NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

02-186-91

02-LOT-001-223-2-02 (OPS) Revision 6

TITLE: PRIMARY CONTAINMENT ISOLATION SYSTEM

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Summary of Pages

(Effective Date: 4/12/91)

Number of Pages: 30

Date	Pages
March 1991	1 - 30

THIS LESSON PLAN IS A GENERAL REWRITE

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY:

VERIFICATION

DATA ENTRY

RECORDS

31

5/3/136

I. TRAINING DESCRIPTION

A. Title of Lesson: Primary Containment Isolation System

B. Lesson Description: This lesson contains information pertaining to the Primary Containment Isolation System. The scope of the training is defined by the learning objectives and in general covers the knowledge required of a Licensed Control Room Operator.

C. Estimate of the Duration of the Lesson: 4 Hours

D. Method of Evaluation, Grade Format and Standard of Evaluation: Written exam passing grade of 80% or greater.

E. Method and Setting of Instruction: This lecture should be conducted in the classroom.

F. Prerequisites:

1. Instructor:
   a. Certified in accordance with NTP-16.
2. Trainee:
   a. Initial License Candidate - In accordance with the eligibility requirements of NTP-10.
   b. Licensed Operator Requal - In accordance with the requirements of NTP-11.

G. References:

1. Technical Specifications
   a. 3/4.3.2 Isolation Actuation Instrumentation
   b. 3/4.4.7 Main Steam Line Isolation Valves
   c. 3/4.6.3 Primary Containment Isolation Valves
2. Procedures
   a. N2-OP-83, Primary Containment Isolation System
3. NMP2 FSAR
   a. Design Basis Vol. 14, Chapter 6.2
4. TCO-02-LIC-90-055
5. LER 87-55 (Microfilm roll #8827 Frame 3087)
6. LER 88-38 (Microfilm roll #9463 Frame 4781)
7. 807E152TY

II. REQUIREMENTS

A. AP-9 Administration of training

B. NTP-10 Training of Licensed Operator Candidates

C. NTP-11 Licensed Operator Requalification Training

D. NTP-12 Unlicensed Operator Training

III. TRAINING MATERIALS

A. Instructor Materials:

1. Classroom
2. Lesson Plan
3. TR
4. Transparency package
5. Overhead projector
6. Applicable references
7. Trainee handouts
8. Board markers

B. Trainee Materials:

1. Handouts (can include text, drawings, objectives, procedures, etc.)
2. Pens, pencils, paper
3. Course Evaluation Forms

IV. EXAMS AND MASTER ANSWER KEYS

A. Exams will be generated and administered as necessary.

B. Exams and Master Answer Keys will be on permanent file in the Records Room.

V. LEARNING OBJECTIVES:

Upon satisfactory completion of this lesson, the trainee will demonstrate the knowledge to:

A. Terminal Objectives:

TO-1.0	Manually isolate a Selected System.	(2239010101)
TO-2.0	Operate the Primary Containment System in response to a LOCA high drywell pressure from the Control Room.	(2239050601)
TO-3.0	Shut the Instrument Gas (Nitrogen) and Containment inerting supply lines from the Control Room.	(2239090101)
TO-4.0	Manually isolate the Containment Leakage Monitoring System.	(2239540101)
TO-5.0	Respond to an automatic containment isolation (SRO only)	(3449420503)
TO-6.0	Respond to a RWCU system isolation (SRO only)	(3449770403)

B. Enabling Objectives:

EO-1.0 Explain the purpose of the Primary Containment Isolation System.

EO-2.0 Define type A, B and C process line containment penetrations.

EO-3.0 State what systems are isolated in each isolation group (for groups 1-9).

EO-4.0 Describe the operation of the ISC manual isolation switches for each group isolation function.

EO-5.0 For each isolation in Groups 1-9:

a. List all signals which would cause an isolation function.

b. List the setpoints for each automatic isolation function.

c. State when and how automatic functions are bypassed.

EO-6.0 Regarding the Primary Containment Isolation System 1) locate the correct drawing and 2) use drawings to perform the following:

- Identify electrical and mechanical components.
- Trace the flowpath of fluids or electricity.
- Identify interlocks and setpoints.
- Describe system operation.
- Locate information about specific components.
- Identify system interrelations.

EO-7.0 For the following interlocks 1) state the setpoint 2) describe the purpose.

- MSL Low Pressure Group One isolation bypass.
- Low Condenser Vacuum Group One isolation bypass.
- WCS System High Differential Flow isolation bypasses.
- Power Failure Test pushbuttons.

EO-8.0 Explain the basis for each precaution and limitation listed in N2-OP-83.

EO-9.0 Regarding the Primary Containment Isolation System, determine and use the correct procedure to identify the actions and/or locate information related for:

- startup
- normal operation
- shutdown
- off-normal operation
- annunciator response

EO-10.0 Given a specific set of plant conditions, determine how the Primary Containment Isolation System responds.

EO-11.0 Describe how the Primary Containment Isolation System is utilized during the performance of EOP's.

EO-12.0 Describe the interrelationship of the following list of systems with the Primary Containment Isolation System.

- Plant Electrical Distribution
- Leakage Detection System
- Rx Vessel Instrumentation
- Standby Liquid Control
- Reactor Protection System
- Condensate System
- Main Steam System
- Radiation Monitoring System
- Traversing In-core Probe
- Residual Heat Removal
- Reactor Water Cleanup

EO-13.0 Given NMP2 Technical Specifications and a set of plant conditions, determine the appropriate bases, limiting conditions for operation, limiting safety system setting, and/or action statement as applicable.

VI. LESSON CONTENT

LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
I. INTRODUCTION		
- Self		
- Fill out TR		
- Brief trainees on use of Course Evaluation Forms		
- Inform trainees of Method of Evaluation		
- Read trainee Learning Objectives	Weekly Exams	
A. Purpose		EO-1.0
To limit the release of radioactive materials to less than that specified by regulatory guides.		
B. General Description		
1. The ISC provides automatic and manual isolation of appropriate lines which penetrate the containment.		
2. Process lines penetrating the containment are divided into three categories.		EO-2.0
a. Type A		
Lines with direct connection to RP vessel and penetrate primary containment.	Example: Main Steam Lines	
b. Type B		EO-2.0
Lines that don't communicate directly with the RPV, but penetrate containment and communicate with free air space.	Example: Primary Containment Purge	
c. Type C		EO-2.0
Lines that penetrate primary containment but do not communicate directly with RPV or primary containment free air space.	Example: CCP	

3. Types A and B will have inboard and outboard isolations, Type C requires only an outboard isolation, (most have both).
4. Check valves may be used as inboard isolations, but not outboard.

II. DETAILED DESCRIPTION

A. The isolation valves operated by ISC are divided into twelve groups:

Utilize TP's of each group showing Isolation group number and systems in that group. EO-3.0

1. Group 1 isolations
   a. MSIV's and steam line drains
2. Group 2 isolations EO-3.0
   a. Reactor water sample lines
3. Group 3 isolations
   a. Auto TIP withdrawal and isolation valve closure
4. Group 4 isolations
   a. RHS sample lines and RHS to radwaste
5. Group 5 isolations
   a. RHS shutdown cooling suction valves, RHS shutdown cooling injection valves, RHS reactor head spray valve
6. Group 6 isolations
   a. WCS <u>outboard</u> isolation valves

7. Group 7 isolations
   a. WCS inboard isolation valve
8. Group 8 isolations
   a. Containment Auxiliary Systems
      1) CCP-RB closed loop cooling water
      2) CMS-Containment ATM monitoring
      3) ADS-Auto depressurization system air lines
      4) IAS-Instrument air
      5) LMS-Containment leakage monitoring
      6) Reactor recirc hyd power unit lines
      7) Drywell drains
      8) Hydrogen recombiner lines
      9) Drywell fire protection (deactivated)
9. Group 9 Isolations
   a. CPS Valves
10. Group 10 Isolations
    a. ICS Steam Supply Valves
11. Group 11 Isolations
    a. ICS vacuum breaker isolation valves.
12. Group 12 isolations
    a. Remote manually operated containment isolation valves

EO-3.0

B. Logic

1. Designed to automatically isolate two valves in each process line (inboard and outboard isolation valve).
2. Arranged in two divisions (I and II) with four channels (A, B, C, and D)
3. In general, ISC is arranged so that all outboard valves are controlled by Division I (Channel A and D) and all inboard valves are controlled by Division II logic (Channel B and C).
   a. Exceptions to this are:
      1) MSIV's
      2) H_2 Recombiners
      3) Containment monitoring
   b. MSIV's use one out of two taken twice logic.
      1) An MSIV closure signal closes both inboard and outboard valves.
      2) Only MSIV's use this logic.
4. Each division of logic is independent.
   a. No single failure can prevent the required automatic or manual operation of at least one valve of an inboard/outboard pair of isolation valves.

Draw on Board:

(OUTBD)	(INBD)
DIV I	DIV II
A D	B C

Using TP of P602 -
Point out locations of the DIV I and II isolation pushbuttons.

5. All systems except MSIV's and the GTS radiation monitor require a minimum of two trip signals to cause a valve closure.
   a. Leak Detection System high temperature trips require only a single trip signal.

C. Resets

1. Isolation signals for Groups 1-10 seal-in and must be reset when signal clears.
   a. Groups 1-9 reset on panel 602.
   b. Group 10 reset on panel 601 (ICS) with keylock switches.
   c. Group 11 resets automatically when initiating condition clears.

-Show TP OF P601, P602, P603
-Point out how to reset Groups 1-10 using these TP's.

D. Manual Isolation

1. Four Manual Isolation pushbuttons on panel 602.
   a. One button for each logic channel.
   b. Pushbuttons isolate Group 1-9.
   c. Each switch is an armed collar pushbutton.
      1) Actuation of any one switch will result in a half isolation signal only. (Does not shut any isolation valves).

EO-4.0

-Use TP of P602 to show location of pushbuttons.

LESSON CONTENT	DELIVERY NOTES	ECTIVES/ NOTES
2) Actuation of the A and C channel switches will deenergize the B solenoids for the inboard MSIV's and the A solenoids for the outboard MSIV's generating half isolation signal, (does not shut any isolation valves.)	Draw on board: A & C = No isolation	
3) Actuation of the B and D switches will deenergize the A solenoids for the inboard MSIV's and the B solenoids for the outboard MSIV's generating a half-isolation signal, (does not shut any isolation valves).	B & D = No isolation A & B or = All 8 MSIV's; No other C & D Groups isolate	
4) Actuation of the A <u>and</u> B <u>or</u> C <u>and</u> D switches will close all eight MSIV's only, (no other groups isolate).		
5) Actuation of the A and D switches will isolate all eight MSIV's. The outboard MSL drain isolation valves and the outboard isolation valves in Groups 2, 4, 6, 8, and 9.	Q: When is this specifically required? A: During Control Room evacuation, (OP-78, Remote Shutdown System). Ask trainees to list the systems isolated in Group 8.	EO-4.0

6) Actuation of the B and C switches will isolate all eight MSIV's, the inboard MSL drain isolation valve, the inboard isolation valves in Groups 2, 4, 5, 7, 8 and 9, and will isolate Group 3.

7) Actuation of all four switches will fully isolate Groups 1-9.

2. Group 10 manual isolation is accomplished on panel 601 with a single pushbutton.

   a. Group 10 manual isolation will only occur with a Reactor Core Isolation Cooling System initiation signal sealed in. (108.8" or manual RCIC initiation by Arm & Press P.B. Depressed))

3. Groups 11 and 12 have no group manual isolation capability.

Q: Which division is this?

A: Div. II.

E. <u>Group 1</u>

1. Main steam isolation valves (MSIV)

   a. Provided to control loss of coolant from the RPV and the release of radioactive material to the environment.

   b. Isolation <u>always</u> picks up both inboard and outboard isolation in contrast to other systems which may only pick up one or the other.

Inboard MSIV's: AOD 6A - D — EO-5.0

Outboard MSIV's: AOD 7A - D

STEAM LINE DRAINS: MOV111, 112, 208 — EO-6.0

Q: What type of logic is used by the MSIV's?

A: "One out of two, taken twice: (i.e., A:DIV I and B:DIV II).

2. Main steam line drains
   a. Same parameters cause isolation as with MSIV's.
   b. Drains do not use 1 of 2 taken twice logic.

Q: What type of logic do MSIV drains use?
A: "Two out of two, taken once:
(A and D or B and C).

3. Isolation Signals
   a. Steamline low pressure (766 psig)

EO-5.0

      1) Indicates failure of steam bypass and pressure control, prevents rapid depressurization and excessive cooldown.
      2) Sensed on each main steam line upstream of TSV's.
      3) Bypassed when mode switch not in RUN.

EO-5.0

   b. Steamline area high temperatures
      1) High MSL Tunnel Temperature $\leq$ 165.7°F.
      2) High MSL Tunnel T $\leq$66.7°
      3) High MSL lead enclosure temperature $\leq$ 146.7°F.
         a) Detects small breaks outside containment not detected by steam line flow sensors.
         b) Indicates break of RCPB.

c. Low condenser vacuum 8.5" Hg vacuum
   1) This isolation is bypassed with:
      a) Mode Switch in startup, refuel or shutdown and,
      b) Main Turbine Tripped (TSV's closed) and,
      c) Main Condenser Low Vacuum B/P (panel 609 and 611) switches in bypass.
   2) Indicates loss of primary heat sink and prevents over-pressurizing the condenser.

Q: Why do we need a low vacuum isolation?
A: See 2 below.

d. RPV triple-low level (+17.8")
   1) Indicates RCPB leak.
   2) Intended to keep level above TAF
   3) This can be jumpered out using EOP-6.

Q: What other functions occur at Level 1?
A: -LPCS/LPCI initiate
-DIV I and II D.G.'s start
-ADS timer initiates (provided 159.3" confirmatory signal prevent)
-Group 1 isolation

EO-5.0

e. Main steam line high flow-103 psid. (Any one line).
   1) High flow indicative of large down-stream break steampiping
   2) Isolate break to:
      a) Minimize inventory loss
      b) Limit rad release

d. High main steam line radiation. (3x normal full power background).
   1) Indicates fuel failure.
   2) Minimizes rad release.
   3) Four detectors located in the vicinity of main steam lines in tunnel such that each detector senses radiation level of all four MSL's.

Note: Detectors are in the main steam tunnel, el. 255'

F. Group 2

1. Reactor Water Sample Valves

Valves: 2RCS*SOV104 EO-5.0
2RCS*SOV105 EO-6.0

   a. Isolation is provided to control the possibility of a breach in the RCPB and/or radiological exposure to operating personnel near the sample station.
   b. Two logic channels cause an inboard valve isolation and two logic channels cause an outboard valve isolation.

Q: Which channels cause the outboard isolation?
A: Channels A and D (two out of two, taken once).

   c. Isolate on RPV double-low level (108.8'), MSL hi-hi rad. (3xNFPB), or due to a manual isolation using the armed collar pushbutton.
      1) Low level indicates an RCPB break
      2) High rad prevents excess exposure near sample station.

G. Group 3

1. Traversing In-Core Probe System

   a. Isolation is provided to control the possibility of a breach in the RCPB and/or radiological exposure to operating personnel.

   b. Isolation uses only two (B and C) of the four logic channels. A trip of both channels must occur to effect isolation.

   c. Isolation causes automatic withdrawal of TIP, isolation of ball valve and isolates indexer N_2 purge.

   d. Signals - double-low level (108.8")
      - Hi DW pressure (1.68#)
      - Manual Isolation (switch armed and depressed
        1) Indicates breach in RCPB

Valves: 2NMS*SOV1A,B,C,D,E
2GSN*SOV166

Q: Where is the Group 3 manual isolation switch? EO-5.0 EO-6.0

A: P603

- Use TP of P603 to show location.

H. Group 4

1. RHS Sample and Discharge to Radwaste Isolation

   a. Isolation is provided to provide integrity of A and B LPCI loops. Not primary containment penetration isolation valves.

   b. Two logic channels cause inboard isolation and two cause outboard isolation.

Valves:	2RHS*MOV142	RHR To Radwaste	EO-5.0
	2RHS*MOV149		
	2RHS*SOV35A	RHR Sample Valves	EO-6.0
	2RHS*SOV35B		
	2RHS*SOV36A		
	2RHS*SOV36B		

EO-5.0
EO-6.0

1) Sample valves have isolation overrides for individual valves.

Use TP of P601 to show location of these overrides.

c. Setpoints:
-RPV level 3 (159.3"0
-DW pressure high (1.68#)
1) Indicates vessel inventory loss or breach in RCPB

I. Group 5

EO-5.0
EO-6.0

1. RHS Shutdown Cooling and Reactor Head Spray Isolation

Valves: 2RHS*MOV104
2RHS*MOV112
2RHS*MOV113
2RHS*MOV40A/B
2RHS*MOV67A/B

a. Isolations are provided to prevent excessive reactor vessel inventory loss due to a leak in the RHS. In addition, a reactor pressure isolation is provided to prevent exceeding the pumps maximum design high water temperature limits.

NOTE: Loss of Div. I or Div. II Power (UPS) will cause both Div I and Div. II isolation from the high RPV pressure isolation. (Ref.: 807E152TY Sh. 12)

b. The logic is arranged such that two channels will cause an inboard valve isolation and two channels will cause an outboard valve isolation.

c. The Div. I isolation will close the RHS head spray isolation valve, the RHS S/D cooling injection valve to A loop, and the outboard RHS shutdown cooling suction valve (MOV-113).

d. The Div. II isolation will close the RHS shutdown cooling injection valve to the B loop and the inboard RHS shutdown cooling suction valve (MOV-112).

e. Setpoints:

1) Low water level (159.3")
2) High reactor pressure (128 psig)
3) RHS equipment area high temperature (135°F)
4) High Reactor Building Ambient Temperature (130°F)
5) Reactor Building Pipe Chase High Ambient Temperature (135°F)
6) Manual Isolation

J. Group 6

1. Reactor Water Cleanup Outboard isolation Valve.

Valve: 2WCS*MOV112

a. Isolations are provided to isolate potential source of RCPB leakage, protect WCS components and support emergency system operation.

b. The logic is arranged so that two channels will close the outboard isolation valve.

Note: Direction on how to override Group 6 and 7 isolations are given in EOP-6, Attachment 11.

EO-5.0
EO-6.0

c. Setpoints:

1) Any of the following Leakage Detection System (LDS) signals:
   a) LDS power failure
   b) WCS area high temperature
      i. Pump Room A-135°F
      ii. Pump Room B-150°F
      ii. Heat Exchanger Room-135°F
   c) Reactor Building pipe chase high ambient temperature - 135°F.
   d) WCS high differential flow suction to discharge flow paths-150.5 gpm for 45 seconds.
2) SLC Pump A start or RRCS start of SLC pump.
3) WCS filter demineralizer high inlet temperature-140°F. (NRHX outlet)
4) Low-Low reactor water level:108.8" (level 2).
5) Manual Isolation

Q: Why is it desirable to isolate WCS when SLC initiates?

A: To prevent WCS from removing boron from the RPV and to preserve the availability of the filter/demins.

K. Group 7 - WCS Inboard Isolation

Valve: 2WCS*MOV102

1. Reactor Water Cleanup System Inboard Isolation Valve
   a. Similar to Group 6 except:
      1) Isolates inboard valve. EO-5.0
      2) Group 7 does not isolate WCS on F/D high inlet temperature. EO-6.0
      3) SLC pump B start or RRCS actuation of B SLC pump.

L. Group 8

1. Containment Auxiliary Systems EO-5.0
   a. Isolation provides and maintain containment integrity. EO-6.0
   b. Isolation signals:
      -RPV L2 (108.8")
      -DW Pressure High (1.68#)
      -Manual Isolation
   c. The logic is arranged so that two channels will cause an outboard isolation and two channels will cause an inboard isolation with the following exceptions:
      1) ADS instrument air lines only use outboard isolations. Two lines are divided between Division I and II.

Q: What systems are in Group 8?

A: DW Equipment Drains
DW Floor Drains
CCP
Cont. MON Sys.
Leakage Det. Sys.
DBA H_2 Recombiners
ADS N_2
Instrument Air
DW Fire Protection (De-Activated)

2) DBA H_2 recombiners and containment monitoring process lines are divided so that A train is isolated using Division I and B train is isolated using Division II.

d. LOCA override switches are provided to allow individual valve control to be restored with an isolation signal present.

1) Overrides provided for:

a) CMS valves (P873)

b) DBA H_2 supply recombiners (P873, 875)

c) IAS to SRV accumulators (P851)

d) ADS nitrogen supply lines (P601)

e) CCP to DW unit coolers (P873)

f) Containment purge (P873, P875)

g) RHR sample valves (P601)

Use TP's of these Control Room panels to point out locations of override switches.

e. Individual systems within the group can also be isolated using manual isolation switches on panel 602. The system which can be individually isolated are:

1) IAS to Drywell

Point out individual system isolation pushbuttons on TP of P-602.

2) DBA H_2 Recombiners
3) DW Floor Drains
4) Leakage Detection
5) DW Equipment Drains
6) CMS
7) CCP to DW Coolers

M. Group 9

1. Containment Purge System — EO-5.0 EO-6.0

a. Isolation provides containment integrity and limits radioactive release to environment.

b. Isolation Signals:
-RPV L2 (108.8")
-DW Pressure High (1.68#)
-SB Gas exhaust high radiation
(5.7×10^{-3} uCi/cc)
-Manual Isolation

c. The logic is arranged so that two channels will cause an outboard isolation and two channels will cause an inboard isolation.

Use TP of P602 to show location.

d. The Group 9 valves can be isolated as an individual group using the containment manual isolation switches on panel 602.

e. The containment purge valves have LOCA override switches which will remove the isolation signal to the containment inlet solenoid operated purge valves and the suppression chamber outlet vent valves as well as lineup nitrogen to operate the suppression chamber inboard outlet valve (AOV-109).

1) LOCA override only overrides high drywell or double low level isolation.

Note: Attachment 25 of EOP-6 gives direction on how to override the high-rad isolation.

N. Groups 10-12

1. Group 10 - RCIC Steam Supply Valve
2. Group 11 - RCIC Vacuum Breakers
3. Group 12 - Remote Manual Valves
   a. These Isolations are discussed in individual system chapters.

O. Post Accident Monitoring System (PAMS)

1. PAM recorder charts shift to fast speed on:
   -reactor double-low level (108.8")
   -reactor high pressure (1050 psig).
2. Each recorder has a reset pushbutton to return it to normal speed when the fast speed initiating signals clear.

III. INSTRUMENTATION, CONTROLS AND INTERLOCKS

A. Instruments

1. Inputs to this system are provided from other reactor plant systems.

B. Indications

Control Room

Use TP's of Control Room panels to point out locations, or utilize simulator if available.

1. PAMS level/pressure recorder (panel 601)
2. Off-Normal Status Board (panel 602)

NOTE: This panel is not presently energized.

   a. Primary containment mimic shows valves on all process lines penetrating containment.
   b. Light-On indicates valve out of normal position.
   c. Amber status lights are available for potential problems with main steam or WCS portion of the ISC system.

3. Excess flow valves position (panel 602)

Point out on TP of P-602.

   a. Close at >5 gpm; reset <1 gpm.
   b. Light-On indicates valve closed.

4. Amber logic seal in light are above individual manual isolation switches.
5. Inboard (outboard) valve relay panel, (panel 622/623).
   a. White indicating lights-indicate trip of inboard valve logic during testing.

b. Following systems tested:
- MSL drains inboard logic
- Gps 3, 8 inboard logic
- WCS inboard logic
- Water level inboard logic
- MSL inboard logic

C. Controls

1. 4 manual isolation switches on panel 602.
2. 20 individual auxiliary system isolation/ reset switches on P602.
3. PAM Recorder reset on panel 601. (2 for DIV I, 2 for DIV II)
4. Logic Reset pushbuttons for Groups 1-9 on panel 602. (10 for each division)
5. Group 10 logic reset keylock switches are located on panel 601. Point out the 2 position collar switches for the auxiliary systems. (On a TP or in the simulator)
6. Isolation logic test switches and MSL low vacuum bypass switches are located on panels 611/609.

D. Interlocks

1. MSL Low Pressure Group one isolation bypassed with mode switch out of run.
2. Low Condenser Vacuum Group one isolation bypassed with mode switch out of run, TSV less than 95% open and bypass switches on panels 609/611 in the bypass position.

EO-7.0

3. The WCS system high differential flow isolation is bypassed for 45 seconds on system startup to allow for flow stabilization.
4. Leakage Detection System bypass switch (panel 632/642) will bypass the WCS high differential flow, all high area temperature isolations and the power failure test pushbuttons, if pushed.
5. Power failure test pushbuttons (panel 632/642) test power loss to containment isolation logic. LDS bypass switch in bypass results in power loss annunciators only.

IV. SYSTEM OPERATION

A. Precautions and Limitations — EO-8.0

1. Discuss the precautions and limitations of OP-83 with trainees.

B. Startup — EO-9.0

1. Review the startup procedure of OP-83 with trainees.

C. Normal Operation

1. Primary Containment Isolation system energized and trips reset. — EO-9.0, EO-10.0

2. Loss of power to ISC results in isolation.

D. Shutdown

1. Once the PCIS is placed in operation, it is not normally shutdown. — EO-9.0
2. Portions of the system can be shutdown for maintenance if allowed by Technical Specifications.
3. De-energizing the PCS logic will result in isolation of those systems controlled by that logic.

E. Testing

1. Tests conducted by <u>single</u> channel (panel 609/611) without causing an isolation.

Note: These panels are not simulated. Show locations of P609/P611 on a TP. — EO-10.0

F. Off-Normal and Annunciator Response — EO-9.0, EO-10.0

1. Review off-normal section of OP-83 with trainees.
2. Review Annunciator Response section of OP-83 with trainees.

Show TP of 602200 Annunciator panel. Read applicable windows to trainees in random order, and have them read response from the procedure. — EO-11.0

3. The Primary Containment Isolation System is utilized to limit the release of radioactive materials in support of the EOP's.

- In the EOP's, direction may be given to override Primary Containment Isolation signals in order to accomplish necessary corrective actions and prevent further equipment/ containment damage.

Utilize EOP-6 Attachments 11, 21, 25 as examples.

V. SYSTEM INTERRELATIONS

EO-12.0

A. AC Power

1. UPS Bus A (Outbd) and Bus B (Inbd)
2. PAM recorders receive 120 VAC power from A & B instrument bus.

Q: Which UPS supplies this power?
A: UPS 3A & B.

B. Leakage Detection System

1. Provides room and area high temperature isolation signals to ISC Groups 1, 4, 5, 6, 7.

Draw on board:
UPS 3A(B) --> EPA's --> isolation logic
--> RPS logic

C. Rx Vessel Inst.

1. Provides ISC with signal inputs of Rx Vessel parameters (level, pressure)

D. Standby Liquid Control

1. Provides isolation signal to WCS upon SLS initiation

E. Rx Protection System

1. Provides isolation signals to ISC for parameters which also cause RPS trip (DW Press, MSL radiation)

F. Condensate System

1. Provides Main Condenser Vacuum signal.

G. Main Steam System

1. Provides steam line pressure and flow signals.
2. ISC will isolate MSIV's and steam line drains.

H. Radiation Monitoring System

1. Provides main steam line radiation signals to Groups 1 and 2 via RPS.
2. Provides GTS discharge to stack signal to Group 9.

I. Traversing In-core Probe

1. ISC causes automatic withdrawal, ball valve isolation and N_2 purge isolation to indexers.

J. Residual Heat Removal System

1. ISC cause RHS sample valves, drains to Radwaste and SDC valves to isolate.

K. Reactor Water Cleanup

1. Auto isolates upon command of ISC system.

L. Redundant Reactivity Control

1. Provides isolation signal to WCS.

EO-13.0

VI. Technical Specifications

A. Review each of the referenced documents with the class.

1. 3/4.3.2 Isolation Actuation

2. 3/4.4.7 Main Steam Line Isolation Valves
3. 3/4.6.3 Primary Containment Valves

VII. RELATED PLANT EVENTS

Review LER 87-55 and LER 88-38 with trainees.

VIII. SYSTEM HISTORY

Review PN2Y87MX201 with trainees.

Note: This is in response to TCO-02-LIC-90-055.

IX. WRAP-UP

A. Review trainee learning objectives.
B. Answer any questions.

Phrase each objective as a question to gauge trainee comprehension.