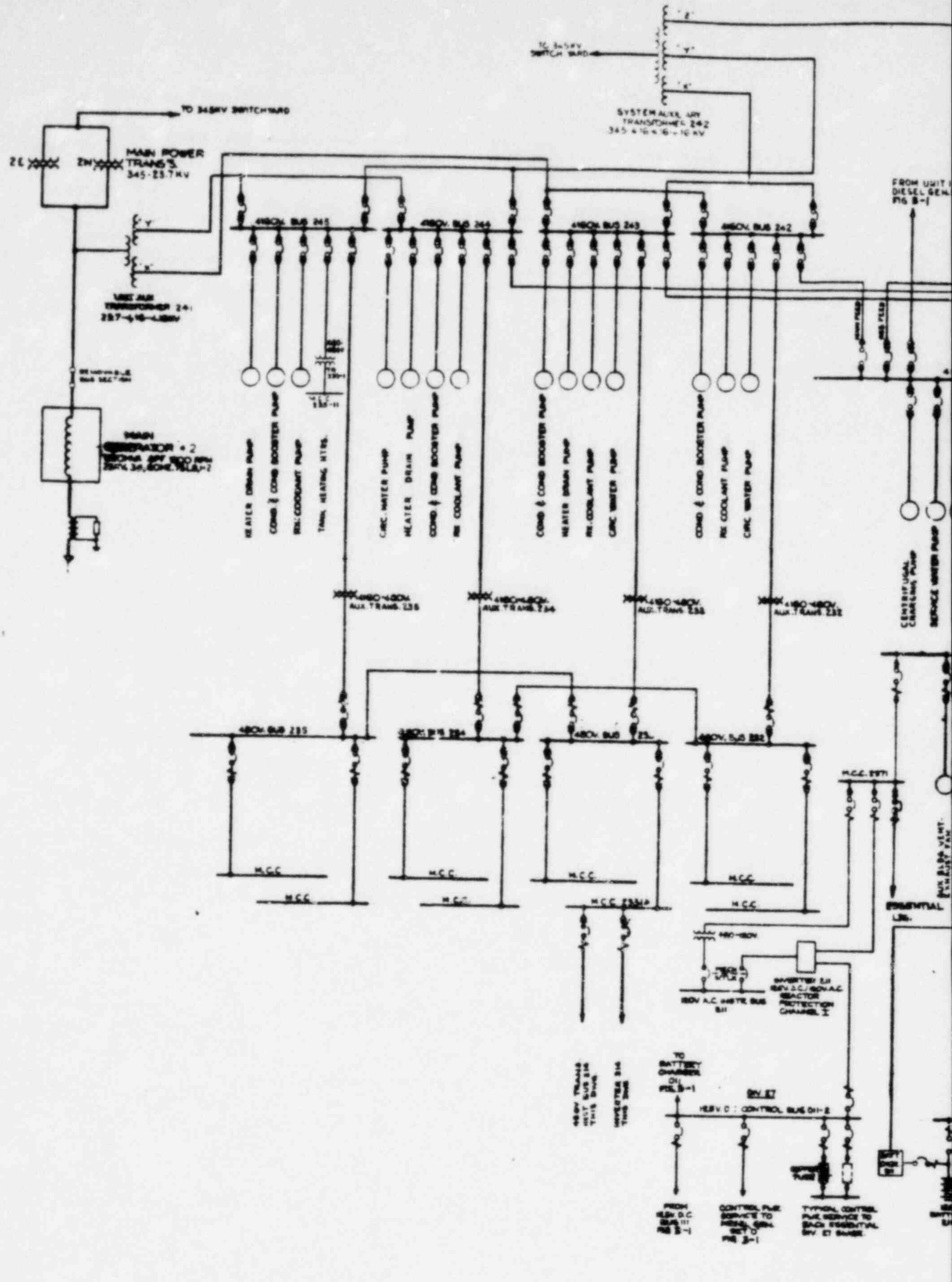


TO 345 KV SWITCH YARD
SYSTEM AUXILIARY TRANSFORMER 141
345-4.16-4.16 KV
MAIN POWER TRANS'S
345-23.7KV
UNIT AUX TRANSFORMER 141
23.7-4.16-4.16KV
MAIN GENERATOR #1
25KV, 3ø, 60HZ, 75LB/H2
DIESEL GEN 1B
4160V BUS 145
4160V BUS 146
4160V BUS 148
4160V BUS 147
HEATER DRAIN PUMP
COND & COND BOOSTER PUMP
RX COOLANT PUMP
TANK HEATING HTRS.
CIRC. WATER PUMP
HEATER DRAIN PUMP
COND & COND BOOSTER PUMP
RX COOLANT PUMP
COND & COND BOOSTER PUMP
HEATER DRAIN PUMP
RX COOLANT PUMP
CIRC. WATER PUMP
COND & COND. BOOSTER PUMP
RX COOLANT PUMP
CIRC. WATER PUMP
4160V ENG SAFETY FEATURES
CENTRIFUGAL CHARGING PUMP
SERVICE WATER PUMP
RESIDUAL HEAT PUMP
AUX. F.W. PUMP
COMPONENT COOLING PUMP
4160-480V AUX. TRANS. 135
4160-480V AUX. TRANS. 134
4160-480V AUX. TRANS. 133
4160-480V AUX. TRANS. 132
480V BUS 135
480V BUS 134
480V BUS 133
480V BUS 132
M.C.C.
M.C.C. 133A
INVERTER 114
REACTOR PROTECTION CHANNEL IV
120V A.C. INSTR. BUS 114
TO 125V D.C. CONTROL BUS 112 FIG 8-1
125V. BATTERY 112

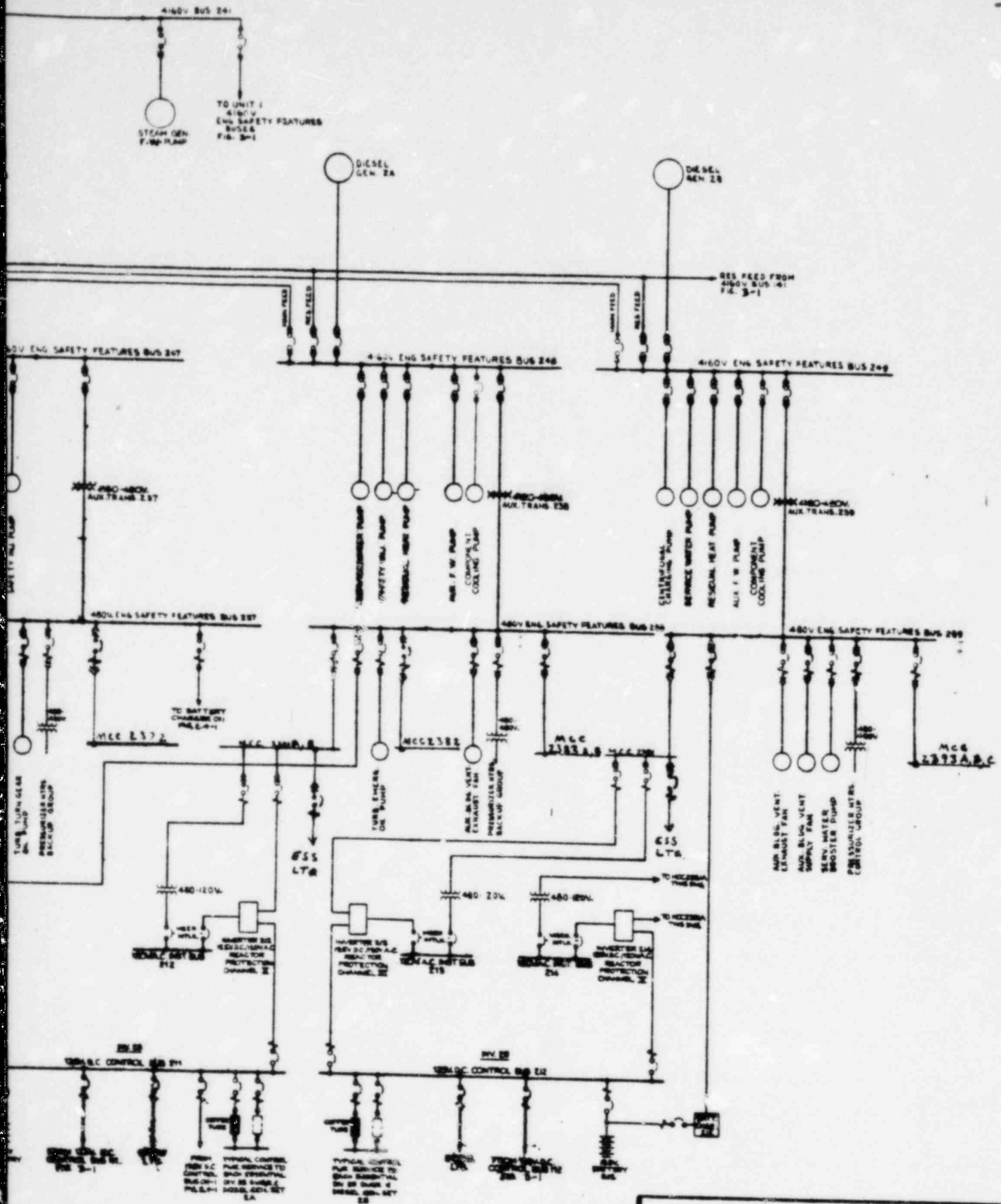


ZION STATION UNIT 1
COMMONWEALTH EDISON COMPANY
FIRE PROTECTION ASSOCIATED CABLE REPORT

FIGURE 3 - 1
SINGLE LINE ELECTRICAL DIAGRAM UNIT 1



MAIN POWER TRANS'S.
345-23.7KV
SYSTEM AUXILIARY TRANSFORMER 242
4160V. BUS 245
4160V. BUS 244
4160V. BUS 243
4160V. BUS 242
HEATER DRAIN PUMP
COND. & COND BOOSTER PUMP
RX COOLANT PUMP
TANK HEATING HTRS.
CIRC. WATER PUMP
HEATER DRAIN PUMP
RX COOLANT PUMP
CIRC. WATER PUMP
CENTRIFUGAL CHARGING PUMP
SERVICE WATER PUMP
480V. BUS 235
M.C.C.



ZION STATION UNIT 2
COMMONWEALTH EDISON COMPANY
FIRE PROTECTION
ASSOCIATED CABLE REPORT

FIGURE 5 - 1
SINGLE LINE ELECTRICAL DIAGRAM UNIT 2