

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION

JM Patel 8/29/84

GP-18 SCRAM REVIEW PROCEDURE

1.0 PURPOSE

This procedure will ensure that all reactor scrams are analyzed and a determination made that the plant can be safely restarted.

2.0 PREREQUISITES

2.1 Scram condition, automatic or manual.

THIS PROCEDURE IS REQUIRED ONLY ON A SCRAM CONDITION WHEN CONTROL RODS ARE WITHDRAWN AND CONTROL ROD INSERTION OCCURS/OR SHOULD HAVE OCCURRED TO COMPLETE THE SCRAM.

3.0 PROCEDURE

3.1 As soon as the plant conditions permit, Shift Supervision shall initiate GP-18 C.O.L. This C.O.L. is to be filled out by the STA (or Shift Supervision)

3.2 The STA shall review the completed C.O.L. and using this information and interviews with involved personnel, compile an Upset Report. This report should contain applicable recorder traces and copies of the Sequence of Events Log and Post Trip Logs from the process computer and the Sentinel printout from the ERFDS computer.

3.3 An Upset Report shall be written then reviewed by the Engineer-Operations or Engineer-Technical. A copy of the report is to be filed in the station files and copies of the report are to be distributed to other personnel as felt applicable by station management.

3.3.1 The upset report should contain as a minimum the following:

- a. TITLE - the title should be sufficiently descriptive to identify the type of incident and the equipment involved
- b. UNIT STATUS - the status of the unit at the beginning of the upset
- c. SEQUENCE OF EVENTS - a chronological listing of all pertinent events surrounding the upset
- d. DISCUSSION - a free form account of the upset
- e. ANALYSIS - a detailed investigation of the causes of the upset
- f. RECOMMENDATIONS - recommendations on how future occurrences can be prevented
- g. APPENDICES - as many appendices as felt necessary to present supporting documentation may be included
- h. DISTRIBUTION - distribution shall include but is not limited to:
 - i. Station Superintendent
 - ii. Assistant Station Superintendent
 - iii. Operations Engineer
 - iv. Records Management (Station File)

3.4 The Operations Engineer (or alternate) shall review the GP-18 C.O.L. for completeness and content and will ensure there are no unresolved or unexplained conditions. He will then sign the "Reviewed By" line at the end of the C.O.L. and indicate if PORC review is required. PORC review is required for any of the conditions listed below:

3.4.1 A scram with undetermined cause

3.4.2 Unexplained or unidentified action of events

- 3.4.3 Failure of ECCS to properly operate
 - 3.4.4 Failure of any control rods to fully insert
 - 3.4.5 Failure of RPS, NSSSS or other systems subject to Tech. Spec. LSSS to operate as required
 - 3.4.6 Any other significant event as determined by the Operations Engineer or his designated alternate
- 3.5 If the Operations Engineer indicates no PORC review is required, his signature on GP-18 completes the C.O.L. for purposes of GP-2. (GP-2 requires GP-18 to be completed and Plant Superintendent permission to start up).
- 3.6 If PORC review is indicated, the PORC reviews the event to determine if NRB review is required or to determine what actions must be taken prior to start up. NRB reviews the event prior to start up if the event was different from those evaluated in the F.S.A.R or if requested by the PORC.
- 3.7 If no NRB review is required, indication of PORC review in the C.O.L. and completion of actions required by PORC constitutes completion of GP-18 C.O.L.
- 3.8 If NRB review is required, indication of NRB review in the C.O.L. and completion of NRB and PORC items must be completed to constitute a completed C.O.L. for start up.

4.0 REFERENCES

- 4.1 NRC Generic letter 83-28
- 4.2 GP-2
- 4.3 GP-3
- 4.4 GP-4

C.O.L. GP-18 SCRAM REVIEW PROCEDURE

DATE OF SCRAM _____

TIME OF SCRAM _____

INITIATING EVENT

SHORT DESCRIPTION OF INITIATING EVENT

Manual _____

Automatic _____

INITIAL CONDITIONS

Rx Pwr _____ %
Gen Load _____ MWe
Recirc Speed A _____ % B _____ %
RFP's On A _____ B _____ C _____
Cond Pps On A _____ B _____ C _____
Circ Pps On A _____ B _____ C _____ D _____

NOTES

1. This C.O.L. is divided into several sections to allow verification of proper operation of RPS, NSSSS, ECCS, and 4KV and 13KV electrical systems.

2. When this procedure is in use, the following may also be required:

A) Notification of Plant Staff _____ (Name)

B) Red phone report made to NRC 1-hour _____ 4-hour _____ None _____

C) EP-101 Classification Time
Notification Made

Unusual Event _____
Alert _____
Site Emergency _____
General Emergency _____
None of the Above _____

D) Trip Procedures used _____

3. Obtain the Post Trip Data Log and the Sequence of Events Log which print out automatically after the event.
4. Initiate printouts from the ERFDS (ERIS) computer in TSC.
5. If equipment fails to operate as intended, obtain printout on Vibration Monitoring System for each monitored item which malfunctioned.
6. In case of radiation release, obtain printouts from Rad-Met System computer.
7. If any discrepancies from expected automatic actions are noted and indicated, indicate these in Part VII.
8. Perform ST-3-107-640 1 "Reactor Vessel Thermal Transient Monitoring".

PART 1 RPS

1. Record RPS "FIRST IN" annunciator if observed. _____
2. From the computer printout and annunciators, verify the following:

	COMPUTER	ANNUNCIATOR
A) Manual Scram A Trip	_____	_____
B) Manual Scram B Trip	_____	_____
C) Mode Switch in S/D	_____	_____
D) CRD Vol Hi Level	_____	_____
A Channel	_____	
B Channel	_____	
C Channel	_____	
D Channel	_____	

3. Verify the following:
 - A) All rods full in _____
 - B) All 8 RPS rod GPS _____
white lights out
 - C) Scram disch vol isolated _____ Inboard _____ Outboard

4. Was the scram initiated manually?

Yes _____ verify no auto scram signals occurred before the manual scram signal. Go to Part II.

No _____ (auto scram) continue with Step 5 of this section.

5. From the computer printout and annunciators, verify the following and record time from computer for each scram signal:

	COMPUTER	ANNUNCIATOR
A) Auto Scram A Trip	_____	_____
B) Auto Scram B Trip	_____	_____

6. From the computer printout, determine the scram initiating signal and record time on computer for each signal.

Scram initiated By _____

- A) Channel A _____
- B) Channel B _____
- C) Channel C _____
- D) Channel D _____

7. From steps 5 and 6 determine the time from the scram initiating event to the scram signal for each channel by computing the following:

A) 5A. (First Time of 6A or 6C)
_____ - _____ = _____ cycles

B) 5B. (First Time of 6B or 6D)
_____ - _____ = _____ cycles

8. List other scram signals that occurred (use reverse side if more room is needed).

A) _____ C) _____

Channel A _____
B _____
C _____
D _____

Channel A _____
B _____
C _____
D _____

B) _____ D) SCRAM DISCH VOL HI LEVEL

Channel A _____
B _____
C _____
D _____

Channel A _____
B _____
C _____
D _____

9. Check recorder charts to verify automatic actions correctly occurred:

Reactor Level	_____	ARM/IRM	_____
Reactor Pressure	_____	Drywell Pressure	_____
Main Steam Line Rad	_____	Condenser Vacuum	_____

10. List alarm and reset time of all Hi-Flux scrams below and calculate the difference. Verify this is less than 1.5 seconds.

CHANNEL	TIME OF SCRAM SIGNAL	RESET	DIFFERENCE	ACCEPTABLE
A				
B				
C				
D				

NOTE: Time on computer is given in Hours:Minutes:Seconds:Cycles.

If any time exceeds 1.15 seconds (69 cycles = 1 sec and 9 cycles) notify Operations Engineer immediately.

11. Verify that scram times of the rods selected on the scram time recorder are less than seven seconds. _____

(Reference ST 10.9)

12. Briefly describe the cause of the scram.

13. Proceed to Part II.

PART II NSSS GROUP I ISOLATION

1. A Group I isolation signal initiates closure of the MSIV's, the steam line drain valves, and, if the initiating event is either a MSL Hi Rad/Inop, a Vessel Lo-Lo-Lo Level or a Manual Initiation, the steam line sample valves and reactor water sample valves close also.

Group I isolations are initiated by either manual initiation of one-out-of-two twice logic from the following isolation signals:

- 1) Main Steam Line High Radiation
- 2) Reactor Vessel Low Low Low Water Level
- 3) Main Steam Line High Flow
- 4) Steam Tunnel High Temperature
- 5) Main Steam Line Low Pressure (with Reactor Mode Switch in RUN)
- 6) Main Condenser Low Vacuum (this trip is bypassed if B21H-S25A, B, C, & D switches are in BYPASS and the Turbine Stop Valves are less than 90% open).

2. Record Group 1 "FIRST IN" annunciator if observed. _____

3. The following alarms and computer printouts indicate if a Group I isolation should have occurred. Fill in the levels at the time of scram.

Panel 1BC801

<u>Annunciator</u>	<u>Window No.</u>	<u>Alarmed?</u> Y/N	<u>Nominal Initiating Value</u>	<u>Level at time of Scram</u> (Obtained from computer or chart recorder)
DIV 1 NSSSS MSIV INITIATED	1	_____	NA	NA
DIV 2 NSSSS MSIV INITIATED	11	_____	NA	NA

<u>Annunciator</u>	<u>Window No.</u>	<u>Alarmed?</u>	<u>Nominal Initiating Value</u>	<u>Level at time of Scram</u>
(Obtained from computer or chart recorder)				
DIV 3 NSSSS MSIV INITIATED	6	_____	NA	NA
DIV 4 NSSSS MSIV INITIATED	16	_____	NA	NA
NSSSS MANUAL ISOLATION	2	_____	NA	NA
REACTOR LO-LO-LO-LEVEL	12	_____	-129 inches	_____
MAIN STEAM LINE HI FLOW	17	_____	140% (108.7 psid)	_____
STEAM TUNNEL HI TEMP	13	_____	192 F (Tunnel) 165 F (Turbine Bldg)	_____
MAIN STEAM LINE LO PRESS	18	_____	756 psig	_____
MAIN CONDENSER LO VACUUM	7	_____	10.5 psid	_____
<u>Panel 10C800</u>				
1 MAIN STEAM LINE DIVISION I RAD MONITOR HI/DOWNSCALE	26	_____	3X back-ground	_____
1 MAIN STEAM LINE DIVISION II RAD MONITOR HI/DOWNSCALE	27	_____	3X back-ground	_____

4. Should a Group I isolation have occurred? Yes ___ No ___

If yes, go to Step 5.

If no, go to Part III.

5. Did a Group I isolation occur? Yes _____ No _____

Yes _____ Go to Step 6.

No _____ Indicate discrepancies in Part VII and go to Step 6.

6. Observe that the following events occurred:

- A. All MSIV's closed _____
- B. MSL sample valves closed _____
(MSL Hi Rad or Rx Lo-Lo Level only)
- C. MSL drains closed _____
- D. Recirc sample valves closed _____
(MSL Hi Rad or Rx Lo-Lo-Lo Level only)
- E. Mechanical Vac. Pump Tripped _____
(if running)(MSL Hi Rad only)
- F. Main Steam Bypass Leakage
Barrier Block Valves
and Vent Valves _____
(Rx Lo-Lo Level or Hi D/W Press only)

7. Comments:

PART III ECCS

1. Check which of the following alarms occurred:

- A) Reactor Low Level (Level 3) _____ (1AC803)
- B) Drywell High Pressure _____ (1AC/1CC801)
(Div 1/2/3/4)
- C) Reactor Lo-Lo Level (Level 2) _____ (1BC801)
- D) Drywell Hi Press Signal Sealed In _____ (1OC826)
(Div 1/3)
- E) Reactor Lo-Lo-Lo Level (Level 1) _____ (1AC/1CC801)
(Div 1/2/3/4)

2. Should any high pressure ECCS Systems have initiated?

- Yes _____ Go to Step 3
- No _____ Go to Step 23

3. Did HPCI initiate?

- Yes _____ Go to Step 4
- No _____ Go to Step 11

4. Check the following actions

- A) Aux oil pump started _____
- B) HV55-1F003 opened _____
- C) HV55-1F006 opened _____
- D) HV55-1F105 opened _____
- E) Turb. gov. & stop valves opened _____

5. Did HPCI isolate?

- Yes _____ Go to Step 6
- No _____ Go to Step 8

6. Check HPCI isolation initiations

- A) Steam Line Hi Flow alarm _____ (10C847)
- B) Turb. Exh. Hi Press alarm _____ (10C847)
- C) High temp in HPCI, Stm Leak Det. _____
- D) Low Steam line press _____

7. Check the following isolate

- A) HV55-1F002 closed.
- B) HV55-1F003 closed.
- C) HV55-1F041 closed.
- D) HV55-1F042 closed.
- E) HV55-1F100 closed.

8. Did HPCI trip?

Yes _____ Go to Step 9
No _____ Go to Step 10

9. Check the following:

- A) Pump Suct Lo Press alarm
- B) Turb Exh Hi Press alarm
- C) Reactor High-Level alarm
- D) Turbine Overspeed
- E) Low Steam Line Press
- F) Outboard Auto-Isolation
- G) Inboard Auto-Isolation

_____ (10C847)
_____ (10C847)
_____ (1AC803)

10. Comments on HPCI operation

11. Did RCIC initiate?

Yes _____ Go to Step 12
No _____ Go to Step 19

12. Check the following:

- A) RCIC Tubine gov. & SV open
- B) HV50-1F045 opened
- C) HV49-1F013 opened
- D) HV50-1F046 opened
- E) HV50-1F012 opened
- F) 10P219 started

13. Did RCIC isolate?

Yes Go to Step 14
No Go to Step 16

14. Check RCIC isolation initiations

- A) High steam supply line diff. press
- B) Low steam line press
- C) Turb exh. diaph. high press
- D) Steam leak detection
- E) High area temp
- F) High ventilation diff. temp

15. Check the following isolate

- A) HV49-1F008 closed
- B) HV50-112 closed
- C) HV49-1F076 closed
- D) HV49-1F007 closed

16. Did RCIC trip or shut down?

Yes Go to Step 17
No Go to Step 18

17. Check the following:

- A) Div 1 or Div 3 isolation
- B) Overspeed
- C) Low pump suction
- D) High exhaust press

18. Comment on RCIC operation

19. Did ADS timers initiate?

Yes Go to Step 20
No Go to Step 23

20. Did ADS timers go to completion?

Yes No

21. List those ADS SRV's that opened?

E
H
K
M
S

22. Comment on ADS

23. Should any low pressure ECCS systems have initiated?

Yes Go to Step 24
No Go to Part IV

24. Did any RHR initiate?

Yes Go to Step 25
No Go to Step 26

25. Check which of the following occurred:

A) A RHR pump start
B) B RHR pump start
C) C RHR pump start
D) D RHR pump start
E) HV51-1F017A opened
F) HV51-1F017B opened

26. Did any core spray pump start?

Yes Go to Step 28
No Go to Step 29

27. Check which of the following occurred:

- A) A Core Spray pump start
- B) B Core Spray pump start
- C) C Core Spray pump start
- D) D Core Spray pump start
- E) HV52-1F005 opened
- F) HV52-1F037 opened

28. Comment on RHR/Core Spray operation

29. Go to Part IV

PART IV 4KV & D/G OPERATION

1. Should any diesel generators have started? (If yes, circle probable cause)

Yes Go to Step 2
 (LOCA, Loop, Dead Bus, Manual Start, Remote Start)
 No Go to Step 2

2. Should a 4KV fast transfer have occurred?

Yes Go to Step 3
 No Go to Part V

3. Did a loss of power occur?

Yes Go to Step 4
 No Go to Step 6

4. Did a 4KV fast transfer occur?

Yes Go to Step 5
 No Go to Step 6 and list discrepancies in Part VII.

5. List final 4KV breaker positions. (All Breaker prefixed with 152-)

<u>BUS 10A115</u>		<u>BUS 10A116</u>		<u>BUS 10A117</u>		<u>BUS 10A118</u>	
Open	Closed	Open	Closed	Open	Closed	Open	Closed
11507	<input type="checkbox"/> <input type="checkbox"/>	11607	<input type="checkbox"/> <input type="checkbox"/>	11707	<input type="checkbox"/> <input type="checkbox"/>	11807	<input type="checkbox"/> <input type="checkbox"/>
11509	<input type="checkbox"/> <input type="checkbox"/>	11609	<input type="checkbox"/> <input type="checkbox"/>	11709	<input type="checkbox"/> <input type="checkbox"/>	11809	<input type="checkbox"/> <input type="checkbox"/>
11502	<input type="checkbox"/> <input type="checkbox"/>	11602	<input type="checkbox"/> <input type="checkbox"/>	11702	<input type="checkbox"/> <input type="checkbox"/>	11802	<input type="checkbox"/> <input type="checkbox"/>
*11505	<input type="checkbox"/> <input type="checkbox"/>	*11605	<input type="checkbox"/> <input type="checkbox"/>	*11705	<input type="checkbox"/> <input type="checkbox"/>	*11805	<input type="checkbox"/> <input type="checkbox"/>

6. Did any diesel generators start?

Yes Check which D/G started
 (D11) (D12) (D13) (D14)
 No Go to Step 9

7. Did any D/G load

Yes Go to Step 8
 No Go to Step 9

* Feeder to Safeguard 480V Load Center

8. Which D/G bkrs. closed? (Identify with an "X")

<u>DG 11</u>	<u>152-11507</u>	_____
<u>DG 12</u>	<u>152-11607</u>	_____
<u>DG 13</u>	<u>152-11707</u>	_____
<u>DG 14</u>	<u>152-11807</u>	_____

9. Comments on D/G and 4KV operation.

10. Go to Part V

PART V 13KV AND MAIN TURB. GENERATOR

1. Was the main turbine on?

Yes Go to Step 2
No Go to Part VI

2. Turb. trip was:

Manual _____
Automatic _____

3. Record Turbine Trip "FIRST IN" annunciator if observed. _____

4. Should a 13KV transfer have occurred?

Yes Go to Step 5
No Go to Step 7

5. 13KV transfer was:

Automatic _____ Go to Step 6
Manual _____ Go to Step 7
Did not occur _____ Go to Step 7 and list discrepancy in Part VII.

6. Verify the following:

- A) A recirc Pp trip _____
(Indication on C602) BKR 252-10103 Compu ID C1067
B) B recirc Pp trip _____
(Indication on C602) BKR 252-10203 Compu ID C1068
C) Fast transfer was to bkr(s) _____
bkr(s) _____

7. Verify the following actions:

A) Stop valve not open trip. Annunciator _____

Channel A Computer _____
B _____
C _____
D _____

B) Turb. CV close trip. Annunciator _____

Channel A Computer _____
B _____
C _____
D _____

- C) Gen. protective lockout 386B trip _____
(Loss of field, Gen exc, transf Prot)
- D) Gen. protective lockout 386F trip _____
(Gen Excit. over, Ground Overcurrent)
- E) Gen. output bkrs. trip _____
(Bkr's 452-535 & 452-635)
- F) Gen. Fld. Bkr. trip _____
(At C654 Indication _____, 1AC854 Alarm _____)

8. List other gen. lockout relays that are flagged.

_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments:

PART VI

1) To allow for future reconstruction of the event, list the names of the following individuals.

Shift Superintendent	_____
Shift Supervisor	_____
Chief Operator	_____
ACO	_____
ACO	_____
STA	_____
PO	_____
APO	_____
AO	_____
Helper	_____

List any other personnel involved and their work groups.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PART VII ANOMALIES AND REVIEWS

1. List all automatic actions which failed to occur.

2. List any unresolved or unexplained conditions noted in this procedure.

C.O.L. Completed By _____

STA Review By _____

NOTE: THE FOLLOWING STEPS ARE TO BE COMPLETED BY THE OPERATIONS ENGINEER OR ALTERNATE AS APPLICABLE.

- | <u>PORC</u> Review Required Due To: | <u>CHECK</u> |
|--|--------------|
| A) Undetermined cause of scram. | _____ |
| B) Unexplained or unidentified actions or events. | _____ |
| C) Failure of ECCS to properly operate. | _____ |
| D) Failure of all control rods to fully insert. | _____ |
| E) Failure of RPS, NSSSS, or other systems subject to LSSS to operate as required. | _____ |
| F) Other significant event as determined by <u>Operations Engineer</u> . | _____ |
| G) No <u>PORC</u> review required. | _____ |

Reviewed By _____

(Operations Engineer or Alt.)

4. List Items Requiring PORC Review

5. List Actions Required By PORC Review

6. PORC Review Complete and all Actions Required by PORC completed

_____/_____/_____
PORC MTG. NO. INITIAL DATE

7. Was an NRB Review Required Yes ___ Go To Step 8

No ___ End

8. Describe Conditions Warranting NRB Review

9. Describe Actions Required by NRB Review

10. All Actions Required by NRB Review Are Completed

INITIAL