07-214-91

NINE MILE POINT NUCLEAR STATION UNIT #2

OPERATING PROCEDURE

PROCEDURE NO. N2-OP-32

LOW PRESSURE CORE SPRAY

APPROVALS	SIGNATURES	DATE AND INITIALS REVISION 3	REVISION 4	REVISION 5
Superintendent Operations NMP Unit #2 M.D. Jones	M.D. Jones	5/5/87 FINAL		
Station Superintendent NMP Unit #2 R.B. Abbott	R.B. Abbott	5/6/87 RBA		
General Superintendent Nuclear Generation T.J. Perkins	T.J. Perkins	5/6/87 TJP		

FOR INFORMATION ONLY

Summary of Pages (Cont'd on Cover Sheet 2)

Revision 3 (Effective 5/6/87)

Page	Date
ii,2,30	November 1986
6-8,12,13,15,16,18,20, 38,41-49	March 1987

*Periodic Review, 4/19/91, no changes

NIAGARA MOHAWK POWER CORPORATION

THIS PROCEDURE NOT TO BE USED
AFTER April 1993
SUBJECT TO PERIODIC REVIEW.

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Cover Sheet Continuation (Page 2)

Summary of Pages (Cont'd)

Pages	Date
1	March 1990 (Publication Change)
21-23,29,37,40	November 1990 (TCN-11 and Publication Change *2)
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9	April 1991 (TCN-14)
3,4,14,24	April 1991 (TCN-15)

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REFERENCES

1.0 ESAR

Section 6.3 Emergency Core Cooling Systems

2.0 FLOW DIAGRAMS

FSK-27-5A Low Pressure Core Spray
FSK-27-5B Low Pressure Core Spray
PID-32A Low Pressure Core Spray

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N2-OP-32

LOW PRESSURE CORE SPRAY

A. TECHNICAL SPECIFICATIONS

1.0 Section 3/4.5 - Emergency Core Cooling Systems

2.0 Section 3/4.3.3 - ECCS Actuation Instrumentation

B. SYSTEM DESCRIPTION

LPCS is designed to deliver sufficient spray to each fuel bundle in the core to prevent excessive clad temperatures subsequent to a design bases LOCA without the aid of other low pressure ECCS. Such protection extends to a small and intermediate breaks in which ADS or HPCS has operated to lower the RPV pressure to the operating range of LPCS.

The LPCS system automatically initiates upon receipt of either of the following signals:

- Reactor Vessel Level 1 low level of 17.8 inches (wide range level instrumentation)
- High Primary Containment Pressure of 1.68 psig

For manual initiation, a two-position disarmed/armed maintained contact collar switch and, an initiation pushbutton are provided on P601. (This pushbutton provides DIV I ECCS initiation. In addition to LPCS, the DIV I Diesel and LPCI A will initiate).

LPCS is returned to standby by depressing the reset switch on Panel P601. The LPCS pump and water leg pressure pump are located in the Reactor Building North Aux Bay, elevation 175' level. Normal suppression pool level is between 199'6" and 201' elevation.

LPCS is a completely independent water spray loop consisting of a core spray pump (2CSL*P1), a system water leg pump (2CSL*P2), a sparger ring, spray nozzles, necessary piping, valves, and instrumentation. The LPCS pump (2CSL*P1) takes water from the suppression pool and sprays the water via an injection valve and sparger ring into the plenum chamber above the core. The core spray pump, system water leg pressure pump and all MOV's can be operated remotely from the Control Room panel P601. Process indication is provided in the Control Room on panel P601 (system flow indicator, pump motor ammeter, discharge pressure and valve position indication.)

The LPCS Pump auto start sequence has two different time delays, dependent on the type of the auto start signal. If a LOCA start signal (High Drywell Pressure, Reactor Low Level 1) is present, with no concurrent loss of offsite power, the time delay for automatic start is 10 seconds from receipt of the signal. If a LOOP signal (instantaneous or sustained loss of voltage) is received concurrent with a LOCA signal, the auto start time delay will be 6 seconds from the repowering of the emergency bus. (Note that repowering of the emergency BUS will take approximately 10 seconds for a total time delay for LPCS pump start of 16 seconds.). *

C. OPERATING REQUIREMENTS

1.0	Systems	
1.1	Standby Diesel Generators	N2-OP-100A
1.2	Standby & Emergency A.C. Dist.	N2-OP-72
1.3	Emergency DC Distribution	N2-OP-74A
2.0	Other	
2.1	Suppression pool water level between 199.5 and 201 foot level.	

D. PRECAUTIONS/LIMITATIONS

5.1

1.0 The duty cycle of ECCS MOV's is five (5) cycles, OPEN and SHUT, per hour. Operate the available standby ECCS if the MOV duty cycle limitation is observed.

2.0 Prior to a system test or startup, ensure that the system has been filled and vented, and that the waterleg pressure pump is maintaining injection line pressure above 65 psig.

3.0 Do not permit the LPCS Pump to run on minimum flow more than 30 minutes. Do not permit the LPCS pump to exceed a runout flow of 7800 GPM.

4.0 Ensure LPCS Pump Motor stable full load running current does not exceed 187 Amps.

5.0 Observe the following LPCS pump motor start limitations:

a. Two starts in succession from ambient temperature after which a 60 minute wait is required prior to subsequent start attampts.

b. One start from rated temperature (established after 30 minutes run time), after which a 60 minute wait is required prior to subsequent start attempts.

6.0 LPCS Pump should not be manually started if annunciator 601428 "LPCS HIGH POINT VENT LEVEL LOW" is received to prevent a water hammer.

7.0 With a LPCS logic initiation signal present and the injection valve manual override sealed in (injection valve hand switch taken to the CLOSE position), the LPCS injection valve will not auto open. (This condition is indicated by the illumination of the amber light above the injection valve).

8.0 Do not open Testable Check Valve 2CSL*AOV101 from its control switch when the reactor pressure and LPCS System pressure is not equalized.

9.0 LPCS Suction Valve 2CSL*MOV112 shall remain open during plant shutdown LPCS flow pattern test using RHR and LPCS suction cross connect. This prevents excessive differential pressure across the valve.

10.0 If it is necessary to align the LPCS system to the RHR system (for suction from the Rx Vessel), the setpoints of 2CSL*RV123 and 2CSL*RV134 may be exceeded. It will be necessary to gag these Relief Valves.

11.0 With the RHR system lined up in shutdown cooling mode and the LPCS/RHR removable spool piece installed, LPCS Pump Suction Isolation, 2CSL*V121 must be kept shut to prevent reactor vessel draining to the suppression pool.

12.0 Do not secure or place the LPCS system in MANUAL mode unless, by at least two independent indications, (1) misoperation in AUTOMATIC mode is confirmed, or (2) adequate core cooling is assured. "Misoperation" includes both inappropriate initiation of the LPCS system and continued operation of the LPCS system beyond automatic trip setpoints. If the LPCS system is placed in MANUAL mode, it will not initiate automatically. Make frequent checks of the initiating or controlling parameter. When MANUAL mode is no longer required, restore the LPCS system to AUTOMATIC/STANDBY per Steps F.2.4 and E.1.0.

13.0 A potential for water hammer exists when the LPCS pump is restarted after a pump trip while operating in a flow test mode. Following a loss of power, and prior to pump restart, water can drain down from the piping into the suppression pool creating voids. A restart of the pump without refilling the drained piping can result in severe water hammer. TCN-15

E. STARTUP PROCEDURE

1.0 Startup To Standby

1.1 Verify suppression pool water level is between 199.5 to 201 feet (elevation), at P601.

1.2 Verify Electrical Lineup per Table II.

1.3 Perform Fill and Vent per this procedure.

1.4 Depress LPCI A/LPCS Reset pushbutton. Verify white seal-in light out, at P601.

1.5 Place LPCS Pump 1 CSL*P1 control switch in normal after "STOP" at P601.

1.6 Restore LPCS MANUALLY OUT OF SERVICE pushbutton to normal, at P601.

1.7 Verify Standby Condition Status Checks per this procedure.

2.0 Fill and Vent

2.1 Shutdown To Inoperable per this procedure.

2.2 Verify Valve Lineup per Table I. TCN-15

2.3 Verify Condensate Storage and Transfer System in service per N2-OP-4.

NOTE: When venting from a valve, open until a steady stream of water appears, then shut valve. direct drains to Radwaste or a suitable container. Ensure the container is properly labeled. Contact Radiation Protection for assistance if properly labeled containers are unavailable.

2.4 Open CLS Pump Suction Line Test Conn, 2CSL*V120.

2.5 Uncap and vent from CSL Pump Suction Line Test Conn, 2CSL*V123. Replace cap.

2.6 Shut CSL Pump Suction Line Test Conn, 2CSL*V120.

2.7 Uncap and vent from Waterleg Pump Suction Strainer Test Conn, 2CSL*V7. Replace cap.

2.8 Uncap and vent from Waterleg Pump Suction Strainer Test Conn, 2CSL*V8. Replace cap.

2.9 Uncap and vent from CSL Pump 1 Suction Line Test Conn, 2CSL*V5. Replace cap.

2.10 Open CSL Pump 1 Suction Barrel Vent, 2CSL*V33.

2.11 Vent from CSL Pump 1 Suction Barrel Vent, 2CSL*V11.

2.12 Shut CSL Pump 1 Suction Barrel Vent, 2CSL*V33.

2.13 Vent from CSL Pump 1 Seal Vent, 2CSL*V125.

2.14 Shut LPCS Pump Min Flow, 2CSL*MOV107, at P601.

2.15 Open CSL Pump 1 Discharge Check Bypass, 2CSL*V3.

2.16 Unlock and open Condensate Makeup and Drawoff To CSL, 2CSL*V16.

2.16.1 Vent 2CSL*P1 per Steps E.2.10 through E.2.13.

2.17 Shut CSL Pump 1 Discharge Check Bypass, 2CSL*V3. TCN 12

2.18 Uncap and vent from LS127 Vent, 2CSL*V32.

2.19 Shut and lock Condensate Makeup and Drawoff To CSL, 2CSL*V16.

2.20 Start LPCS/RHR A Water Leg Pump CSL*P2, at P601.

2.21 Vent from LS127 Vent, 2CSL*V32. Replace cap.

2.22 Open Pump 1 Minimum Flow Vlv CSL*MOV107, at P601.

2.23 Notify I & C to vent instrumentation.

2.24 Startup to Standby per this procedure, as required.

F. NORMAL OPERATION

1.0 Standby Condition Status Checks

1.1 Verify the following valve positions at P601;

a. Pump 1 Suction Vlv CSL*MOV112, open.

b. Pump 1 Minimum Flow Vlv CSL*MOV107, open.

c. LPCS Injection Manual Isol Vlv CSL*HCV117, open.

d. Injection Testable Check Vlv CSL*AOV101, shut.

e. Pump 1 Injection Vlv CSL*MOV104, shut.

f. Test Return To Suppr Pool CSL*FV114, shut.

1.2 Verify LPCS Pump 1 CSL*P1 not running, control switch in normal after "STOP", at P601

1.3 Verify LPCS/RHR A Water Leg Pump CSL*P2 running, at P601.

1.4 Verify LPCS Disch Press greater than 65 psig, at P601.

1.5 Verify LPCI 'A'/LPCS white seal in light out.

2.0 Automatic Initiation

2.1 Verify one or more of the following LPCS initiation signals present, at P601:

a. RPV Water Level less than 17.8 inches (level 1).

b. Drywell Pressure greater than 1.68 psig.

2.2 To initiate LPCI A/LPCS (Division I), rotate LPCI A/LPCS Manual Initiation pushbutton collar to "ARMED" and depress pushbutton.

CAUTION

Do not allow the Low Pressure Core Spray pump to operate in a runout flow condition of greater than 7800 GPM.

CAUTION

Do not allow the LPCS Pump to operate on minimum flow recirc for greater than 30 minutes.

2.3 Verify the following at P601/P851:

a. LPCI A/LPCS Reset white seal in light comes on. 3

b. Division I Diesel starts.

c. Pump 1 CSL*P1 starts.

d. Test Return To Suppr Pool CSL*FV114 shuts, if open.

e. Pump 1 Minimum Flow Vlv CSL*MOV107, opens.

f. Pump 1 Injection Vlv CSL*MOV104, opens when RPV Pressure decreases to within 88 psid of LPCS Disch Press. 3

g. RPV injection flow initiates, as indicated by Injection Testable Check Vlv CSL*AOV101, open.

h. Pump 1 Minimum Flow Vlv CSL*MOV107, shuts when LPCS Flow is greater than 1200 gpm.

NOTE: Refer to N2-OP-31 for LPCI A response.

NOTE: LPCS Pump 1 Injection Valve amber override light indicates the control switch has been taken to "CLOSE" with an initiation signal present. 3

2.4 To stop LPCS injection flow, perform the following at P601.

a. Shut Pump 1 Injection Vlv CSL*MOV104.

b. Verify Pump 1 Minimum Flow Vlv CSL*MOV107, opens. 3

2.5 If extended LPCS Pump operation on minimum flow is required, increase system flow per the following, at P601:

a. Verify RPV Water Level greater than 17.8 inches (Level 1).

b. Verify Drywell Pressure less than 1.68 psig.

c. Depress LPCI A/LPCS Reset pushbutton. Verify white seal-in light off.

d. Throttle Test Return To Suppr Pool CSL*FV114, as required to establish LPCS Flow of approximately 6350 gpm. | 3

e. Verify Pump 1 Minimum Flow Vlv CSL*MOV107, shut.

CAUTION

Prior to manually opening LPCS Pump 1 Injection, shut LPCS Test Return To Suppr Pool to prevent a pump runout condition. | 3

3.0 Manual Injection

3.1 Start LPCS Pump 1 CSL*P1, at P601. | 3

3.2 Verify Test Return To Suppr Pool CSL*FV114 shut, at P601.

CAUTION

Do not allow the LPCS pump to operate on minimum flow recirc for greater than 30 minutes.

CAUTION

Do not allow the LPCS pump to operate in a runout flow condition of greater than 7800 GPM.

3.3 Verify Pump 1 Minimum Flow Vlv CSL*MOV107 open, at P601.

NOTE: LPCS Pump 1 Injection Vlv CSL*MOV104, is interlocked shut until RPV pressure decreases to within 88 psid of LPCS Disch Press. | 3

3.4 When LPCS injection is required, perform the following, at P601:

a. Open Pump 1 Injection Vlv CSL*MOV104.

b. Verify LPCS injection flow as indicated by LPCS Injection Testable Check Vlv CSL*AOV101, open. | 3

c. Verify Pump 1 Minimum Flow Vlv CSL*MOV107, shuts when LPCS Total Flow is greater than 1200 gpm.

NOTE: LPCS Pump 1 Injection Valve amber override light indicates the control switch has been taken to "CLOSE" with an initiation signal present.

3.5 To stop LPCS injection flow, perform the following at P601:

a. Shut Pump 1 Injection Vlv CSL*MOV104. | 3

b. Verify Pump 1 Minimum Flow Vlv CSL*MOV107 opens.

3.6 If extended LPCS Pump operation on minimum flow is required, increase system flow per the following, at P601:

a. Verify RPV Water Level greater than 17.8 inches (Level 1).

b. Verify Drywell Pressure less than 1.68 psig.

c. Depress LPCI A/LPCS Reset pushbutton. Verify white seal in light off.

d. Throttle Test Return To Suppr Pool CSL*FV114, as required to establish LPCS Total Flow of approximately 6350 gpm.

e. Verify Pump 1 Minimum Flow Vlv CSL*MOV107 shut. 3

CAUTION

Prior to manually opening LPCS Pump 1 Injection, shut LPCS Test Return To Suppr Pool to prevent a pump runout condition.

G. SHUTDOWN PROCEDURE

1.0 Shutdown To Standby

NOTE: This will be performed per N2-EOP's.

1.1 Depress LPCI A/LPCS Reset pushbutton. Verify white seal in light off, at P601.

1.2 Shut Pump 1 Injection Vlv CSL*MOV104, at P601.

1.3 Verify Pump 1 Minimum Flow Vlv CSL*MOV107 opens, at P601. 3

1.4 Stop LPCS Pump 1 CSL*P1, at P601.

1.5 Restore LPCI A/LPCS Manual Initiation pushbutton collar to "DISARM," as required.

1.6 Verify Standby Condition Status Checks per this procedure.

2.0 Shutdown To Inoperable

2.1 Depress LPCS MANUALLY OUT OF SERVICE pushbutton at P601.

2.2 Place LPCS Pump 1 CSL*P1 control switch in "PULL-TO-LOCK," at P601. 3

2.3 Rack out LPCS Pump, 2CSL*P1, breaker, per Table II.

2.4 Verify Pump 1 Injection Vlv CSL*MOV104 shut, at P601. 3

2.5 Place LPCS Injection, 2CSL*MOV104, MCC breaker to "OFF," per Table II.

NOTE: If performing Fill and Vent, depressurizing LPCS is not required.

2.6 If LPCS is to be depressurized, perform one of the following:

a. Shut Waterleg Pump Discharge Isol, 2CSL*V17.

NOTE: Stopping LPCS/RHR A Water Leg Pump will depressurize RHR A.

b. Stop LPCS/RHR A Water Leg Pump CSL*P2, at P601.

H. OFF NORMAL PROCEDURES

1.0 LPCS Injection Throttling To Support Alternate SDC

NOTE: This will be performed as directed per N2-OP-31.

NOTE: Issuing yellow holdout for lifted leads provides for SSS notification, documentation, and Independent Verification to satisfy AP-6.1 Exclusion requirements of Step 1.3.1.

1.1 Issue yellow holdout to SSS for lifted leads. Independent Verification of tag placement is required. SSS shall sign holdout sheet authorizing placement of tags. TCN-14

1.2 To throttle LPCS injection flow, perform the following:

a. At 2EHS*MCC102C cubicle 15B, remove 2CSL*MOV104 seal in circuitry by lifting leads 1 and 7 from relay 49X-2CSLN04. TCN-14

b. Throttle Pump 1 Injection Vlv CSL*MOV104, at P601 to achieve the desired RPV injection flow.

1.3 When LPCS injection flow throttling is no longer required, then restore lifted leads as follows:

1.3.1 Clear yellow holdout for lifted leads. Independent Verification of tag removal and restoration is required. SSS shall sign holdout sheet authorizing restoration. TCN-14

1.3.2 Land leads lifted in Step 1.2.a.

2.0 This step is deleted.

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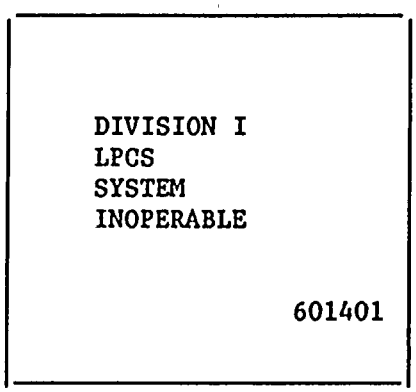
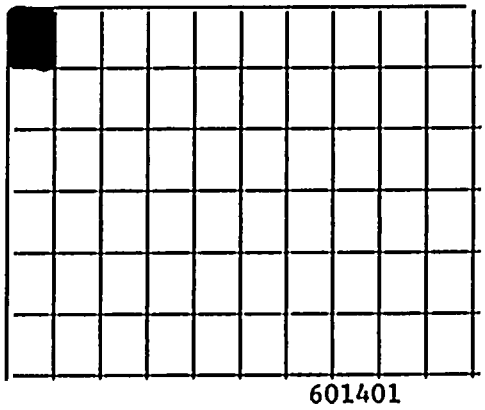
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS

1.0 601401 Division I LPCS System Inoperable

Reflash: No





	Computer Point	Computer Printout	Source	
1.1	CSLBC02	DIV I LPCS SYSTEM	1. LPCS PMP 1 SUCT VLV CSL*MOV112 2. LPCS PMP 1 INJECT VLV CSL*MOV104 3. LPCS PMP 1 MIN FLOW VLV CSL*MOV107 4. LPCS TEST RETURN TO SP CSL*FV114 5. LPCS/RHR A RTN TO SP RHS*MOV30A 6. LPCS PMP 1 SUCT VLV CSL*MOV112 7. LPCS PMP 1 CSL*P1	* 3

Computer Point	Computer Printout	Source
		8. LPCS LINE BREAK
		9. LPCS RELAY LOGIC POWER FAIL
		10. LPCS/RHR A IN TEST STATUS
		11. LPCS TRIP/ UNIT CALIB GROSS FAIL
		12. LPCS TRIP UNIT OOF/ POWER FAIL
		13. LPCS MANUALLY OUT OF SVCE

1.2 Corrective Action

a. Refer to the following INOP windows for response:

b. Refer to Technical Specifications.

Window	Source	Automatic Action
1. LPCS PMP 1 SUCT VLV CSL*MOV112	LPCS Pump Suction, 2CSL*MOV112, loss of control power. (74-2CSLN03)	NONE

Corrective Action

a. Verify 2CSL*MOV112 power supply lineup per Table II and control power fuse installed.

b. Replace control power fuse as required.

Window	Source	Automatic Action	
2. LPCS PMP 1 INJECT VLV CSL*MOV104	LPCS Pump 1 Injection, 2CSL*MOV104, loss of control power. (74-2CSLN04)	NONE	3

Corrective Action

a. Verify 2CSL*MOV104 power supply lineup per Table II and control power fuse installed.

b. Replace control power fuse as required.

Window	Source	Automatic Action	
3. LPCS PMP 1 MIN FLOW VLV CSL*MOV107	LPCS Pump 1 Minimum Flow, 2CSL*MOV107, loss of control power. (74-2CSLN06)	NONE	3

Corrective Action

a. Verify 2CSL*MOV107 power supply lineup per Table II and control power fuse installed.

b. Replace control power fuse as required.

Window	Source	Automatic Action	
4. LPCS TEST RETURN TO SP CSL*FV114	LPCS Test Return To Suppr Pool, 2CSL*FV114, loss of control power. (74-2CSLN05)	NONE	3

Corrective Action

a. Verify 2CSL*FV114 power supply lineup per Table II and control power fuse installed.

b. Replace control power fuse as required.

Window	Source	Automatic Action
5. LPCS/RHR A RTN TO SP RHS*MOV30A	RHR A/LPCS Return to Suppr Pool, 2RHS*MOV30A, valve full shut or control switch in "CLOSE" at P601.	NONE

Corrective Action

a. Open RHR A/LPCS Return to Suppr Pool RHS*MOV30A, as required, at P601.

Window	Source	Automatic Action
6. CSL*MOV112 CLOSED/CS IN CLOSED POSN	LPCS Pump 1 Suction, 2CSL*MOV112, keylock control switch in "CLOSE" at P601, or valve shut as sensed by valve position limit switch.	NONE

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Corrective Action

a. Open LPCS Pump 1 Suction Vlv CSL*MOV112, as required at P601.

Window	Source	Automatic Action
7. LPCS PMP 1 CSL*P1	LPCS Pump 1, 2CSL*P1, loss of control power. (74-2CSLN01)	NONE

Corrective Action

a. Verify 2CSL*P1 power supply lineup per Table II and control power fuse installed.

b. Replace control power fuse as required.

c. Verify LPCS Pump 1 CSL*P1 control switch not in "PULL-TO-LOCK" at P601.

Window	Source	Automatic Action
8. LPCS LINE BREAK	Differential pressure between LPCS and LPCI A injection lines greater than 3.8 psid. (2RHS*PDT18A)	NONE

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Corrective Action

a. Utilize LPCI B/C if available.

Window	Source	Automatic Action	
9. LPCS RELAY LOGIC POWER FAIL	LPCS relay logic loss of power or one of the following test pushbuttons depressed at P629: a. Logic Power Monitor (S15) b. Power Test (S14)	NONE	3

Corrective Action

a. Verify 2CSLN07 power supply lineup per Table II and fuses F1 and F2 installed/not blown at P629.

b. Verify 2CSLN08 power supply lineup per Table II and fuse F10 installed/not blown at P629.

c. Release TEST pushbuttons.

d. Notify I & C.

Window	Source	Automatic Action	
10. LPCS/RHR A IN TEST STATUS	Diesel A Test Jack (J1) jumper installed at P629, or LPCS Power Availability Test keylock switch in "TEST" at P629.	NONE	3

Corrective Action

a. Remove Diesel A Test Jack (J1) jumper at P629, when testing is complete.

b. Restore LPCS Power Availability Test keylock switch to "NORMAL" at P629, when testing is complete.

c. Notify I & C.

Window	Source	Automatic Action	
11. LPCS TRIP UNIT CALIB GROSS FAIL	LPCS Trip Units being calibrated or sensing gross failure, at P629.	NONE	3

Corrective Action

a. Restore calibrated Trip Units to normal.

b. Notify I & C.

Window	Source	Automatic Action	
12. LPCS TRIP UNIT OOF/ POWER FAIL	LPCS Trip Units out of file or sensing loss of power at P629	NONE	3

Corrective Action

a. Restore LPCS Trip Units to file at P629.

b. Verify 2CSLN08 power supply lineup per Table II and fuse F10 installed/not blown at P629. | 3

c. Verify LPCS Power Test pushbutton not depressed at P629. | 3

d. Notify I & C. | 3

Window	Source	Automatic Action	
13. LPCS MANUALLY OUT OF SVCE	LPCS MANUALLY OUT OF SVCE pushbutton depressed at P601.	NONE	3

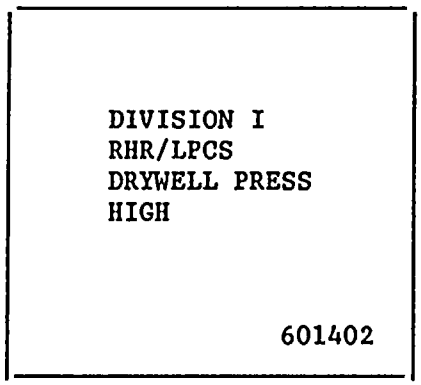
Corrective Action

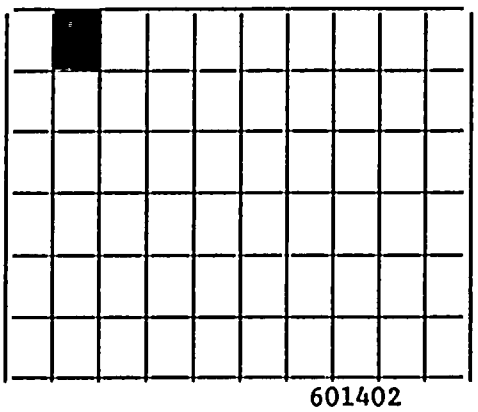
a. Restore LPCS MANUALLY OUT OF SVCE pushbutton to normal, as required, at P601. | 3

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

2.0 601402 Division I RHR/LPCS Drywell Pressure High

Reflash: Yes





2.1

	Computer Point	Computer Printout	Source	
a.	CSLPC07	D1 RHR/LPCS DW PRESS	Drywell press greater than 1.68 psig. (2ISC*PT17A)	* 3
b.	CSLPC08	D1 RHR/LPCS DW PRESS	Drywell press greater than 1.68 psig. (2ISC*PT17C)	* 3

2.2 Automatic Response

a. If both Channels sense high Drywell pressure, the following occurs:

1. Division 1 Emergency Diesel Generator 2EGS*EG1 starts.
2. LPCS system aligns in the injection mode.
3. RHR Loop A aligns in the LPCI mode.
4. RHR Heat Exchanger 1A Inlet Bypass Valve RHS*MOV8A opens and seals in for 10 minutes.
5. RHR Steam Condensing Mode isolates.
6. In conjunction with low RCIC steam supply pressure, RCIC Turbine Exhaust Suppr Pool Vacuum Brkr ICS*MOV164 isolates.

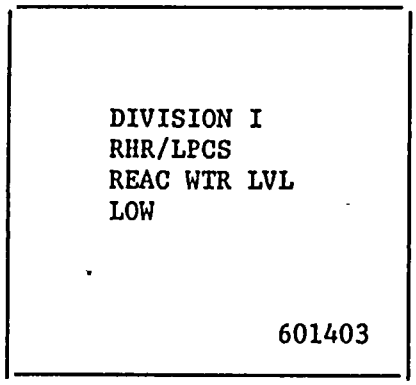
2.3 Corrective Action

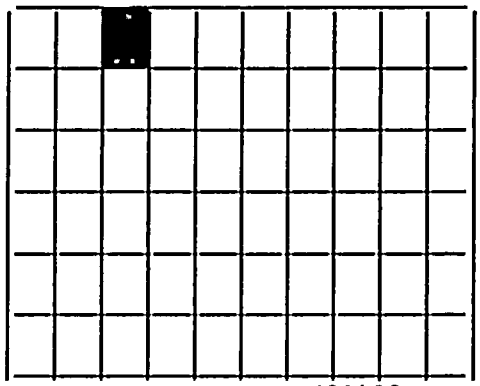
a. Verify by multiple indications alarming condition.
b. Refer to Emergency Operating Procedures.
c. Verify automatic response at P601/P852. 3

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

3.0 601403 Division I RHR/LPCS Reactor Water Level Low

Reflash: Yes





3.1

	Computer Point	Computer Printout	Source	
a.	CSLLC01	D1 RHR/LPCS RX WTR LVL	Reactor water level less than Level 1 (17.8"). (2ISC*LT9A)	*3
b.	CSLLC02	D1 RHR/LPCS RX WTR LVL	Reactor water level less than Level 1 (17.8"). (2ISC*LT9C)	*3

3.2 Automatic Response

a. If both channels sense low Reactor water level, the following occurs:

1. Division 1 Emergency Diesel Generator 2EGS*EG1 starts.
2. LPCS system aligns in the injection mode.
3. RHR Loop A aligns in the LPCI mode.
4. RHR Heat Exchanger 1A Inlet Bypass Valve RHS*MOV8A opens and seals in for 10 minutes.
5. RHR Steam Condensing Mode isolates.

3.3 Corrective Action

a. Verify by multiple indications alarming condition.
b. Refer to Emergency Operating Procedures.
c. Verify automatic response, at P601/P852.

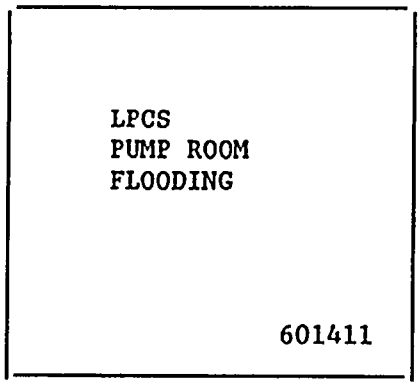
3

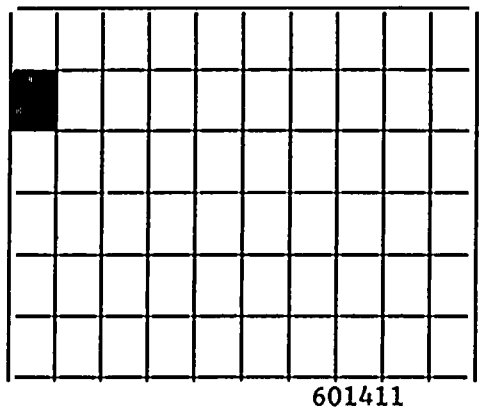
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

4.0 601411 LPCS Pump Room Flooding

Reflash: No

TCN-11





4.1	Computer Point	Computer Printout	Source
	DFRLC10	LPCS PMP RM FLOODING	LPCS Pump Room water level 2 inches above the floor. (2DFR*LS147)

4.2 Automatic Response

NONE

4.3 Corrective Action

a. If Suppression Pool Water Level is lowering, shut LPCS Pump 1 Suction CSL*MOV112, at P601. Shutdown to Inoperable per this procedure.

b. Verify LPCS Pump Room Sump Pumps, 2DFR-P2C and P2D, running at 2CES-PNL513.

c. Refer to Technical Specifications.

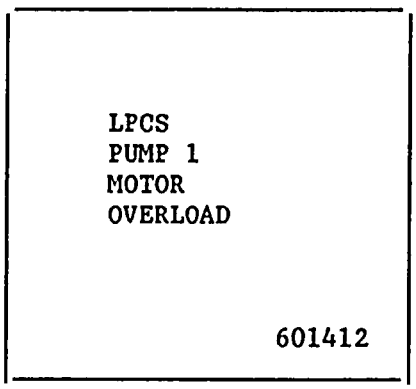
d. Refer to N2-EOP's.

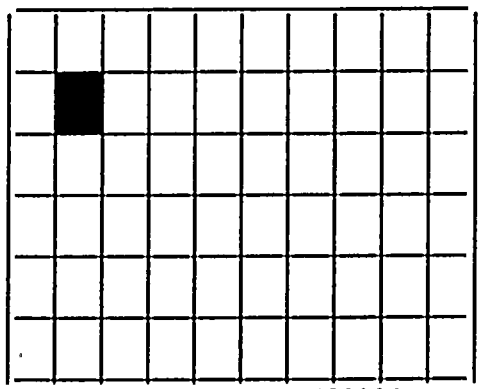
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

5.0 601412 LPCS Pump Motor Overload

Reflash: No

TCN-11





5.1

Computer Point	Computer Printout	Source
CSLTC01	LPCS PMP 1 MOT	LPCS Pump 1, 2CSL*P1, motor overcurrent. (51X-2CSLN01).

5.2 Automatic Response

a. LPCS Pump 1 CSL*P1 trips and is interlocked from starting.

5.3 Corrective Action

a. If initiation signal is present, ensure alternate ECCS available.

b. Refer to Technical Specifications.

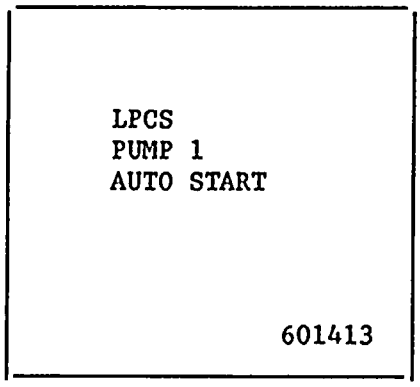
c. Prior to restarting, reset 86-Lockout relay locally at LPCS Pump, 2CSL*P1, breaker, per Table II.

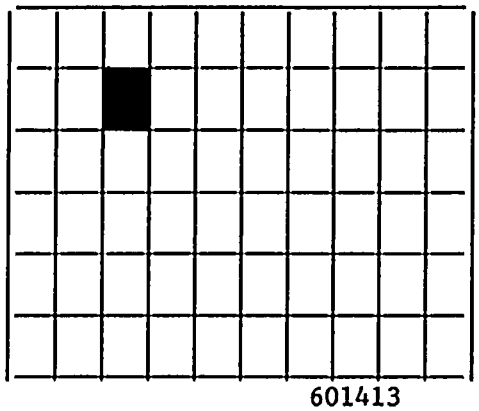
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

6.0 601413 LPCS Pump Auto Start

Reflash: No

TCN-11





6.1	Computer Point	Computer Printout	Source
	CSLBC03	LPCS PMP 1 AUTO START	LPCS Pump 1, 2CSL*P1, breaker closed coincident with control switch in normal after "STOP" at P601.

6.2 Automatic Response

NOTE: The only automatic start signals for the LPCS Pump originate in the LOCA initiation logic. Other non-LPCS automatic actions are: Division 1 Diesel Generator Starts, and the "A" Loop of the RHS System shifts to the LPCI mode.

a. LPCS Pump 1 CSL*P1 starts.

b. LPCS System aligns for injection.

6.3 Corrective Action

a. Verify automatic response, at P601.

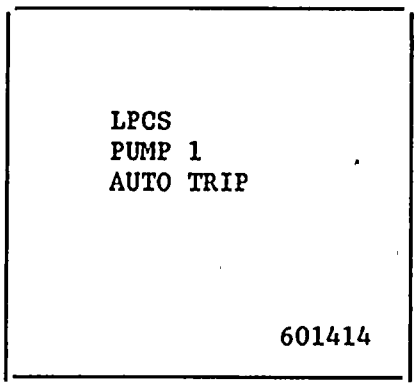
b. Verify by multiple indications the validity of the LOCA initiation.

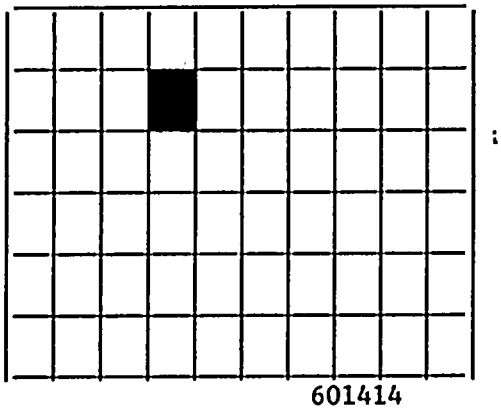
c. Refer to Emergency Operating Procedures.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

7.0 601414 LPCS Pump Auto Trip

Reflash: No





7.1	Computer Point	Computer Printout	Source
	CSLUC01	LPCS PMP 1 AUTO TRIP	LPCS Pump 1, 2CSL*P1, manual or automatic start signal received and breaker not closed.

7.2 Automatic Response

a. LPCS Pump 1 CSL*P1, trips.

7.3 Corrective Action

a. If initiation signal is present, refer to Emergency Operating Procedures.

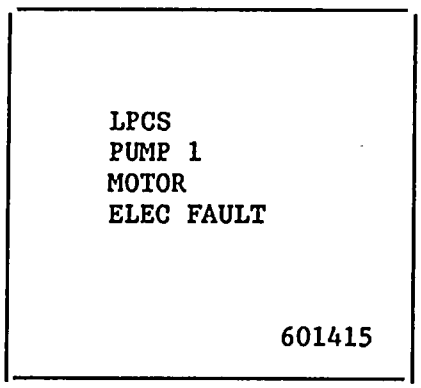
b. Refer to Technical Specifications.

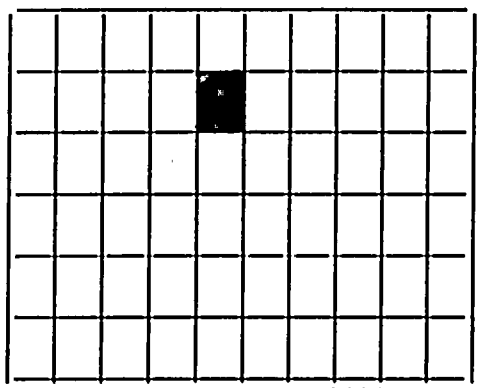
c. Severe water hammer can occur if a pump trip occurs while in the flow test mode and the pump is subsequently restarted. Ensure the system is filled and vented prior to pump restart. TCN 15

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

8.0 601415 LPCS Pump Motor Electrical Fault

Reflash: No





8.1

Computer Point	Computer Printout	Source
CSLUC02	LPCS PMP 1 MOT ELEC	LPCS Pump 1, 2CSL*P1 motor ground. (86-2CSLN01)

* 3

8.2 Automatic Response

a. LPCS Pump 1 CSL*P1 trips.

8.3 Corrective Action

a. If initiation signal is present, refer to Emergency Operating Procedures.

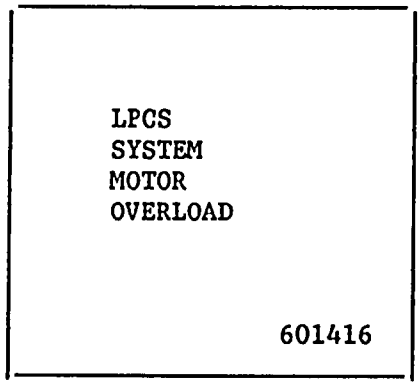
b. Refer to Technical Specifications.

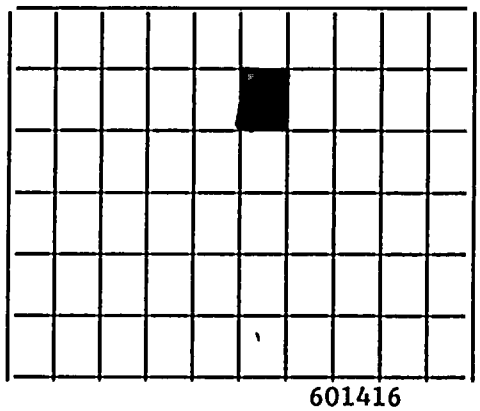
c. Prior to restarting LPCS Pump, reset 86-Lockout relay locally at LPCS Pump, 2CSL*P1, breaker, per Table II.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

9.0 601416 LPCS System Motor Overload

Reflash: Yes





9.1

Computer Point	Computer Printout	Source	
a. CSLTC02	LPCS WTR LEG PMP2 MOT	LPCS/RHR A Water Leg Pump, 2CSL*P2, motor overload. (49X-2CSLN02)	* 3
b. CSLTC03	LPCS SUCT MOV112 MOT	LPCS Pump 1 Suction Valve, 2CSL*MOV112, motor overload. (49X-2CSLN03)	* 3
c. CSLTC04	LPCS INJ MOV104 MOT	LPCS Pump 1 Injection Vlv, 2CSL*MOV104, motor overload. (49X-CSLN04)	* 3
d. CSLTC05	LPCS MIN FLOW MOV107 MOT	LPCS Pump 1 Minimum Flow,2CSL*MOV107, motor overload. (49X-2CSLN06)	* 3
e. CSLTC06	LPCS TEST RTN FV114 MOT	LPCS Test Return To Suppr Pool, 2CSL*FV114 motor overload.(49X-2CSLN05)	*3

9.2 Automatic Response

NOTE: The affected valve(s) will still align in the injection mode in response to an initiation signal.

a. For CSLTC02, LPCS WTR LEG PMP2 MOT, LPCS/RHR A Water Leg Pump, 2CSL*P2, trips. *3

b. For CSLTC04, LPCS INJ MOV104 MOT, LPCS Pump 1 Injection Vlv, 2CSL*MOV104, valve travel stops. *3

c. For CSLTC05, LPCS MIN FLOW MOV107 MOT, LPCS Pump 1 Min Flow, 2CSL*MOV107, valve travel stops. *3

9.3 Corrective Action

a. Verify affected component(s) from computer printout.

NOTE: Remote operation may result in motor damage.

NOTE: Motor overload for 2CSL*MOV104 or 2CSL*MOV107 will render the valve throttleable from P601.

b. If operation is required, position affected valve(s) at P601.

c. If required, position affected valve manually as follows:

1. Place MCC breaker to "OFF" per Table II.

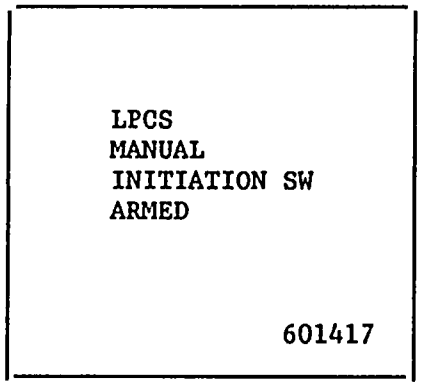
2. Position valve manually.

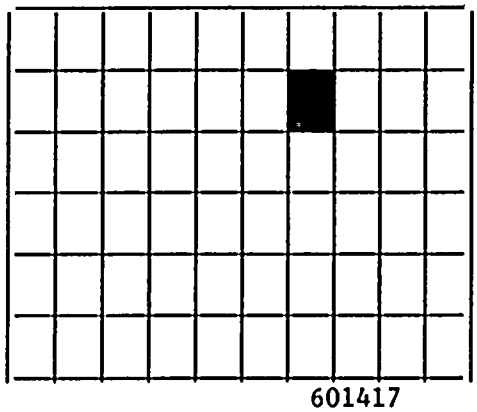
d. Refer to Technical Specifications.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

10.0 601417 LPCS Manual Initiation Switch Armed

Reflash: No





10.1	Computer Point	Computer Printout	Source
	CSLBC04	LPCS MAN INIT SW ARMED	LPCS/RHR A Manual Initiation pushbutton collar rotated to the "ARMED" position.

10.2 Automatic Response

NONE

10.3 Corrective Action

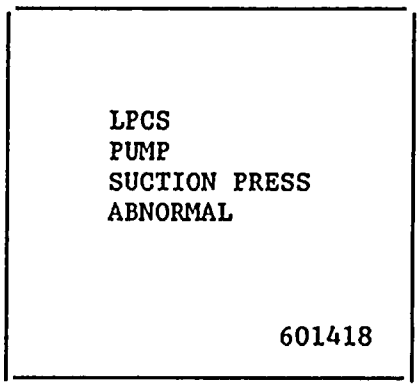
a. Return LPCS/RHR A Manual Initiation pushbutton collar to "DISARM" if initiation is not required.

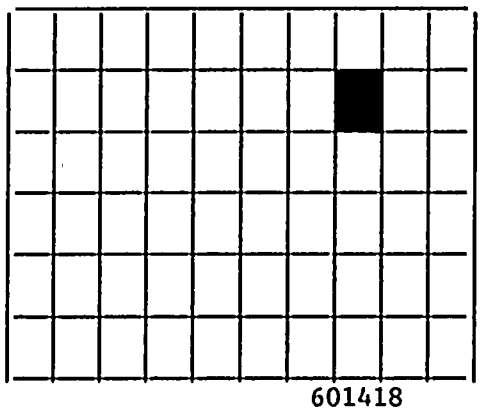
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

11.0 601418 LPCS Manual Suction Pressure Abnormal

Reflash: No

TCN-11





11.1

Computer Point	Computer Printout	Source
CSLPC06	LPCS PMP 1 SUCT PRESS	LPCS Pump suction pressure greater than 50 psig or less than 3.5 psig. (2CSL*PT130)

11.2 Automatic Response

NONE

11.3 Corrective Action

a. Verify LPCS Pump suction pressure locally on 2CSL*PI111.

b. If LPCS operation is not required per N2-EOP's, shutdown per this procedure.

c. For a low suction pressure, verify the following at P601:

1. Suppression Pool Level greater than 199.5' elevation.

2. LPCS Pump 1 Suct Vlv CSL*MOV112 open.

3. CSL*P1 Current less than 167 amps (indicating pump runout).

d. For a high suction pressure, perform the following:

NOTE: High pressure can only occur if RHR and LPCS systems are cross-connected through normally removed spoolpiece between 2CSL*HCV118 and 2CSL*HCV119 during testing.

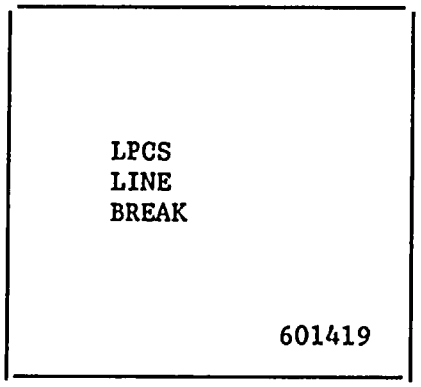
1. Shut RHR Suction Supply To CSL, 2CSL*HCV118 and 2CSL*HCV119.

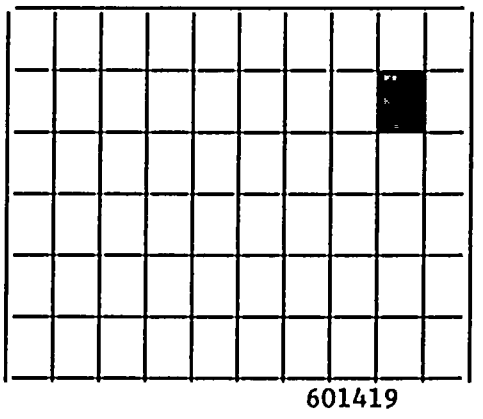
2. Decrease RPV pressure prior to resuming testing.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

12.0 601419 LPCS Line Break

Reflash: No





12.1 Computer Point	Computer Printout	Source	
CSLBC13	LPCS/LINE BREAK	LPCS injection differential pressure greater than 3.8 psid. (2RHS*PDT18A)	* 3

12.2 Automatic Response

NONE

12.3 Corrective Action

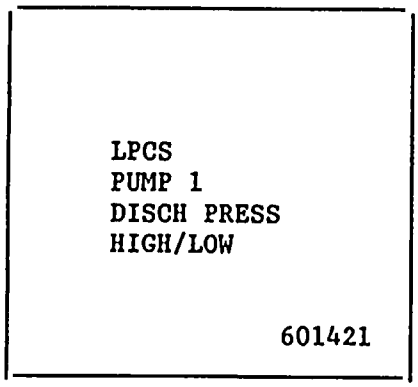
a. Utilize LPCI B/C if injection is required.

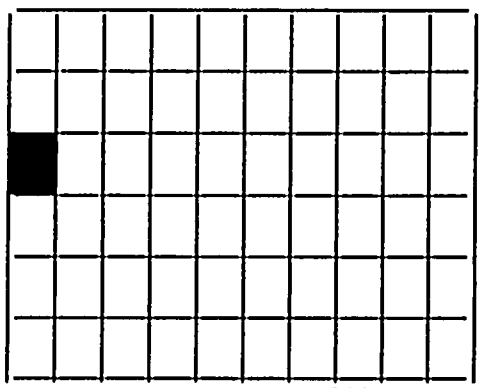
b. Refer to Technical Specifications.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

13.0 601421 LPCS Pump Discharge Pressure High/Low

Reflash: No





13.1	Computer Point	Computer Printout	Source	
	CSLPC01	LPCS PMP1 DISCH PRESS	LPCS Pump discharge pressure greater than 525 psig or less than 62 psig. (2CSL*PT108)	*3

13.2 Automatic Response

NONE

13.3 Corrective Action

NOTE: The Water Leg Pump 2CSL*P2 also supplies the RHR-A System.

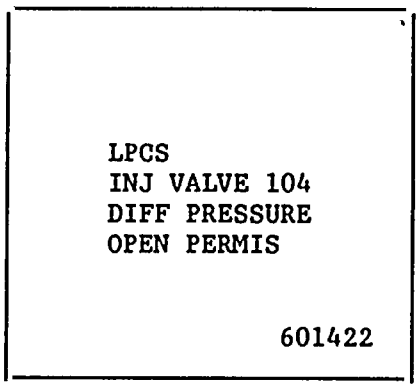
a. Verify LPCS Disch Press at P601.

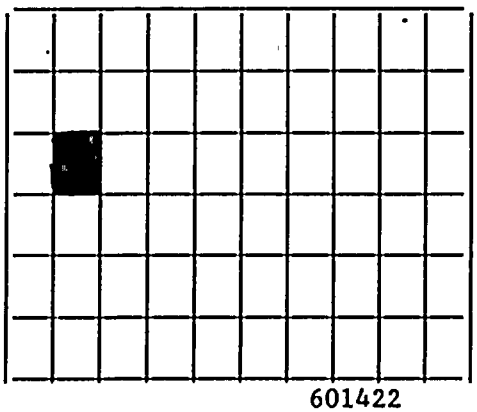
b. If discharge pressure is high, verify LPCS Pump 1 Injection Vlv CSL*MOV104, shut at P601.

c. If discharge pressure is low, verify LPCS/RHR A Water Leg Pump CSL*P2 running at P601.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

14.0 601422 LPCS Inj Valve 104 Diff Pressure Open Permis





Reflash: No

14.1	Computer Point	Computer Printout	Source	
	CSLPC04	LPCS MOV104 DP PERMIS	LPCS Pump 1 Injection, 2CSL*MOV104, differential pressure less than 88 psid. (2CSL*PDT132)	* 3

14.2 Automatic Response

a. If an LPCS initiation signal is present, LPCS Pump 1 Injection Vlv CSL*MOV104 opens.

14.3 Corrective Action

a. If an initiation signal is present (Drywell pressure 1.68 psig or RPV level 1), verify LPCS Pump 1 Injection Vlv CSL*MOV104 opens, at P601.

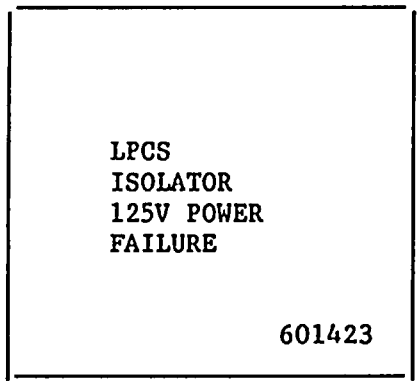
b. If LPCS injection is required per N2-EOP's, open LPCS Pump 1 Injection Vlv CSL*MOV104, at P601.

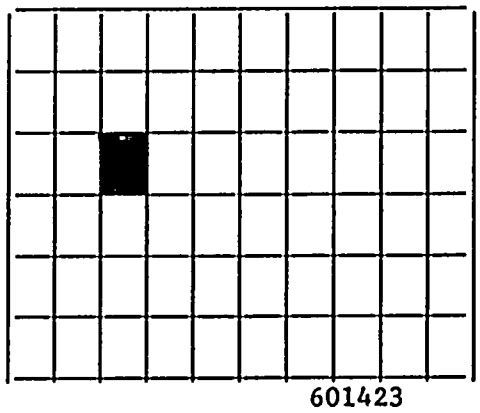
NOTE: This annunciator will normally be energized when the RPV is depressurized.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

15.0 601423 LPCS Isolator 125V Power Failure

Reflash: No





15.1	Computer Point	Computer Printout	Source	
	CSLBC07	LPCS ISOLATOR 125V PWR	Loss of power to digital isolator E21-AT1 at P629.	* 3

15.2 Automatic Response

NONE

15.3 Corrective Action

a. Verify 2CSLN07 power supply lineup per Table II.

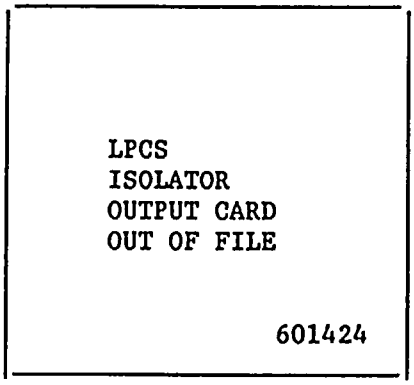
b. Refer to Technical Specifications.

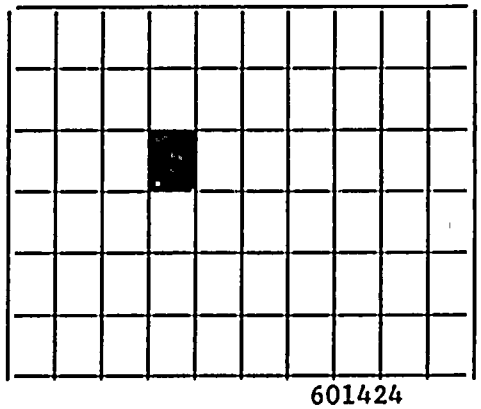
c. Notify I & C.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

16.0 601424 LPCS Isolator Output Card Out Of File

Reflash: No





16.1	Computer Point	Computer Printout	Source	
	CSLBC08	LPCS ISOL OUTPUT CD OOF	LPCS optical isolator output card out of file at P629.	*3

16.2 Automatic Response

NONE

16.3 Corrective Action

a. Replace isolator card that is out of file on Panel P629.

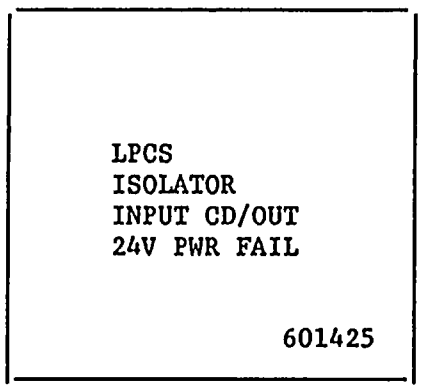
b. Refer to Technical Specifications.

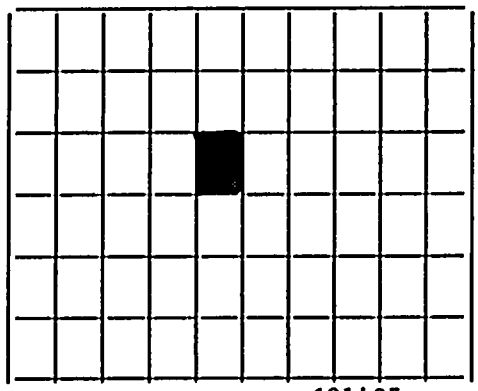
c. Notify I & C.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

17.0 601425 LPCS Isolator Input Card Out Of File or 24V Power Failure

Reflash: No





17.1

Computer Point	Computer Printout	Source	
CSLBC09	LPCS ISO INP CD OUT	LPCS 24VDC optical isolator loss of power or input card out of file at P629.	*3

17.2 Automatic Response

NONE

17.3 Corrective Action

a. Restore input card to file at P629.

b. Verify 2CSLN08 power supply lineup per Table II.

c. Refer to Technical Specifications.

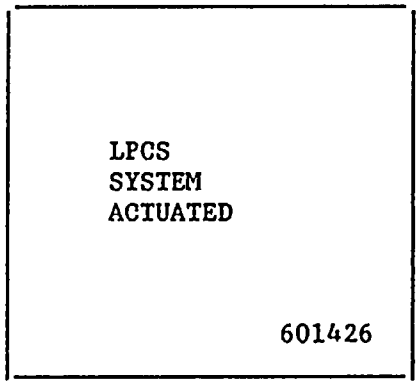
d. Notify I & C.

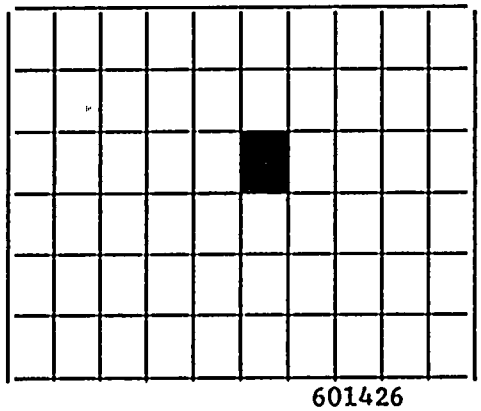
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

18.0 601426 LPCS System Actuated

TCN-11

Reflash: No





18.1	Computer Point	Computer Printout	Source
	CSLBC06	LPCS SYS ACTUATED	LPCS manual or automatic initiation due to one or more of the following: 1. LPCS/LPCI A Manual Initiation pushbutton armed and depressed at P601. 2. Drywell pressure greater than 1.68 psig. (2ISC*PT17A and PT17C) 3. RPV water level less than level 1 (17.8"). (2ISC*LT9A and LT9C)

18.2 Automatic Response

a. Division 1 Emergency Diesel Generator 2EGS*EG1 starts.

b. LPCS system aligns in the injection mode.

c. RHR Loop A aligns in the LPCI mode.

d. RHR Heat Exchanger 1A Inlet Bypass Valve RHS*MOV8A opens and seals in for 10 minutes.

e. RHR Steam condensing mode isolates.

18.3 Corrective Action

a. Verify automatic response, at P601/P852. 3

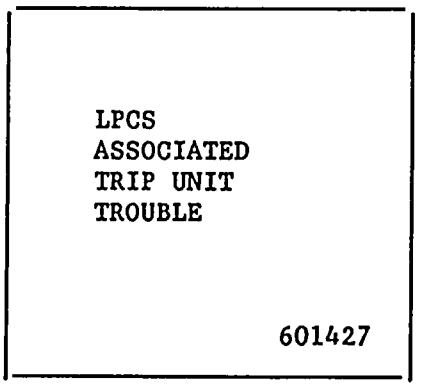
b. Determine which signal initiated the actuation and verify the validity of that signal by multiple indications.

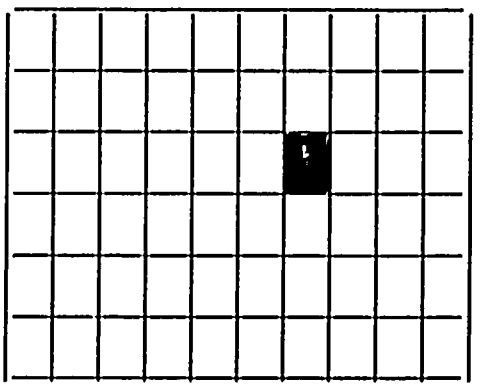
c. Refer to N2-EOP's.

I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

19.0 601427 LPCS Associated Trip Unit Trouble

Reflash: No





19.1	Computer Point	Computer Printout	Source
	CSLBC05	LPCS ASSOC TRIP UNIT	A DIV I Trip Unit sensing one or more of the following at P629 or P632: 1. Out of file 2. Gross failure 3. Loss of power 4. Being Calibrated

* 8

19.2 Automatic Response

NONE

19.3 Corrective Action

a. Check Panel P629 and P632 to determine alarming condition.

b. Verify 2CSLN07 power supply lineup per Table II.

c. Verify 2CSLN08 power supply lineup per Table II.

d. Refer to Technical Specifications.

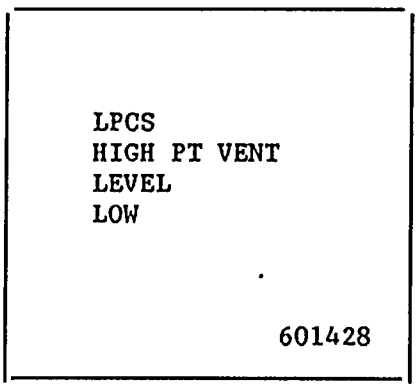
e. Notify I & C.

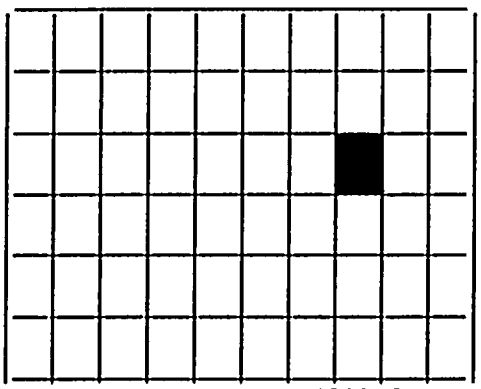
I. PROCEDURES FOR CORRECTING ALARM CONDITIONS (cont.)

20.0 601428 LPCS High Point Vent Level Low

TCN-11

Reflash: No





20.1	Computer Point	Computer Printout	Source
	a. CSLLC03	LPCS HIGH POINT VENT LVL	LPCS injection header high point vent level low. (2CSL*LS127)

20.2 Automatic Response

NONE

20.3 Corrective Action

NOTE: LPCS/RHR A Water Leg Pump 2CSL*P2 supplies the RHR-A System.

a. Verify LPCS/RHR A Water Leg Pump CSL*P2 is running and CSL*P2 Disch Press greater than 65 psig, at P601.

b. Perform LPCS Fill and Vent per this procedure.

c. Visually check for leaks.

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Required Position	Actual Position	Initial & Date	Remarks
2CSL*MOV112	Pump 1 Suction Vlv	Open			P601
2CSL*MOV107	Pump 1 Minimum Flow Vlv	Open			P601
2CSL*FV114	Test Return to Suppr Pool	Shut			P601
2CSL*MOV104	Pump 1 Injection Vlv	Shut			P601
2CSL*AOV101	Injection Testable Check Vlv	Shut			P601
2CSL*HCV117	LPCS Injection Manual Isol Vlv	Locked Open			P601 3
2CSL*EFV1	Excess Flow Check	Open			P602

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*V1	CSL Waterleg Pump Suction	Locked Open			
2CSL*RV134	Waterleg Pump Suction Relief	Not Gagged			
2CSL*V45	Waterleg Pump Suction Strainer Drain	Shut And Capped			
2CSL*V7	Waterleg Pump Suction Strainer Test Connection	Shut And Capped			
2CSL*V8	Waterleg Pump Suction Strainer Test Connection	Shut And Capped			
2CSL*V61	CSL*PT129 Inst Root Isol	Open			
2CSL*V12	Waterleg Pump Recir Isol	Locked Open			
2CSL*V14	Waterleg Pump Discharge Check	Installed			
2CSL*V21	Waterleg Pump Discharge Check	Installed			
2CSL*V17	Waterleg Pump Discharge Isol	Locked Open			
2CSL*FLS1	2CSL*P1 Discharge Spectacle Flange	Not Blocked			

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*V121	CSL Pump Suction Isol Blocking	Locked Open			
2CSL*V120	CSL Pump Suction Line Test Conn	Shut			
2CSL*V124	CSL Pump Suction Line Drain Conn	Shut And Capped			
2CSL*V54	CSL Pump Suction Line Drain Conn	Shut			
2CSL*V123	CSL Pump Suction Line Test Conn	Shut And Capped			
2CSL*V37	CSL Pump Suction Drain To RHS	Shut			
2CSL-V38	CSL Pump Suction Drain to RHS Check	Installed			
2CSL*RV123	CSL Pump Suction Header Relief	Not Gagged			
2CSL*R0125	Waterleg Pump Min Flow Restricting Orifice	Installed			
2CSL*V50	Waterleg Pump Recirc Isol	Locked Open			

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TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*HCV119	CSL Pump Suction From RHR A	Locked Shut			
2CSL*V52	Vent Between 2CSL*HCV118 and 2CSL*HCV119	Shut And Capped			
2CSL*V51	Drain Between 2CSL*HCV118 and 2CSL*HCV119	Shut And Capped			
Blind Flange	Blind Flange Before 2CSL*HCV118	Installed			
Blind Flange	Blind Flange System Side Of 2CSL*HCV119	Installed			
2CSL*HCV118	RHR Suction Supply To CSL Pump	Locked Shut			
2CSL*V26	*PI111, *PT130 Inst Root Isol	Open			
2CSL*V39	CSL Pump 1 Suction Line Low Point Drain	Shut			
2CSL*V122	CSL Pump 1 Suction Strainer Drain	Shut and Capped			
2CSL*V5	CSL Pump 1 Suction Line Test Conn	Shut And Capped			

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*V33	CSL Pump 1 Suction Barrel Vent	Shut			
2CSL*V11	CSL Pump 1 Suction Barrel Vent	Shut			
2CSL*V20	*PT109, *PI103, *PT110 Inst Root Isol	Open			
2CSL*V53	CSL Pump 1 Recirc Isol	Open			
2CSL*HCV115	CSL Pump 1 Recirc Flow Throttle	Locked Throttled			4 1/2 turns open from full shut 3
2CSL*V9	CSL Pump 1 Full Flow Test Return Check	Installed			3
2CSL*V4	CSL Pump 1 Discharge Check	Installed			
2CSL*V3	CSL Pump 1 Discharge Check Bypass	Shut			
2CSL*V2	CSL Pump 1 Discharge Piping Drain	Shut and Capped			

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*V23	*FT126, *FT107, Upstream Inst Root Isol	Open			
2CSL*V22	*FT126, *FT107, Downstream Inst Root Isol	Open			
2CSL*RO106	CSL Pump 1 Discharge Restricting Orifice	Installed			
2CSL*RV105	CSL Pump 1 Discharge Relief	Not Gagged			
2CSL*V46	*LS127 Inst Root Isol	Open			
2CSL*V47	*LS127 Inst Drain	Shut And Capped			
2CSL*V32	*LS127 Inst Vent	Shut And Capped			
2CSL*V24	*PT108 Inst Root Isol	Open			
2CSL*V27	*PDT132 Inst Root Isol	Open			
2CSL*V16	Condensate Makeup And Drawoff To CSL	Locked Shut			3
2CSL*V29	LLRT Conn	Shut			
2CSL*V30	LLRT Conn	Shut And Capped			

TABLE I

VALVE LINE-UP SHEET

Valve No.	Description	Normal Position	Actual Position	Initial & Date	Remarks
2CSL*V34	*PDT132 Inst Root Isol	Open			3
2CSL*V35	LLRT Conn	Shut			3
2CSL*V36	LLRT Conn	Shut			
2CSL*V125	CSL Pump 1 Seal Vent	Shut			

TABLE II

LPCS SYSTEM POWER SUPPLY LINEUP

Component Number	Component Description	POWER SUPPLY Bus Number	Cubicle/ Breaker	NORMAL POSITION	ACTUAL POSITION	INITIALS & DATE	REMARKS
2CSL*P1	Low Pressure Core Spray Pump	2ENS*SWG101	7	Racked In			
2CSL*P2	LPCS Waterleg Pressure Pump	2EHS*MCC102C	16C	ON			3
2CSL*MOV112	LPCS Pump 1 Suction Valve	2EHS*MCC102C	15D	ON			3
2CSL*MOV104	LPCS Pump 1 Injection Valve	2EHS*MCC102C	15B	ON			
2CSL*FV114	LPCS Test Return To Suppr Pool	2EHS*MCC102C	15A	ON			
2CSL*MOV107	LPCS Pump 1 Minimum Flow Valve	2EHS*MCC102C	15C	ON			
2CSL*H1A	LPCS Pump Space Heater	2EJA*PNL100A	3	ON			

TABLE II

LPCS SYSTEM POWER SUPPLY LINEUP

Component Number	Component Description	POWER SUPPLY Bus Number	POWER SUPPLY Cubicle/ Breaker	NORMAL POSITION	ACTUAL POSITION	INITIALS & DATE	REMARKS
2CSLN07	LPCS Initiation Logic	2BYS*PNL201A	2	On			
2CSLN08	LPCS MTU Logic Power Supplies	2VBS*PNL101A	23	On			
2CSLN09	LPCS Indication & Status Lights	2SCM*PNL101A	2	On			
2CSLN11	Digital Isolator AT7 (Div II)	2BYS*PNL201B	12	On			