

## SCENARIO 09 OVERVIEW

VCT level channel, LT-114, fails high (Event 1) over a 1 minute ramp. The failure of LT-114 will cause letdown to divert to the LHUT, but with no associated alarms until the level drops. With LT-114 failed high, a swap to the RWST is prevented. Upon discovery of the failed channel, the SFM enters OP AP-19. The BOP is directed to realign letdown to the VCT. The RO should restore VCT level.

(Event 2) The SFM is notified by Chemistry of RCS activity increase indicating failed fuel. Chemistry requests 120 gpm letdown to help clean up the RCS. A second Charging Pump is started to support the increased letdown Current sample results are: 63 microcuries/gram Dose Equivalent I-131 and 120/E-bar gross radioactivity. The SFM should refer to Tech Spec 3.4.8.

(Event 3) The SFM determines that a shutdown is required per Tech Spec 3.4.8 actions a and b. The SFM directs the BOP and RO in shutting down the plant per OP L-4.

A S/G 1-3 tube leak occurs, 0 to 20 gpm over 3 minutes (Event 4). The RO and BOP should identify the indications of a tube leak and report them to the SFM. The SFM should enter and take actions per OP AP-3, Steam Generator Tube Failure. The leak should be estimated at less than 50 gpm and the normal shutdown should be continued.

PZR level channel, LT-459 fails low (Event 5). PZR heaters are turned off and Letdown Isolation occurs. Charging flow increases and actual PZR level increases. The failed channel is identified and PZR level control is placed in manual. The SFM enters OP AP-5 due to the level channel failure. An alternate channel is selected. Letdown is reestablished and PZR level control is returned to auto.

S/G 1-2 Main Steam Line break inside Containment (Event 6) results in an ESFAS actuation. The reactor will trip but Auto Safety Injection fails to actuate on both trains (Event 7). The crew will have to manually initiate Safety Injection. The SFM enters EOP E-0 and transitions to EOP E-1. The crew should be aware that the steam supply to the TDAFP from S/G 1-3 will be contaminated. If the steam supply from S/G 1-2 is not isolated early, it will be isolated per EOP E-2.

As the crew takes action to isolate the faulted S/G 1-2, the tube leak on S/G 1-3 increases from 20 gpm to 400 gpm (Event 8). The crew will transition from EOP E-2 to EOP E-3, based on secondary radiation or increasing S/G 1-3 level. Action will be taken to isolate the ruptured S/G 1-3. Both steam supplies to the TDAFP should be isolated and AFW Pp 1-3 should be cross tied to feed all four S/Gs.

|                     |  |               |                  |              |   |
|---------------------|--|---------------|------------------|--------------|---|
| Facility:           | DCPP Units 1 & 2   | Scenario No.: | 9                | Op-Test No.: | 2 |
| Examiners:          | _____  |               | Operators: _____ |              |   |
|                     | _____  |               | _____            |              |   |
|                     | _____  |               | _____            |              |   |
| Objective:          | Evaluate the crew's ability to diagnose and respond to a VCT level channel failing high.               |               |                  |              |   |
|                     | Evaluate the crew's ability to diagnose and respond to an increase in RCS activity requiring shutdown. |               |                  |              |   |
|                     | Evaluate the crew's ability to diagnose and respond to a S/G tube leak of 20 gpm.                      |               |                  |              |   |
|                     | Evaluate the crew's ability to diagnose and respond to a PZR level channel failing low.                |               |                  |              |   |
|                     | Evaluate the crew in using EOPs during a Main Steam Line break inside Containment.                     |               |                  |              |   |
|                     | Evaluate the crew's ability to diagnose and respond to an Auto Safety Injection fail to activate.      |               |                  |              |   |
|                     | Evaluate the crew in using EOPs during a S/G Tube rupture.   |               |                  |              |   |
| Initial Conditions: | 100% power, equilibrium xenon, Middle of cycle (IC-25)   |               |                  |              |   |
| Turnover:           | .25 gpd leak on S/G 1-3. AFW Pp 1-2 is OOS for 24 hrs. D/G 1-1 is OOS for 8 hrs.                       |               |                  |              |   |
|                     | Severe Weather; high winds 30-40 mph.  |               |                  |              |   |

| Time min | Event No. | Malf. No. | Event Type*  | Event Description  |
|----------|-----------|-----------|--------------|--|
| 3        | 1         | xmt cvc20 | I, BOP       | VCT level channel, LT-114, fails high.                                 |
| 5        | 2         |           | C, SFM       | Notified by Chemistry of RCS activity increase indicating failed fuel. |
| 5+       | 3         |           | N/R, RO, SFM | Shutdown per Tech Specs 3.4.8 actions a and b.                         |
| 15       | 4         | mal       | C, RO        | S/G 1-3 tube leak (0 to 20 gpm over 3 minutes)                         |

|                            |   |                              |               |  |
|----------------------------|---|------------------------------|---------------|--|
|                            |   | rsc4c                        |               |  |
| 30                         | 5 | xmt<br>pzc40                 | I, RO,<br>SFM | PZR level channel, LT-459, fails low.                  |
| 40                         | 6 | mal<br>mss2b                 | M, All        | S/G 1-2 Main Steam Line break inside Containment.      |
| cond<br>on trip            | 7 | mal<br>ppl3a<br>mal<br>ppl3b | C, RO,<br>SFM | Auto Safety Injection fails to actuate on both trains. |
| cond<br>on<br>progre<br>ss | 8 | malrsc4<br>c                 | M, All        | S/G 1-3 tube leak increases from 20 gpm to 400 gpm.    |

\* (N)ormal      (R)eactivity      (I)nstrument      (C)omponent      (M)ajor



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p-Test No.: 2 Scenario No.: 9 Event No.: 2 Page 2 of 9

Event Description : \_\_\_\_\_ Notified by Chemistry of RCS activity increase indicating failed fuel  
 \_\_\_\_\_  
 \_\_\_\_\_

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      | BOP      | Place 120 gpm letdown in service as directed by SFM <ul style="list-style-type: none"> <li>Go to OP B-1A:XII step 6.13</li> </ul>  |
|      |          | Coordinate with RO to start a second CCP and place 120 gpm letdown in service  |
|      | RO       | Coordinate with BOP to start a second CCP and place 120 gpm letdown in service   |
|      |          | Monitor Regenerative HX outlet temperature and increase charging as required   |
|      | SFM      | Direct crew to place 120 gpm letdown in service per Chemistry request  |
|      |          | Consult Tech Spec 3.4.8 concerning RCS sample results of 63 microcuries/gram Dose Equivalent I-131 and 120/E-bar gross radioactivity   |
|      |          | Determines shutdown required per Tech Specs 3.4.8 actions a and b. <ul style="list-style-type: none"> <li>Be in at least Hot Standby with T-avg less than 500° F within 6 hours</li> </ul> |

-Test No.: 2 Scenario No.: 9 Event No.: 3 Page 3 of 9

Event Description : Shutdown per Tech Specs 3.4.8 action a.

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | BOP      | Monitor primary and secondary parameters during ramp  |
|      | RO       | Initiate boration for ramp to go off line <ul style="list-style-type: none"> <li>• Operate the makeup system mode selector switch</li> <li>• Operate the boric acid integrator</li> </ul> |
|      |          | Set up the DEHC <ul style="list-style-type: none"> <li>• Place MW feedback in service</li> <li>• Set MW reference</li> <li>• Set load rate</li> </ul>                                     |
|      |          | Commence ramp at approximately 5 MW/min to go off line within 6 hours   |
|      |          | Monitor T-avg and T-ref and borate as necessary   |
|      | SFM      | Review precautions and limitations of OP L-4 and conduct tail board briefing  |
|      |          | Direct RO to commence a ramp to go off line and cooldown to < 500° F within   |

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|--|--|---------|
|  |  | 6 hours |
|--|--|---------|

: No.:   2  Scenario No.:   9   Event No.:   4   Page   4   of   9  Event Description:            S/G 1-3 tube leak (0 to 20 gpm over 3 minutes)

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      | BOP      | Acknowledge SJAE, Main Steamline high radiation (RM-72, and S/G Blowdown high radiation alarms and report to SFM <ul style="list-style-type: none"> <li>• Check radiation monitors</li> <li>• Check proper S/G Blowdown isolation</li> </ul> |
|      |          | Take actions as directed by SFM  |
|      | RO       | Recognize symptoms of a SGTR and report to SFM   |
|      |          | Stop power ramp and stabilize plant to estimate leak size  |
|      |          | Estimates primary leak size at less than 50 gpm  |
|      |          | Continue power ramp down per SFM direction   |
|      | SFM      | Go to AR PK11-06, SJAE High Rad<br>Go to OP AP-3, Steam Generator Tube Failure   |
|      |          | Direct RO to determine leak rate <ul style="list-style-type: none"> <li>• Charging / letdown mismatch</li> <li>• STP R-10C</li> </ul>  |

|  |  |   |
|--|--|---|
|  |  | <ul style="list-style-type: none"><li>• OP O-4, Appendix A, S/G Tube Leakage Estimation</li></ul> |
|  |  | Direct RO to continue ramp to go off line   |

Form No.: 2

Scenario No.: 9 Event No.: 5 Page 5 of 9

Event Description: PZR level channel, LT-459, fails low

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | BOP      | Recognize indications of a PZR level channel failing low and report to SFM <ul style="list-style-type: none"> <li>• Letdown isolation</li> <li>• Alarms PK05-21, PZR Level Hi/Lo and PK05-22, PZR Level Hi/Lo Control</li> <li>• LT-459 indicating lower than other channels</li> </ul> |
|      | RO       | Recognize indications of a PZR level channel failing low and report to SFM <ul style="list-style-type: none"> <li>• PZR level alarms</li> <li>• PZR heaters off</li> </ul>  |
|      |          | Place PZR level control in manual and restore PZR level   |
|      |          | Select an alternate channel for control and restore auto level control <ul style="list-style-type: none"> <li>• Restore PZR Heaters</li> </ul>  |
|      | SFM      | Acknowledge reports from BOP / RO   |
|      |          | Go to AR PK05-21, PZR Level Hi/Lo<br>Go to OP AP-5 and direct operator recovery actions <ul style="list-style-type: none"> <li>•</li> </ul>   |

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|  |  | Direct RO to take manual control of charging <ul style="list-style-type: none"><li>• Direct RO to select an alternate channel</li><li>• Direct BOP / RO to reestablish letdown and restore auto level control</li></ul> |
|  |  | Contact Maintenance Services to trouble shoot and repair LT-459   |
|  |  | Consult Tech Spec 3.3.1 <ul style="list-style-type: none"><li>• Trip inoperable channel in 6 hours</li></ul>  |

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Event Description: S/G 1-2 Main Steam Line break inside Containment / No auto SI

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | BOP      | Recognize and report Main Steam Line break inside containment indications <ul style="list-style-type: none"> <li>Increasing Containment pressure</li> </ul>   |
|      |          | Perform Immediate Actions of EOP E-0  |
|      |          | Isolate the faulted S/G as directed by the SFM<br>** Critical Task  |
|      | RO       | Recognize and report Main Steam Line break inside containment indications   |
|      |          | Recognize and report Safety Injection initiated but not actuated (May do manual SI prior to auto initiation) <ul style="list-style-type: none"> <li>Performs manual SI as directed by SFM</li> </ul> ** Critical Task |
|      |          | Perform Immediate Actions of EOP E-0  |

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Description: S/G 1-2 Main Steam Line break inside Containment / No auto SI (continued)

| Time | Position | Applicant's Actions or Behavior   |
|------|----------|---|
|      | SFM      | Acknowledge reports from BOP / RO of Main Steam Line break inside containment   |
|      |          | Acknowledge report of Safety Injection initiated but not actuated (May direct manual SI prior to auto initiation) <ul style="list-style-type: none"> <li>• Direct RO to do a manual SI</li> </ul> <b>** Critical Task</b> |
|      |          | Go to EOP E-0 and direct operator actions   |
|      |          | Direct transition to EOP E-2 and direct isolation of faulted S/G 1-2 (may have been isolated early)   |
|      | NOTE:    | On transition to EOP E-2, S/G 1-3 tube rupture will be initiated (Event 8)  |

Scenario No.: 9 Event No.: 8 Page 8 of 9  
 Event Description: S/G 1-3 tube leak increases from 20 gpm to 400gpm

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      | BOP      | Recognize and report indications of S/G 1-3 tube rupture <ul style="list-style-type: none"> <li>Increasing level in S/G 1-3</li> <li>Rapid drop in PZR</li> </ul>            |
|      |          | Isolate S/G 1-3 as directed by SFM <ul style="list-style-type: none"> <li>Close steam supply to TDAFP even though it is the only source of steam</li> </ul> ** Critical Task |
|      |          | Direct local cross tie of AFW Pp1-3 discharge <ul style="list-style-type: none"> <li>Feed S/G 1-1 and 1-4 for cooldown</li> </ul>  |
|      |          | Coordinate with the RO to initiate an RCS cooldown using the 10% steam dumps per EOP E-3<br>** Critical Task   |
|      | RO       | Recognize and report S/G 1-3 tube rupture  |
|      |          | Coordinate with BOP to initiate an RCS cooldown per EOP E-3 <ul style="list-style-type: none"> <li>Determine required core exit temperature</li> </ul>                       |

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t No.:   2   Scenario No.:   9   Event No.:   8   Page   9   of   9    
 Event Description:            S/G 1-3 tube leak increases from 20 gpm to 400gpm   (continued)

| Time | Position | Applicant's Actions or Behavior  |
|------|----------|--|
|      | SFM      | Acknowledge reports from BOP / RO of indications of S/G 1-3 tube rupture   |
|      |          | Transition to EOP E-3  |
|      |          | Direct isolation of S/G 1-3 per EOP E-3 <ul style="list-style-type: none"> <li>• Direct closure of steam supply to TDAFP even though it is the only source of steam</li> </ul>       |
|      |          | Direct local cross tie of AFW Pp1-3 discharge <ul style="list-style-type: none"> <li>• Direct feed to S/G 1-1 and 1-4 for cooldown</li> </ul>  |
|      |          | Direct the BOP and RO to initiate an RCS cooldown using the 10% steam dumps per EOP E-3 <ul style="list-style-type: none"> <li>• Determine required core exit temperature</li> </ul> |

## NRC SCENARIO 09 SETUP

### SIMULATOR SET-UP

| CONSOLE ENTRY  | DESCRIPTION  |
|----------------|--|
| INIT 25        | Initialize the simulator at 100% power, equilibrium xenon, MOL   |
| DRILL 6090     | <ul style="list-style-type: none"><li>• Clears D/G 1-1</li><li>• Clears AFW Pp 1-2</li><li>• S/G 1-3 has 0.25 gpd (0.0002 gpm) tube leak</li></ul>   |
| Control Boards | <ul style="list-style-type: none"><li>• Place D/G 1-1 mode select switch in manual</li><li>• Place CAUTION stickers on:<ul style="list-style-type: none"><li>• D/G 1-1 mode select switch and breaker</li><li>• AFW 1-2 control switch</li></ul></li></ul> |

## NRC SCENARIO 09 SETUP

### CONTROL BOARD SETUP

- Copies of all commonly used forms and procedures
- Any tags placed/removed as necessary
- Plant Abnormal Status Board updated as necessary
- Circuit Breaker Flags taken to correct position
- Equipment status lamicoids placed correctly
- BA Pp 1-2                      **B.A. XFER PP SUPPLYING BLENDER**
- CWP 1-1                        **SUPPLYING IN-SERVICE SCW HX**
- CWP 1-1                        **AUTO RECLOSE FEATURE CUTIN ON THIS CWP**
- CR Vent Trn 1 Bus F        **SELECTED TO BUS 2F**
- CR Vent Trn 1 Bus H        **SELECTED TO BUS 1H**
- Proper Delta-I curve for Simulator INIT on CC1
- Rod Step Counters indicate correct position
- PPC Setup:
  - CC2: QP TAVG, ALM/MODE-1, QP CHARGING.
  - Others: BIG U1169, MODE-1.
  - RBU is updated.
  - DELTAI is updated.
  - PENS running.
  - R2B blowdown flows at 80 gpm.
- SPDS (screens and time updating), A screen "RM", B screen "SPDS".
- Chart Recorders in operation
- Ensure Annunciator Horn is on (BELL ON) and Sound Effects are on (SOUND ON)
- ALL typewriters ON with adequate paper/ribbons/etc. and are in the "ON LINE" status
- Video and audio recording systems disabled.
- Communications systems turned on and functional
- CREDIT/TEAM setup complete, if applicable
- Print out copy of RISK ASSESSMENT

# NRC SCENARIO 09 SETUP

## TIMELINE AND INSTRUCTOR ACTIONS FOR SIMULATION

**X = manual entry required**

INITIATES:

|   | TIME LINE                                   | CONSOLE ENTRY  | SYMPTOMS/CUES/DESCRIPTION  |
|---|---|--|--|
| X | 0 min                                       | DRILL 6091   | After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)  |
|   | 3 min - E1                                  | xmt cvc20 3,100,60,180,d,0   | VCT level channel LT-114 fails high.   |
| X | E1+ 2 min                                   | Chemistry requests 120 gpm letdown to help clean up RCS. Samples = 63 microcuries/gram DE I-131, and 120/E-Bar microcuries /gram gross activity. | Notified by Chemistry of high RCS activity sample results indicating failed fuel.  |
|   | 5 min - E2                                  | n/a  | Places 120 gpm letdown in service.   |
|   | 5+ min - E3                                 | n/a  | Commences shutdown per Tech Specs 3.4.8 actions a and b.   |
|   | 15 min - E4                                 | mal rcs4c act 20,180,900,d,0   | S/G 1-3 tube leak (0 to 20 gpm over 3 min).  |
|   | 30 min - E5                                 | xmt pzs40 3,0,2,1800,d,0   | PZR level channel LT-459 fails low.  |
|   | 40 min - E6                                 | mal mss2b act,1e06,240,2400,d,0  | S/G 1-2 Main Steam Line break inside containment.  |
|   | Cond on - E7 trip                           | mal ppl3a act 1,0,0,d,0<br>mal ppl3b act 1,0,0,d,0   | Auto Safety Injection fails to actuate on both trains.   |
| X | When requested                              | loa afw11 act,1  | To open discharge cross tie on motor driven AFW Pumps.   |
| X | Increase - E8 size on transition to EOP E-2 | mal rcs4c act 400,120,0,d,0  | Increase S/G 1-3 tube leak from 20 to 400 gpm over 2 minutes.<br><br>Note: Monitor S/G 1-3 water level, if level decreases then go ahead and put in rupture. |

**NRC SCENARIO 09**  
**CREW TURNOVER SHEET**

1. Unit 1 is at 100% power middle of cycle and has been there for the last 137 days.
2. Current reactivity management conditions are:  
Diluting RCS approximately 30 gal. every 2 hours.
3. RCS Boron concentration is 945 ppm.
4. Unit 2 is at 100% power and has been there for the last 28 days.
5. A 0.25 gpd leak on S/G 1-3, monitoring per OP O-4.
6. AFW Pp 1-2 OOS for maintenance 24 hours ago. Estimated RTS in 4 hours.
7. D/G 1-1 OOS for maintenance 8 hours ago. Estimated RTS in 12 hours.  
STP I-1C performed 3 hours ago.
8. The plant is experiencing severe weather, high winds 30 to 40 mph.
9. No one is in containment, no entries are expected.

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