Final Submittal

CRYSTAL RIVER AUGUST EXAM 50-302/2003-301

AUGUST 25 - 29, 2003

1. As Given Simulator Scenario Operator Actions ES-D-2

Facility: Crystal Unit #3 Scenario No.: 1 Run #1 Op-Test No.: 1

Examiners: R. Baldwin
G. Hopper
K. O'Donohue

Operators: Mary Warren (SRO)
Bill Oakley (RO)
Brandon Webster (BOP)

Initial Conditions: The plant is at 21% power with the main generator on line and TBVs closed. 1st stage HP turbine temperature is 376° F.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours); FWP-7 (32 hours). All required surveillances have been completed. An emergency need for power exists. Substation personnel in switchyard (Unit 5 breaker maintenance). Thunder Storms predicted for Citrus and Levy counties.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP) N(RO)	Condensate system returned to power lineup. (OP-203)
2	N/A	I (SRO)	RM-A6 Gas fails low. SRO TS determination. (TS 3.4.14)
3 3a	1	I(RO) I(SRO) N(RO)	"A" selected Startup Level fails low slowly. (OP-501 & OP-504) 3a. Return ICS to Auto
4	2	I (BOP) I (SRO)	Turbine header pressure setpoint fails low over three minutes. SRO TS determination. (TS 3.7.4)
~~5~~	~~N/A~~	~~R (RO)~~	~~Manual power increase. (OP-204)~~ NOT PERFORMED
~~6~~	~~3~~	~~C (BOP)~~	~~FW-223/224-TE trend up. Requires startup of FWBP-1B and shutdown of FWBP-1A. (OP-605)~~
7	4	C (RO)	PZR steam space leak, small, 25 gpm. (AP-520)
	5	C (RO)	RCV-13, PZR spray block valve, fails to close.
8	6	M (ALL)	PZR steam space leak, large, 160 gpm. (EOP-2, EOP-3)
9	7	C (BOP)	MUP-1C shaft seizure on ES start signal / MUV-73 fails to open automatically. **[CT]** (EOP-13, Rule 1)
10	8	C (RO)	RCP-1D breaker will not open. **[CT]**

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

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Swing [ ] Mid
3. Rx power and power history – 23%, shutdown for 3 days
4. Boron concentration – 1517 PPMB
5. Xenon – Increasing
6. RCS Activity - See Status Board

B. Tech. Spec. Action requirement(s) in effect:

- T.S. 3.5.2 Condition "A" for DHP-1A. Condition entered 12 hours ago.

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.
- FWP-7 motor bearing replacement. Expected return to service in 12 hours.

D. Significant problems/abnormalities:

- An emergency need for power exists due to other generating facilities being unavailable.
- Severe thunderstorms predicted for Citrus and Levi counties.

E. Evolutions/maintenance for the on-coming shift:

- Continue with plant startup per OP-203 at step 4.2.38.
- Continue power escalation per OP-204.
- Dispatcher has requested a minimum 20%/hour power increase.
- Substation personnel are in the switchyard doing routine maintenance on Unit 5 breakers.
- Maintenance to continue work on DHP-1A, MUP-1A, RWP-1 and FWP-7

F. ROs walk down the main control boards and provide the crew with the following data:

RCS Average Temperature	_____	Make-up Tank Level	_____
RCS Pressure	_____	Turbine Load	_____
Pressurizer Level	_____	Turbine Reference	_____

Facility: Crystal Unit #3 Scenario No.: #1 run 2 Op-Test No.: 1

Examiners: R. Baldwin, G. Hopper

Operators: _Surrogate (SRO
_ Jonathan Huecker (RO)
_ Tony Renier (BOP)_

Initial Conditions: The plant is at 21% power with the main generator on line and TBVs closed. 1st stage HP turbine temperature is 376° F.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours); FWP-7 (32 hours). All required surveillances have been completed. An emergency need for power exists. Substation personnel in switchyard (Unit 5 breaker maintenance). Thunder Storms predicted for Citrus and Levy counties.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (RO)	Condensate system returned to power lineup. (OP-203)
~~2~~	~~N/A~~	~~I (SRO)~~	~~RM-A6 Gas fails low. SRO TS determination. (TS 3.4.14)~~
3	1	I(RO) I(SRO)	"A" selected Startup Level fails low slowly. (OP-501 & OP-504)
~~4~~	~~2~~	~~I (RO)~~ ~~I (SRO)~~	~~Turbine header pressure setpoint fails low over three minutes. SRO TS determination. (TS 3.7.4)~~
~~5~~	~~N/A~~	~~R (RO)~~	~~Manual power increase. (OP-204)~~
6	~~3~~	~~C (BOP)~~	~~FW-223/224-TE trend up. Requires startup of FWBP-1B and shutdown of FWBP-1A. (OP-605)~~
~~7~~	~~4~~	~~C (RO)~~	~~PZR steam space leak, small, 25 gpm. (AP-520)~~
	~~5~~	~~C (BOP)~~	~~RCV-13, PZR spray block valve, fails to close.~~
8	6	M (ALL)	PZR steam space leak, large, 160 gpm. (EOP-2, EOP-3)
9	7	C (RO)	MUP-1C shaft seizure on ES start signal / MUV-73 fails to open automatically. **[CT]** (EOP-13, Rule 1)
10	8	C (BOP)	RCP-1D breaker will not open. **[CT]**

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

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Swing [ ] Mid
3. Rx power and power history – 23%, shutdown for 3 days
4. Boron concentration – 1517 PPMB
5. Xenon – Increasing
6. RCS Activity - See Status Board

B. Tech. Spec. Action requirement(s) in effect:

- T.S. 3.5.2 Condition "A" for DHP-1A. Condition entered 12 hours ago.

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.
- FWP-7 motor bearing replacement. Expected return to service in 12 hours.

D. Significant problems/abnormalities:

- An emergency need for power exists due to other generating facilities being unavailable.
- Severe thunderstorms predicted for Citrus and Levi counties.

E. Evolutions/maintenance for the on-coming shift:

- Continue with plant startup per OP-203 at step 4.2.38.
- Continue power escalation per OP-204.
- Dispatcher has requested a minimum 20%/hour power increase.
- Substation personnel are in the switchyard doing routine maintenance on Unit 5 breakers.
- Maintenance to continue work on DHP-1A, MUP-1A, RWP-1 and FWP-7

F. ROs walk down the main control boards and provide the crew with the following data:

RCS Average Temperature	_____	Make-up Tank Level	_____
RCS Pressure	_____	Turbine Load	_____
Pressurizer Level	_____	Turbine Reference	_____

Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Rev.: 02

Event Description: OP-203, Plant Startup, Rev. 100 will be signed off to step 4.2.18, which is to complete the turbine startup; auto synchronize, and load the generator. (**NORM EVOL**). This will continue until condensate is in automatic and the procedure sends them to OP-204, Power Operation.

Time	Position	Applicant's Actions or Behavior
	RO	• Increase power using the SG/RX master hand/auto station o Raise OTSGs off Low Level Limits (K-7-4; K-8-4) (LLL) via increasing SG/RX master demand o Once LLLs are clear place SG/RX master in "AUTO" o Select Delta Tc to "AUTO"
	BOP	• Directs SPO to ENSURE HDV-53 and HDV-54 are not isolated • When DFT can not be maintained at about 10' with CDP discharge pressure at 250 o Reduce running CDP (B) demand to minimum (0) o Open CDV-43 o Open CDV-44 o Adjust CDP demand to maintain DFT level (CD flow adjusted to slightly higher than before CDV-43 and 44 were opened.) o Direct SPO to close CDV-40 • PLACE the operating CDP Demand Station in auto o PLACE CDP-1B Demand Station in Auto o SELECT "MEAS VAR" on CDP Master Demand Station o ADJUST CDP Master Demand Station setpoint knob until the demand indicates a "zero" error (on carrot) o SELECT "POS" on CDP Master Demand Station o PLACE CDP Master Demand Station in Auto
	SRO	• Monitor the BOP/RO performing the power escalation and CD system alignment

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Rev.: 02

Event Description: While the RO is placing ICS into automatic, RM-A6 Gas fails low. The SRO should evaluate TS 3.4.14. No TS actions are required as long as RM-A6 Particulate monitor is operable.

Time	Position	Applicant's Actions or Behavior
	BOP	• Acknowledge alarm o (H-2-2) Atmospheric Monitor Warning o Review AR • Inform SRO of RM-A6 Gas failure
	SRO	• ITS 3.4.14, RCS Leak Detection, should be evaluated for applicability. No TS actions are required as long as the particulate monitor remains operable

Op-Test No.: 1 *Scenario No.:* 1 *Event No.:* 3 *Rev.:* 02

Event Description: Once the SRO has had time to address the ITS, for RM-A6 Gas fails low, the "A" OTSG select Startup level transmitter fails low slowly. This will result in an overfeed of the "A" OTSG. (**MALF**)

Time	Position	Applicant's Actions or Behavior
	OAC	• Acknowledge alarm o (K-2-2) SASS MISMATCH o Event Point 0195 "A" OTSG SU level mismatch • Inform SRO of Instrument failure resulting in overfeed of "A" OTSG • At a minimum take the following Bailey stations to "Hand" o "A" SU Control Valve o "A" LL Control Valve • May also take the following stations to "Hand" o Rx Diamond o Reactor Bailey o "A" FW Loop Bailey o "B" FW Loop Bailey • Lower "A" LL Control Valve demand to reduce FW flow and stabilize the plant • Selects good SU level instrument for ICS input in accordance with OP-501 (BOP will normally assist by reading OP-501) • ICS stations are returned to "Auto" in accordance with OP-504 (BOP will normally assist by reading OP-504)
	SRO	• Acknowledge SASS MISMATCH alarm announcement and ensure OAC is properly dealing with the failure. • Once the plant is stable, holds a mini brief to ensure all crew members understand plant status. • Directs OAC/BOP to use OP-501 to select a good SU level instrument for "A" OTSG. • Directs OAC/BOP to use OP-504 to return ICS to "Auto"
	BOP	• Assist the OAC in monitoring parameters to stabilize the plant • Uses OP-501 to direct OAC in selection of good "A" OTSG SU level • Uses OP-504 to direct OAC returning ICS to "Auto"

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Rev.: 02

Event Description: Once ICS stations are in automatic the turbine header pressure setpoint will fail low over a three minute time period (**MALF**) and requires manual control of the SG/RX, Turbine and TBVs. This will lead to the reactivity manipulation in manual control when power increase is resumed.

Time	Position	Applicant's Actions or Behavior
	RO	• Observe the following: o Turbine setter increasing o Header pressure decreasing o Megawatts generated increase o Turbine Bypass Valves opening • May receive "Turbine Throttle Pressure High/Low" alarm if actions aren't taken quickly. (O-3-4) • Take manual control of Turbine/EHC and SG/Rx. • If the TBVs are not recognized as being open then header pressure will continue to decrease. • RO and BOP must coordinate header pressure recovery by closing the TBVs and adjusting the GVs to maintain 885 psig
	SRO	• Monitor and supervise the header pressure setpoint malfunction recovery. Ensure proper coordination between RO and BOP. • Call for maintenance to investigate problem. • Evaluate TS 3.7.4 for applicability. Per the Basis the TBVs are NOT inoperable for this failure. (valves will work in Manual) • Have the RO continue the power escalation in manual
	BOP	• Coordinate and assist the RO in turbine header pressure recovery

Op-Test No.: 1 Scenario No.: 1 Event No.: 5 Rev.: 02

Event Description: Manual power increase. Emergency need for power exists. Turbine controlled in Manual.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Increase load with the Turbine in manual o Monitor reactor power increase o Monitor feedwater flow increase o Ensure steam pressure maintained near setpoint
	SRO	• Direct power increase • MAY HAVE TO BE PROMPTED FOR MEGAWATTS

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 Rev.: 02

Event Description: After 5% to 10% power increase FW-223 & 224-TE's trend up **(MALF)**. *This will require startup of FWBP-1B and shutdown of FWBP-1A.*

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Recognize temperature increase on FWBP-1A • Direct SPO to investigate temperature rise
	BOP	• Startup FWBP-1B using OP-605, Section 4.3 o Procedure signed off up to Step 4.3.8 o Ensure flow path exists o Verify permit lights o Start FWBP-1B o Direct SPO to locally stroke FWV-7 20 to 50% open o Open FWV-7 o Stop FWP-6B o Select FWV-48 to AUTO • Secure FWBP-1A using OP-605, Section 4.4 o Start FWP-6A o Open FWV-47 o Close FWV-8 o Stop FWBP-1A
	SRO	• Direct startup of FWBP-1B and shutdown of FWBP-1A • Notify maintenance to investigate temperature rise

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 02

Event Description: Once plant is stable with FWBP-1B in service insert the PZR small steam leak (**MALF**) (25 gpm). This is a small continuous pressure decrease that will send the operator into AP-520 and is slow enough to take actions prior to protective functions actuation.

Time	Position	Applicant's Actions or Behavior

	RO	• Diagnose RCS leak
		  ○ Slow pressure decrease
		  ○ All heaters energized with pressure decreasing and level very slowly decreasing
		  ○ RB fan condensate high alarms (B-2-5 and E-2-5) will alarm but much later in the malfunction
		  ○ Pressurizer level decrease
		  ○ MUT level decrease
		  ○ Increased MU flow
		• Quantify leak rate of about 10-35 GPM
		• If Rx trip criteria is given by SRO, notifies SRO when trip criteria is reached and Trips the Rx.
		• Performs actions of AP-520 as directed by SRO
		  ○ Verifies OTSG leakage has not increased
		  ▪ Should check SPDS page for RM-A12, RM-G25, RM-G26, RM-G27, & RM-G28 for increase
		  ○ When SRO asks if significant increase in RCS leakage exist, should report that does exist.
		  ○ Verifies MUV-31 controlling PZR level
		  ○ Assist in determination of leak location
		  ○ Isolate leak paths
		  ▪ Verify RCV-53 closed
		  ▪ Verify RCV-14 closed
		  ▪ Selects RCV-13 to close and reports failure of RCV-13
		  ▪ Selects PORV to closed
		  ▪ Closes RCV-11
		• When the Rx is tripped, performs EOP-02 Immediate Actions
		  ○ Depress Rx Trip pushbutton
		  ○ Verifies Groups 1 thru 7 rod inserted
		  ○ Verifies NIs indicate Rx is shutdown
		  ○ Depress Turbine Trip pushbutton
		  ○ Verifies all TVs and GVs are closed
		• Re-performs EOP-02 Immediate Actions as directed by SRO
		• When EOP-02 Immediate Actions are completed, performs symptom scan along with BOP and SRO.

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 02

Event Description: Once plant is stable with FWBP-1B in service insert the PZR small steam leak (**MALF**) (25 gpm). This is a small continuous pressure decrease that will send the operator into AP-520 and is slow enough to take actions prior to protective functions actuation.

Time	Position	Applicant's Actions or Behavior
	SRO	• Direct RO/BOP to quantify the leakage • Should provide RO with Rx trip criteria based upon pressure • Enters and directs actions of AP-520, Loss of RCS Coolant or Pressure o Personnel Notified o Verifies OTSG leakage has not increased o Verifies significant increase in RCS leakage exists and goes to step 3.11 for RCS leakage. o Directs OAC/BOP maintain PZR level o Directs BOP to maintain MUT level o Directs OAC/Bop to get a leak rate o Notifies SSO of need to commence ITS plant S/D within 4 hours o Determines leak location and goes to step 3.20 (RB) o Direct isolation of leak paths and acknowledges failure of RCV-13 to close. (May discuss that RCV-13 may be where the leak is at.) o Direct isolation of RCS sample valves o Directs isolation of Letdown coolers o Directs RO/BOP to monitor for change in RCS leakage. • When Rx is tripped, enters EOP-02 and ensures RO performs EOP-02 Immediate Actions. • Verifies EOP-02 Immediate Actions • Directs formal Symptom Scan with RO and BOP o Check for Unit Black Out o Check for Adequate Sub Cooling Margin o Check for Inadequate Heat Transfer o Check for Excessive Heat Transfer o Check for OTSG Tube Rupture

Op-Test No.: 1 Scenario No.: 1 Event No.: 7 Rev.: 02

Event Description: Once plant is stable with FWBP-1B in service insert the PZR small steam leak (**MALF**) (25 gpm). This is a small continuous pressure decrease that will send the operator into AP-520 and is slow enough to take actions prior to protective functions actuation.

Time	Position	Applicant's Actions or Behavior

	BOP	• Quantify leak rate
		• Perform actions of AP-520 as directed by SRO
		  o Notify Personnel
		  ▪ PA announcement
		  ▪ SPO/PPO contacted via radio
		  o Verify OTSG leakage has not increased
		  ▪ Checks RM-A12
		  ▪ Checks RM-G25, RM-G26, RM-G27, & RM-G28 for increase
		  o Concurs significant increase in RCS leakage exists
		  o Acknowledges to use MUV-73 as necessary to maintain MUT level
		  o Assist in determination of leak location
		  o Isolate leak paths
		  ▪ Verifies High Point Vent Valves closed
		  ▪ Verifies DHV-3 closed
		  o Close all RCS sample isolation valves
		  ▪ Verifies/Ensures CAV-429, CAV-430, CAV-1, CAV-3, CAV-126, CAV-431, and CAV-432 closed
		  o Isolate Letdown coolers.
		  ▪ Closes MUV-39 & MUV-40
		• When the Rx is tripped, depress the global alarm silence pushbutton.
		• When EOP-02 Immediate Actions are completed, performs symptom scan along with RO and SRO.

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 02

Event Description: Large steam space leak from the pressurizer (**MAJOR TRANSIENT**) (160 gpm). This is triggered from the reactor trip

Time	Position	Applicant's Actions or Behavior
	ALL	• This will depressurize the RCS outside the post trip window. *RCS pressure will decrease to the ES actuation at 1625 psig* o EFW actuation o A loss of SCM will occur • Trip all RCPs within 2 minutes of loss of SCM (**CT**) o When RCP-1D breaker doesn't open, Opens breaker 3104 *to de-energize the 6900 V Aux Bus 3B*
	SRO	• Directs BOP/RO to performs EOP-13 Rule 1 o When RCP-1D breakers doesn't open, ensure 6900 V *Aux Bus 3B is de-energized* • Direct actions of EOP-3, Loss of SCM o Directs RO/BOP to notify PPO to perform EOP-14 Enclosure 2 o Verify proper HPI discharge flow path exists ▪ Verifies MUV-23, MUV-24, MUV-25, MUV-26, MUV-586, and MUV 587 open ▪ Verifies MUV-73 and MUV-58 are open. • Ensure RO/BOP selects MUV-73 open when found closed. o Verifies at least 1 MUP running with required cooling pumps o Verifies MUP recirc valves MUV-53 and MUV-257 are closed. o Verifies HPI recirc to RB valves MUV-543, MUV-544, MUV-545 and MUV-546 closed o Verifies Makeup and Seal Injection isolation valves MUV-586, MUV-18 and MUV-27 closed ▪ • Recognizes Emergency Plan entry (not required to classify)
	RO	• Monitor RCS parameters, core cooling and RCS inventory. • Trip all RCPs within 2 minutes of loss of SCM (**CT**) o When RCP-1D breaker doesn't open, Opens breaker 3104 to de-energize the 6900 V Aux Bus 3B

Op-Test No.: 1 Scenario No.: 1 Event No.: 8 Rev.: 02

Event Description: Large steam space leak from the pressurizer (**MAJOR TRANSIENT**) (160 gpm). This is triggered from the reactor trip

Time	Position	Applicant's Actions or Behavior
	BOP	• Ensures ES equipment is properly aligned • Performs EOP-13, Rule 1, ISCM o Trip RCPs in less than 2 minutes since loss of ASCM • When RCP-1D breaker doesn't open, Opens breaker 3104 to de-energize the 6900 V Aux Bus 3B o Depress "HPI MAN ACT" push buttons on Trains A and B o Depress "RB ISO MAN ACTUATION" push buttons on Trains A and B o Depress "ISCM" push buttons for EFIC channels A and B o Ensure Tincore is selected on SPDS • Verifies all ES components are operating via the actuation light indications (green) for ES actuated equipment. o Recognizes MUV-73 still closed.
		o Opens MUV-73 manually. **(CT)**
		o Notifies SRO of malfunction with MUP-1C and MUV-73

Op-Test No.: 1 Scenario No.: 1 Event No.: 9 Rev.: 02

Event Description: When ES actuates MUP-1C shaft seizes (**MALF after MT**) leaving only 1 MUP supplying water to the core. MUV-73 fails to open on the ES signal. **(CT)**

Time	Position	Applicant's Actions or Behavior
	BOP	• Diagnose MUP-1C failure o (E-4-3) "MUP C Motor Overload" o Amps indicate 0 % o Breaker indicates open (green light lit)
	SRO	• Directs the BOP to ensure all ES equipment is properly aligned
	BOP	• Verifies all ES components are operating via the actuation light indications (green) for ES actuated equipment. o Recognizes MUV-73 still closed.
		o Opens MUV-73 manually. **(CT)**
		o Notifies SRO of malfunction with MUP-1C and MUV-73

Op-Test No.: 1 Scenario No.: 1 Event No.: 10 Rev.: 02 Event Description: RCP-1D will not trip (**MALF after MT**) on the loss of SCM. The 6900V bus must be de-energized. **(CT)**		
Time	Position	Applicant's Actions or Behavior
	RO	• Loss of SCM o Trip all RCPs o RCP-1D will not trip o Breaker closed light "LIT" (red)
	SRO	• May direct the RO to perform actions to stop RCP-1D
	RO	• Secures RCP-1D o Open breaker 3104 to de-energize the 6900V Aux Bus 3B. o RCP-1D de-energizes.
		o All RCPs tripped within 2 minutes (**CT**)

Facility: Crystal Unit #3 Scenario No.: 2 Run 1 Op-Test No.: 1

Examiners: R. Baldwin
K. O'Donohue
G. Hopper

Operators: Mary Warren
Brandon Webster
Bill Oakley

Initial Conditions: The plant is at 100% power.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours); Offsite Power Transformer (7 hours). SP-321 is due after turnover is complete. All other required surveillances have been completed. Substation personnel in switchyard (OPT repair).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Perform SP-321, Enclosure 1.
2	N/A	I (SRO)	EF-98-LT fails low. SRO TS determination.
3	1	I (BOP) I (SRO)	SP-1B-LT2 fails high. "B" OTSG controlling Operating Level fails high, slowly.
	2	C (RO) C (SRO)	SASS module failed to prevent selection of "Y" instrument (SP-1B-LT3). "B" FWP Bailey will have to remain in "Hand"
4	3	C (BOP) C (SRO)	Gland steam leak / condenser vacuum degradation (OP-607) SRO ODCM determination for RM-A12.
5	4	C (BOP)	ARP-1A trips, ARP-1B will not start.
~~6~~	~~5~~	~~I (RO)~~	~~*ULD* station fails as is~~
		R (RO)	Rapid power reduction with SG/Rx Master & "B" FWP in "Hand". (AP-510)
7	6	C (BOP)	40 gpm "A" OTSG tube leak. (EOP-6)
8	7	M (ALL) C (RO)	Two MSIVs close at 70% power / manual reactor trip **[CT]** (AI-505, EOP-2)
	8	C (RO)	One TV and one GV fail to close when Rx tripped, requiring closure of remaining two MSIVs **[CT]**
	9	C (ALL)	Tube leak increases to 280 gpm when the Rx is tripped
9	10	C (BOP)	RCV-14, PZR spray valve failed closed requiring use of PORV to reduce SCM.

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

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Swing [ ] Mid
3. Rx power and power history – 100% for 40 days
4. Boron concentration – 1107 ppmb
5. Xenon – Equilibrium @ -2.4% ΔK/K
6. RCS Activity - See Status Board

B. Tech. Spec. Action requirement(s) in effect:

- T.S. 3.5.2 Condition "A" for DHP-1A. Condition entered 12 hours ago.
- T.S. 3.8.1 Condition "A" for the OPT. Condition entered 8 hours ago.

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.
- Offsite Power Transformer oil leak. Expected return to service in 4 hours.

D. Significant problems/abnormalities:

- Severe thunder storms are predicted for Citrus and Levy counties.

E. Evolutions/maintenance for the on-coming shift:

- Perform SP-321, Enclosure 1 after turnover is complete.
- Continue power operations.
- Maintenance to continue work on DHP-1A, MUP-1A, RWP-1 and the OPT.

F. ROs walk down the main control boards and provide the crew with the following data:

RCS Average Temperature	_____	Make-up Tank Level	_____
RCS Pressure	_____	Turbine Load	_____
Pressurizer Level	_____	Turbine Reference	_____

Facility: Crystal Unit #3 Scenario No.: 2 Run #2 Op-Test No.: 1

Examiners: R. Baldwin Operators: Jonathan Huecker (SRO)
G. Hopper Tony Renier (RO)
_____ Surrogate (BOP)

Initial Conditions: The plant is at 100% power.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours); Offsite Power Transformer (7 hours). SP-321 is due after turnover is complete. All other required surveillances have been completed. Substation personnel in switchyard (OPT repair).

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	N (BOP)	Perform SP-321, Enclosure 1.
2	N/A	I (SRO)	EF-98-LT fails low. SRO TS determination.
3	1	I (RO) I (SRO)	SP-1B-LT2 fails high. "B" OTSG controlling Operating Level fails high, slowly.
	2	C (RO) C (SRO)	SASS module failed to prevent selection of "Y" instrument (SP-1B-LT3). "B" FWP Bailey will have to remain in "Hand"
4	3	C (BOP) C (SRO)	Gland steam leak / condenser vacuum degradation (OP-607) SRO ODCM determination for RM-A12.
5	4	C (BOP)	ARP-1A trips, ARP-1B will not start.
~~6~~	~~5~~	~~I (RO)~~	~~*ULD* station fails as is~~ NOT PERFORMED
		R (RO)	Rapid power reduction with SG/Rx Master & "B" FWP in "Hand". (AP-510)
7	6	C (BOP)	40 gpm "A" OTSG tube leak. (EOP-6)
8	7	M (ALL)	Two MSIVs close at 70% power / manual reactor trip **[CT]** (AI-505, EOP-2)
	8	C (RO)	One TV and one GV fail to close when Rx tripped, requiring closure of remaining two MSIVs **[CT]**
	9	C (ALL)	Tube leak increases to 280 gpm when the Rx is tripped
9	10	C (RO)	RCV-14, PZR spray valve failed closed requiring use of PORV to reduce SCM.

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

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Swing [ ] Mid
3. Rx power and power history – 100% for 40 days
4. Boron concentration – 1107 ppmb
5. Xenon – Equilibrium @ -2.4% ΔK/K
6. RCS Activity - See Status Board

B. Tech. Spec. Action requirement(s) in effect:

- T.S. 3.5.2 Condition "A" for DHP-1A. Condition entered 12 hours ago.
- T.S. 3.8.1 Condition "A" for the OPT. Condition entered 8 hours ago.

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.
- Offsite Power Transformer oil leak. Expected return to service in 4 hours.

D. Significant problems/abnormalities:

- Severe thunder storms are predicted for Citrus and Levy counties.

E. Evolutions/maintenance for the on-coming shift:

- Perform SP-321, Enclosure 1 after turnover is complete.
- Continue power operations.
- Maintenance to continue work on DHP-1A, MUP-1A, RWP-1 and the OPT.

F. ROs walk down the main control boards and provide the crew with the following data:

RCS Average Temperature	_____	Make-up Tank Level	_____
RCS Pressure	_____	Turbine Load	_____
Pressurizer Level	_____	Turbine Reference	_____

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Rev.: 03

Event Description: Perform SP-321, Power Distribution Breaker Alignment, Enclosure 1. (**NORM EVOL**). This is required because the OPT is OOS.

Time	Position	Applicant's Actions or Behavior
	BOP	• Complete Enclosure 1 of SP-321. (Attached) o 230 KV Bus Voltage A or B on Main Control Board is approximately 230 KV o VERIFY that only one of the following ES "A" 4160V feeder breakers is closed and supplying power ▪ 3205 Backup ES Transformer to ES "A" 4160V Bus ▪ 3211 Offsite Power Source Transformer to ES "A" 4160V Bus o Verify that only one of the following ES "B" 4160V feeder breakers is closed and supplying power: ▪ 3206 Backup ES Transformer to ES "B" 4160V Bus ▪ 3212 Offsite Power Source Transformer to 4160V ES "B" Bus o UTILIZING the Synch Scope, VERIFY power is available to ES 4160V Bus Supply Breakers: ▪ 3205 Backup ES transformer to ES "A" 4160V Bus ▪ 3206 Backup ES transformer to ES "B" 4160V Bus o Notifies SRO that he is unable to do step 1.5 UTILIZING the Synch Scope, VERIFY power is available to ES 4160V Bus Supply Breakers: ▪ 3211 Offsite Power Source Transformer to ES "A" 4160V Bus ▪ 3212 Offsite Power Source Transformer to ES "B" 4160V Bus o VERIFY at least one 6900V Reactor Aux. Bus is energized ▪ Verify that "A" 6900V Bus Breaker 3103 is closed and supplying power ▪ OR Verify that "B" 6900V Bus Breaker 3104 is closed and supplying power

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Rev.: 03

Event Description: Perform SP-321, Power Distribution Breaker Alignment, Enclosure 1. (**NORM EVOL**). This is required because the OPT is OOS.

Time	Position	Applicant's Actions or Behavior
	SRO	• Monitor the performance of SP-321 • Provide clarification of Enclosure 1 with this plant configuration

Op-Test No.: 1 Scenario No.: 2 Event No.: 2 Rev.: 03 Event Description: EF-98-LT (EF tank level) fails low. **(MALF)** TS entry required.		
Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Acknowledge alarm o (H-7-1) "EF Tank Level Low-Low" o Reviews AR o Notes that EF-98-LI1 is failed low while EF-99-LI1 still indicates proper EFT level o Informs SRO of instrument failure
	SRO	• Evaluates TS 3.3.17 for applicability. (Has to use Basis to determine.) Enters Condition A. • May evaluate TS 3.3.18 for applicability. (Has to use Basis to determine.) No entry required. • Contacts work controls to initiate repair efforts

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Rev.: 03

Event Description: SP-1B-LT2 ("B" OTSG selected Operating Range Level) fails high slowly. **(MALF)** This results in the lowering of "B" Main FW flow. FWP-2B Bailey control station taken to manual, FWP-2B demand is increased and plant stabilized. When OP-501 is used to select alternate instrument, SASS module is failed preventing selection of alternate transmitter (SP-1B-LT3). **(MALF)** FWP-2B Bailey control station has to remain in "Hand".

Time	Position	Applicant's Actions or Behavior
	RO	• Acknowledge alarm o (K-03-02) "SASS MISMATCH" • Event Point 0796 "B" OTSG Operating Level mismatch o (K-08-02) "STEAM GEN B LEVEL HI/LOW" • Event Point 0945 "B" OSTG Level High • Takes FWP-2B Bailey Control station to "Hand" and increase "B" FW to stabilize the plant. • Select SP-1B-LT3 for control when directed by OP-501 • Participates in contingency brief when held by SRO o Notes the FWP-2B Bailey Control station will have to remain in "Hand" o Discusses need to manual control "B" FW is plant transient occurs.

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Rev.: 03

Event Description: SP-1B-LT2 ("B" OTSG selected Operating Range Level) fails high slowly. **(MALF)** This results in the lowering of "B" Main FW flow. FWP-2B Bailey control station taken to manual, FWP-2B demand is increased and plant stabilized. When OP-501 is used to select alternate instrument, SASS module is failed preventing selection of alternate transmitter (SP-1B-LT3). **(MALF)** FWP-2B Bailey control station has to remain in "Hand".

Time	Position	Applicant's Actions or Behavior
	SRO	• Acknowledges SASS MISMATCH and STEAM GEN B LEVEL HI/LOW alarms when announced by RO/BOP. • Ensures the RO has selected the proper ICS stations to allow stabilization of plant. • Hold a mini brief once the plant is stable to ensure all crew members are aware of plant status. • Directs the BOP to use OP-501 to direct selection of good "B" OTSG operating level instrument. • Acknowledges selecting failure when attempt is made to select SP-1B-LT3. • Hold a mini brief to talk about contingency actions for RO and BOP o May elect to just have FWP-2B Bailey in "Hand" with remaining ICS stations in "Auto" (Most Likely) **OR** o May elect to have FW Loop Bailey stations along with FWP-2B Bailey stations in "Hand".

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Rev.: 03

Event Description: SP-1B-LT2 ("B" OTSG selected Operating Range Level) fails high slowly. **(MALF)** This results in the lowering of "B" Main FW flow. FWP-2B Bailey control station taken to manual, FWP-2B demand is increased and plant stabilized. When OP-501 is used to select alternate instrument, SASS module is failed preventing selection of alternate transmitter (SP-1B-LT3). **(MALF)** FWP-2B Bailey control station has to remain in "Hand".

Time	Position	Applicant's Actions or Behavior
	BOP	• May Acknowledge/Announce alarms o (K-03-02) "SASS MISMATCH" • Event Point 0796 "B" OTSG Operating Level mismatch o (K-08-02) "STEAM GEN B LEVEL HI/LOW" • Event Point 0945 "B" OSTG Level High • Review ARs for alarms • Assist the RO in monitoring plant parameters while RO is stabilizing plant • Participates in contingency brief when held by SRO • Uses OP-501 to direct RO in selection of SP-1B-LT3 for "B" OTSG level control. o Checks computer point for SP-1B-LT3 reading o Directs RO to select SP-1B-MS1 to LAM1-Y o Ensures SRO is aware of failure of SP-1B-LT3 selection • Participates in contingency brief when held by SRO

Op-Test No.: 1 Scenario No.: 2 Event No.: 4/5 Rev.: 03

Event Description: GSV-6, GS control valve, fails closed **(MALF)**. GS supply is lost and GSV-8, GS bypass, is used to restore GS pressure. A Gland steam leak occurs on the GS supply line to the turbine and gland steam is lost to one LP turbine seal causing a vacuum leak. ARP-1A trips **(MALF)** when the second stage manifold check valve opens (low vacuum operation). ARP-1B will not start. Power reduction is commenced using AP-510. Guidance on Main Condenser vacuum leak is contained within OP-607.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Acknowledge alarms: o (O-1-10) Gland Steam System Trouble o (N-1-2) Condenser Vac Pump Trip o (N-1-3) Condenser Vac Pump Trouble o Reviews AR for annunciator alarms • Diagnoses GS system failure o Manually controls GS pressure using GSV-8. • Informs SRO of decreasing condenser vacuum • Perform actions of OP-607 o Monitor computer point T-215 • Diagnoses ARP failures o Attempts start of ARP-1B o Dispatches auxiliary operator to investigate • Informs SRO of component failures
	RO	• When directed by SRO commences power reduction. (If FW Loop Bailey stations **NOT** in "Hand") o ULD selected to "Hand" o Load rate set to SRO directed amount o ULD lowered to 10 • When directed by SRO commences power reduction. (If FW Loop Bailey stations in "Hand") o Lowers on FW Loop Bailey stations o Lowers on FWP-2B Bailey station o Monitors Turbine and Rx to ensure they are following the FW reductions

Op-Test No.: 1 Scenario No.: 2 Event No.: 4/5 Rev.: 03

Event Description: GSV-6, GS control valve, fails closed **(MALF)**. GS supply is lost and GSV-8, GS bypass, is used to restore GS pressure. A Gland steam leak occurs on the GS supply line to the turbine and gland steam is lost to one LP turbine seal causing a vacuum leak. ARP-1A trips **(MALF)** when the second stage manifold check valve opens (low vacuum operation). ARP-1B will not start. Power reduction is commenced using AP-510. Guidance on Main Condenser vacuum leak is contained within OP-607.

Time	Position	Applicant's Actions or Behavior
	SRO	• Time permitting recognizes that there is an ODCM requirement for RM-A12 on a loss of both ARPs. (sampling required every 24 hours) • Assist in diagnosing loss of GS, ARP-1A/1B failures and decreasing vacuum • Refers to OP-607 section 4.5 for condenser vacuum limits and required actions • Enters AP-510 an directs RO to commence power reduction when vacuum cannot be maintained o Direct: ULD selected to "Hand" o Direct: Load rate selected to desired amount (probably 5%/min) o Direct: ULD lowered to 10

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 Rev.: 03

Event Description: ULD demand station fails as is **(MALF)** at 95% reactor power. SG/RX master must be taken to manual and used for power reduction.

Time	Position	Applicant's Actions or Behavior
	RO	• When directed by SRO commences power reduction. (If FW Loop Bailey stations **NOT** in "Hand") o ULD selected to "Hand" o Load rate set to SRO directed amount o ULD lowered to 10 • Recognize power decrease is not in progress when plant quits responding • Informs the SRO of failure • Take SG/RX master to hand and continue power decrease • Lowers on FWP-2B Bailey station to match "A" FW flow. • Monitors o RCS Tave o "A" and "B" FW flows o Turbine Setter/Reference
	SRO	• Direct power decrease per AP-510 o Directs BOP to make PA announcement, inform plant operators, and inform dispatcher o Directs BOP to monitor MUT level and cycle MUV-73 to maintain level ≥55" o Directs BOP to call Chemistry and inform them of >15% in hour. o Directs BOP to have SPO ensure ASV-27 controlling Aux Steam. o Direct BOP to maintain DFT level 10 to 13 feet. o Direct BOP to verify the Aux Transformer is not supplying any buses • Acknowledges ICS failure • Directs RO to take SG/Rx Bailey station to "Hand" and continue with power reduction

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 Rev.: 03

Event Description: ULD demand station fails as is **(MALF)** at 95% reactor power. SG/RX master must be taken to manual and used for power reduction.

Time	Position	Applicant's Actions or Behavior
	BOP	• Makes PA announcement for AP-510 entry • Calls PPO and SPO on radio and ensures they are aware of AP-510 entry • Calls dispatcher and informs them of CR3 power reduction • Monitor MUT level • Calls SPO to ensure ASV-27 controlling • Monitor DFT level • Verifies Aux Transformer not supplying any loads

Op-Test No.: 1 Scenario No.: 2 Event No.: 7 Rev.: 03

Event Description: At approximately 90% power a 40 gpm SGTR occurs on the "A" OTSG **(MALF)**. RM-A12 is OOS because of the loss of both ARPs. Once the tube leak is diagnosed a plant shutdown continues per EOP-6 and AP-510.

Time	Position	Applicant's Actions or Behavior
	BOP	• Diagnose OTSG tube leak o RM-G27 in Hi/Hi alarm o Mismatch between makeup and letdown o (H-1-5) MN Steam Line A/B High Rad Monitor Fail o SPDS shows RM-G27 at 100 GPD • Perform leak rate calculations (Note: This will be difficult with manual ICS control since Tave will not be steady.) • Performs follow-up actions of EOP-6 and AP-510 as directed.
	SRO	• Assist RO in diagnosing the tube leak. • Ensure RO/BOP aware that RM-A12 is unavailable. • Enters EOP-06 if leakage is reported > 1GPM and directs RO/BOP actions. (Should occur) o Verifies MUV-31 is able to control PZR level o Direct BOP to make a PA announcement, inform SPO/PPO of EOP-06 entry o Directs RO to trip Rx if PZR level goes < 100" o Verifies affected OTSG o Continue power reduction IAW AP-510 • Recognize E-plan entry conditions are met. (not required to classify at this time)
	RO	• Diagnose OTSG tube leak o Mismatch between makeup and letdown o (H-1-5) MN Steam Line A/B High Rad Monitor Fail o SPDS shows RM-G27 at 100 GPD • Continue plant shutdown with SG/RX in manual

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Rev.: 03

Event Description: At approximately 70% power 2 MSIVs close **(Major Transient)** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 280 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	RO	• Announces and responds to alarms o (H-5-3) "Main Steam Iso Vlv Air Failure" o SV1/SV2 lights flashing intermittently • Announce MSIV closures as they occur
		• Manually trips the reactor due to the closure of 2 MSIVs **(CT)**
		• Performs Immediate Actions of EOP-2 o Depress Rx Trip pushbutton o Verify Groups 1-7 fully inserted o Verifies NIs indicate the Rx is shutdown o Depresses Turbine Trip pushbutton o Verifies all TVs and GVs Closed ▪ Notes 1 TV and 1 GV NOT closed
		▪ Close the remaining two MSIV's **(CT)**
		▪ Report completion of EOP-02 Immediate Actions • Perform EOP-02 Immediate Action verification with SRO

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Rev.: 03

Event Description: At approximately 70% power 2 MSIVs close **(Major Transient)** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 280 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Performs Symptom Scan o Verifies No Unit Blackout o Verifies No Inadequate Subcooling Margin o Verifies No Inadequate Heat Transfer o Verifies No Excessive Heat Transfer o Verifies Increased OTSG Tube Leakage • Diagnoses rise in OTSG tube leakage increase • Informs SRO of increased leakage • Performs follow-up actions of EOP-6 o Maintains PZR level > 50 inches ▪ Close MUV-49 ▪ Open MUV-24 ▪ Open MUV-73 ▪ Start MUP-1C and required cooling pumps (MUP-1C, DCP-1B, & RWP-3B) ▪ Open MUV-23, 25, and 26 if necessary ▪ Close MUV-53 and 257 if necessary o Controls OTSG pressure using ADVs o Controls EFW per EOP-13, Rule 3 o Performs EOP-14, Enclosure 10

Op-Test No.: 1 Scenario No.: 2 Event No.: 8 Rev.: 03

Event Description: At approximately 70% power 2 MSIVs close **(Major Transient)** which requires a manual reactor trip **(CT).** The SGTR increases to approximately 280 gpm (triggered by the reactor trip). When the Rx is tripped, one TV and one GV do not close, requiring the closure of the remaining two MSIVs. **(CT)** Plant cooldown commences per EOP-6. TBVs are unavailable due to MSIV closure.

Time	Position	Applicant's Actions or Behavior
	SRO	• Enters EOP-2 and verifies Immediate Actions are complete o Rx Trip pushbutton depressed o Group 1-7 rods inserted o NIs indicate Rx shutdown o Turbine Trip pushbutton depressed o All TVs and GV closed (One TV and one GV not closed) ▪ Verifies all MSIV are closed • Directs Symptom scam o Verifies No Unit Blackout o Verifies No Inadequate Subcooling Margin o Verifies No Inadequate Heat Transfer o Verifies No Excessive Heat Transfer o Verifies Increase OTSG tube leakage and transitions to EOP-06 • Assist ROs in diagnosing rise in OTSG tube leakage • Transitions to beginning of EOP-6 and directs ROs actions o Maintain PZR level > 50 inches, Directs the following: ▪ Close MUV-49 ▪ Open MUV-24 ▪ Open MUV-73 ▪ Start MUP-1C and required cooling pumps (MUP-1C, DCP-1B, & RWP-3B) ▪ Open MUV-23, 25, and 26 if necessary ▪ Close MUV-53 and 257 if necessary o Directs closure MSV-55 o Control OTSG pressure using ADVs o Directs MUT level to be maintained > 55" using MUV-73 o May direct tripping MFWPs due to imminent loss of vacuum o Direct BOP to perform EOP-14, Enclosure 10 • Recognizes E-plan actions need to be taken (HPI valve open, steaming to atmosphere with a tube leak)

Op-Test No.: 1 Scenario No.: 2 Event No.: 9 Rev.: 03

Event Description: When RCS pressure reduction is required per EOP-06, RCV-14 (spray valve) fails to open. Procedural guidance is provided to use the PORV to minimize SCM.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	• Attempts to open RCV-14 to minimize SCM as directed. o Diagnoses failure of RCV-14 to open. • Opens RCV-10 to minimize SCM as directed • Controls SCM within band

	SRO	• Directs ROs to maintain minimum subcooling margin (gives band to maintain normally 30-50)
		  o Directs RO to open RCV-14 per EOP-6
		  ▪ Assists in diagnosing RCV-14 failure
		  o Directs RO to minimize SCM by opening the PORV

Facility: Crystal Unit #3 Scenario No.:#3 Run 1 Op-Test No.: 1

Examiners:_____ Operators: __Surrogate (SRO)_____
_____ _Jonathan Huecker (RO)
_____ _Tony Renier (BOP)___

Initial Conditions: The plant is at 60% power. Power decrease in progress to perform trouble shooting on the "B" MFWP governor.

Turnover: The following equipment is OOS: DHP-1A (12 hours); MUP-1A (12 hours); RWP-1 (24 hours). All required surveillances have been completed. Substation personnel in switchyard (Unit 5 breaker maintenance). Severe thunder storms predicted for Citrus and Levy counties. MS 112-PT failed low

Event No.	Malf. No.	Event Type*	Event Description
~~1~~	~~N/A~~	~~N (RO)~~	~~Continue power decrease to approximately 50% power. (OP-204)~~
~~2~~	~~1~~	~~I (SRO)~~	~~MS-112-PT fails low. SRO TS determination. (TS 3.3.11)~~
3	2	C (RO)	"B" MFWP governor fails as the plant is brought through the feedwater MBVs. (AI-500, Appendix 9)
4	3	I (RO)	Selected turbine header pressure transmitter fails high over 2 minutes. (OP-501)
5	4	C (BOP)	SW leak into the RW system. (AP-330)
~~6~~	~~5~~	~~R (RO)~~	~~Turbine remains in manual. Rapid power reduction required for FWP-2A oil leak. (AP-510)~~
7	6	M (ALL)	"A" OTSG steam leak in containment. (EOP-2, EOP-5)
8	7	C (BOP)	EFV-56 failed open. EFV-11 is closed to isolate flow to "A" OTSG. **[CT]**
9	8	C (RO)	"B" Train RBIC fails to actuate automatically/manually and MUV-258 fails to close. MUV-253 is closed by RO/BOP **[CT]**

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

SHIFT TURNOVER

A. Initial Conditions:

1. Time in core life – 300 EFPD
2. Shift: [X] Day [ ] Swing [ ] Mid
3. Rx power and power history – 60%, previously 100% for 40 days
4. Boron concentration – 1125 ppmb
5. Xenon – Equilibrium @ -2.4% ΔK/K
6. RCS Activity - See Status Board

B. Tech. Spec. Action requirement(s) in effect:

- T.S. 3.5.2 Condition "A" for DHP-1A. Condition entered 2 hours ago.

C. Clearances in effect:

- DHP-1A for breaker fuse block replacement. Expected return to service in 4 hours.
- MUP-1A shaft replacement due to high vibration. Expected return to service in 24 hours.
- RWP-1 for impellor replacement. Expected return to service in 4 hours.

D. Significant problems/abnormalities:

- FWP-2B governor oscillations.
- Severe thunder storms predicted for Citrus and Levy counties

E. Evolutions/maintenance for the on-coming shift:

- Continue power decrease to approximately 50% power and shutdown FWP-2B.
- Maintenance to continue work DHP-1A, MUP-1A and RWP-1.
- Substation personnel are in the switchyard doing routine maintenance on Unit 5 breakers.

F. ROs walk down the main control boards and provide the crew with the following data:

RCS Average Temperature	_____	Make-up Tank Level	_____
RCS Pressure	_____	Turbine Load	_____
Pressurizer Level	_____	Turbine Reference	_____

Op-Test No.: 1 Scenario No.: 3 Event No.: 1 Rev.: 01

Event Description: Normal power decrease to about 50% power. **(NORM EVOL)**

Time	Position	Applicant's Actions or Behavior
	RO	• Reduce power per OP-204 o Adjust load rate setpoint o Adjust ULD to about 480 o Monitor normal plant parameters o When power is <60% , Opens FW booster pumps recirc valves
	BOP	• Direct power reduction IAW OP-204 o Notifies the PPO and SPO that plant power reduction is continuing (Not required per OP-204.) o Notify Unit 1/2 of continued power reduction o Calls Chemistry when 15% power change in hour made o When plant power is < 60%, remove one CDP from service IAW OP-603 o When plant power is <52%, opens FW booster pump recirc valves open
	SRO	• Directs OAC/BOP to use OP-204 and commence a power reduction • Monitor the power reduction

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Rev.: 01

Event Description: Shortly after power decrease has commenced MS-112-PT fails low **(MALF)** resulting in a Half-Trip of both "A" and "B" EFIC trains for EFW, MSLI and MFWI. TS entry required.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announces and responds to alarms o (H-6-1) "Steam Gen B Main Steam Iso Actuated" o (H-6-2) "Steam Gen B Main Feedwater Iso Actuated" o (H-6-3) "Emerg FW Actuation" o Reviews AR • Verifies EFIC actuation is not valid • Verifies no EFW equipment started • Notifies SRO of instrument malfunction • Calls PPO to check status of EFIC Channels • Coordinates bypassing of the "C" EFIC Channel with the PPO per OP-450, Section 4.16, as directed by the SRO o Has the PPO come to the Control Room for a prejob brief on Bypassing "C" EFIC Channel o Verifies no RPS Channels bypassed o When PPO places "C" Channel in "Bypass", verifies: • Annunciator H-6-6 'EFIC BYPASS' received • Channel C - Event point 2025 o DEPRESS "Test Results/ Reset" pushbutton on MCB for associated EFIC train o ENSURE EFIC channel half trip has RESET • Participates in mini brief is held by SRO

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Rev.: 01

Event Description: Shortly after power decrease has commenced MS-112-PT fails low **(MALF)** resulting in a Half-Trip of both "A" and "B" EFIC trains for EFW, MSLI and MFWI. TS entry required.

Time	Position	Applicant's Actions or Behavior
	SRO	• Ensures BOP/RO verify that the EFIC actuation is not valid • Should direct RO to stop power reduction • Assists the BOP in diagnosing failure • Directs the BOP to have the PPO check EFIC Channels and report status • When MS-112-PT is reported, evaluates TS for applicability. Enters TS 3.3.11 Conditions "A" and "D" • Directs the BOP to bypass "C" EFIC Channel per OP-450 • Once "C" EFIC Channel is "Bypassed", should hold mini brief to discuss the consequences of the failed transmitter on an EFW actuation. o Vector Logic will close the block valve (EFV-32) to the "B" OTSG from the "B" Train. • Contacts Work Controls to initiate repair efforts (May request the SSO or STA to perform this)
	RO	• Verifies the EFIC actuation is not valid • Assists BOP in diagnosing failure • Participates in mini brief is held by SRO

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Rev.: 01

Event Description: After "C" EFIC channel is bypassed and TS is addressed the power decrease should continue. When the "B" MBV leaves its open seat the "B" MFWP governor will fail high. **(MALF)** The only way to control the failure will be to trip the "B" MFWP.

Time	Position	Applicant's Actions or Behavior
	RO	• Diagnoses MFWP malfunction o (K-6-1) "RCS delta Tc High" o (K-3-2) "SASS Mismatch" o "B" Train MFW flow increasing • May attempt to take manual control of the MFWP (no effect) • May attempt to control flow with the MFW control valves (This action will not work because the MBV is frozen in place due to FW flow error) • Should trip the "B" MFWP o Verify FWV-28 opens o Verify both MBVs close • May take both FW Demand stations to manual to place the plant in TRACK • Controls RCS pressure o May have to utilize the PZR spray valve for pressure control o May lower MUV-31 setpoint to limit PZR in surge • Informs SRO of component failures • Performs actions per AP-545 as directed by SRO o Verifies FWV-29 & 30 Closed o Verifies FWV-28 Open o Control RCS pressure 2130 to 2180 using spray and heaters o Ensure power is $\leq$ 52% and $\leq$ 1335 MWt o Verifies rod index is within limits of OP-103D curves (May use Group 59 computer group to verify this.) o Verifies Rod are within $\pm$ 6.5% of group average • Participates in crew brief when SRO calls for one

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Rev.: 01

Event Description: After "C" EFIC channel is bypassed and TS is addressed the power decrease should continue. When the "B" MBV leaves its open seat the "B" MFWP governor will fail high. ***(MALF)*** *The only way to control the failure will be to trip the "B" MFWP.*

Time	Position	Applicant's Actions or Behavior
	SRO	• Assist RO in diagnosing MFWP governor malfunction • Directs tripping of the "B" MFWP • Enters AP-545 and directs follow-up actions o Verifies FWV-29 & 30 Closed o Verifies FWV-28 Open o Directs BOP to make PA announcement and inform PPO and SPO of entry into AP-545 o Direct RO/BOP to control RCS pressure 2130 to 2180 using spray and heaters o Directs RO to ensure power is $\leq$ 52% and $\leq$ 1335 MWt o Directs BOP to have PPO "Select EFIC MFW isolation pump trip key switches to "BOTH" o May identify that ITS 3.7.3(A) is applicable until the switches have been swapped. o Has RO/BOP verify rod index within OP-103D curves o Has RO verify Rod are within $\pm$ 6.5% of group average • Ask SSO/STA to initiate repair efforts • Hold a Crew Brief when AP-545 is exited • If AMSAC channel tripped during FWP failure and if allowed time, directs BOP to restore AMSAC and EFIC Channels IAW OP-450
	BOP	• Assists RO in diagnosing MFWP governor malfunction • Assists RO with RCS pressure control • Performs actions per AP-545 as directed by the SRO o Directs the PPO to align EFW MFLI switches ▪ PPO to "Select EFIC MFW isolation pump trip key switches to "BOTH" o Verifies rod index within OP-103D curves • Participates in crew brief when SRO calls for one • If directed by SRO, performs section of OP-450 to reset AMSAC and EFIC channels if tripped during FWP failure

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Rev.: 01

Event Description: After the plant is stabilized the selected turbine header pressure transmitter will fail high over three minutes. **(MALF)** The Turbine, SG/Rx Master and TBVs must be taken to manual and header pressure restored.

Time	Position	Applicant's Actions or Behavior
	RO	• Announces and responds to alarms o (O-3-4) "TURBINE THROTTLE PRESSURE HIGH/LOW" o (K-3-2) "SASS MISMATCH" ▪ *Event Point 0771* "Turbine Header Pressure Loop "A" mismatch" • Controls turbine header pressure o Takes manual control of the turbine ▪ Coordinates closure of governor valves with BOP to restore header pressure o Takes SG/Rx Master station to manual o Takes the affected TBVs to manual ▪ Coordinates closure of TBVs with BOP to restore header pressure • Informs SRO of instrument failure • Select SP-10A-PT1 for control IAW OP-501 • Returns stations to automatic IAW OP-504 after good transmitter is selected o ADJUST ICS control stations as necessary to maintain the following conditions ▪ Turbine Header pressure at desired setpoint ▪ Reactor power and Feedwater flow matched within 5% ▪ RCS Tave at setpoint ▪ ΔTc at or near zero o Null out errors on ICS stations o Return Turbine to ICS Auto o Return "A" TBVs to Auto o Return SG/Rx station to Auto

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Rev.: 01

Event Description: After the plant is stabilized the selected turbine header pressure transmitter will fail high over three minutes. **(MALF)** The Turbine, SG/Rx Master and TBVs must be taken to manual and header pressure restored.

Time	Position	Applicant's Actions or Behavior
	SRO	• Assists in diagnosing header pressure transmitter failure • Ensure Turbine, TBVs and SG/Rx station are in Hand/Manual • Directs the restoration of turbine header pressure • Should hold a mini brief to ensure all crew members are aware of plant status. • Directs the BOP to perform applicable sections of OP-501 to swap to a good pressure transmitter • Direct the BOP to perform applicable sections of OP-504 to return ICS to AUTO. • Contacts work controls to initiate repair efforts
	BOP	• Assists RO in diagnosing header pressure transmitter failure • May take turbine to manual • May take TBVs to manual • Coordinates with RO to restore header pressure • Performs section 4.5 of OP-501 to swap to a good pressure transmitter o Checks computer point for "A" MS header pressure (T-228) to verify alternate instrument o Swap SP-10A-HS to SP-10A-PT1 • Direct OP-504 to assists RO in returning ICS stations to automatic

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Rev.: 01

Event Description: After the plant is stable and control stations placed back in automatic an SW leak into the "A" SW heat exchanger occurs. **(MALF)** AP-330 will be entered and actions taken to isolate the leak. The leak is sized such that the majority of the steps in the AP will be exercised to isolate the leak.

Time	Position	Applicant's Actions or Behavior
	BOP	• Announces and responds to alarms o (C-1-9) "SW Surge Tank Pressure High/Low" o (C-1-8) "SW Surge Tank Level High/Low" o Review AR • Diagnoses SW leak o Observe decreasing level in SW Surge tank o Monitor other surge tank levels o Monitor sump levels • Informs SRO of SW leak • Manually fill SW surge tank by opening SWV-277 o May also start WTP-6B to increase fill rate • Performs actions per AP-330 as directed by SRO o Makes PA announcement and informs PPO/SPO of AP-330 entry o Uses SWV-277 maintain SW Surge tank level o Starts WTP-6B o Checks for possible leak locations ▪ RCDT level ▪ DC Surge Tank levels ▪ "REACTOR BLDG SW SYSTEM LEAK" annunciator alarm (C-01-12) ▪ SF pool level o Directs PPO actions per AP-330 ▪ Check sump levels ▪ Isolate SW to SF heat exchanges ▪ Isolate SW to SW heat exchanges o Monitors SW Surge tanks level during isolation attempts to identify when leak is isolated

Op-Test No.: 1 Scenario No.: 3 Event No.: 5 Rev.: 01

Event Description: After the plant is stable and control stations placed back in automatic an SW leak into the "A" SW heat exchanger occurs. **(MALF)** AP-330 will be entered and actions taken to isolate the leak. The leak is sized such that the majority of the steps in the AP will be exercised to isolate the leak.

Time	Position	Applicant's Actions or Behavior
	SRO	• Assists BOP in diagnosing SW leak • Should enter AP-330 prior to meeting Entry Condition using the guidance in AI-505 and AR for SW Surge tank low level alarm • Directs follow-up actions of AP-330 o Directs BOP to make PA announcement and inform PPO/SPO of AP-330 entry o Directs RO that Rx is to be tripped if ▪ SW Surge Tank go < 2' ▪ If multiple CRD temperatures are ≥ 180°F o Directs BOP to use SWV-277 as necessary to maintain SW Surge Tank level o Directs BOP to start WTP-6B o Attempts to identify leak location having BOP/RO/PPO/SPO check following ▪ Conditions in Sea Water Room (PPO) ▪ Bldg sump levels (PPO/SPO) ▪ RCDT level (RO/BOP) ▪ DC surge tank levels (BOP) ▪ "REACTOR BLDG SW SYSTEM LEAK" annunciator alarm (C-01-12) (RO/BOP) ▪ SF pool level (RO/BOP) ▪ Consider SW to CI leak (SPO) ▪ Consider SW to SC leak (SPO) o When none of the above show leak location, continues to step 3.29 for SW leak with unknown location o Directs BOP to have PPO isolate SW to SF heat exchangers o Directs BOP to have PPO isolate SW heat exchangers • Contacts work controls to initiate repair efforts
	RO	• Assists in diagnosing SW leak • Performs actions per AP-330 as directed by the SRO o Assists in attempt to identify leak location

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Rev.: 01

Event Description: When the SW leak is isolated and AP-330 is exited the SPO reports an un-isolable oil leak on FWP-2A. AP-510 will be entered and a rapid power reduction will be performed. When the power reduction is started the turbine will not respond. **(MALF)** The RO/BOP will recognize this failure, take the turbine to manual and continue the power reduction.

Time	Position	Applicant's Actions or Behavior

	RO	• Starts power reduction using the ULD IAW AP-510
		  o Load Rate set to SRO directed rate
		  o ULD lowered to 10
		  o Monitors plant parameters
		  ▪ Diagnoses failure of turbine response
		  ▪ May take turbine to manual
		• If turbine malfunction is not recognized then alarms (N-6-4) "Turbine EHC on Manual", (O-3-4) "Turb Throttle Pressure High/Low", and (K-6-2) "Unit Master In Track" will annunciate after approximately two minutes
		• Informs SRO of turbine performance
		• May continue power decrease with Turbine in manual when directed by SRO
		• When low level limits are reached, aligns ICS stations for shutdown conditions
		  o Rx Diamond to "Manual"
		  o SG/Rx to "Hand" and lowered to 0
		  o FW Loops to "Hand" and lowered to 0
		• Begin RCS cooldown/power reduction IAW SRO direction
		• Inform SRO of when Rx power is < 12%

Op-Test No.: 1 Scenario No.: 3 Event No.: 6 Rev.: 01

Event Description: When the SW leak is isolated and AP-330 is exited the SPO reports an un-isolable oil leak on FWP-2A. AP-510 will be entered and a rapid power reduction will be performed. When the power reduction is started the turbine will not respond. **(MALF)** The RO/BOP will recognize this failure, take the turbine to manual and continue the power reduction.

Time	Position	Applicant's Actions or Behavior

	SRO	• Enters AP-510 and directs followup actions
		• Assists in diagnosing turbine malfunction
		• Directs BOP to take manual control of the turbine and continue power reduction
		• When low level limits are reached, directs RO to align ICS station for shutdown conditions
		  o Rx Diamond to "Manual"
		  o SG/Rx to "Hand" and lowered to 0
		  o FW Loops to "Hand" and lowered to 0
		• Direct RO to begin cooldown/power reduction to get <12%
		• Direct BOP in the tripping of the Main Turbine
		  o Establish turbine load 50 MWe (45 to 55)
		  o Ensure TBVs controlling header pressure
		  o *Trip turbine*

	BOP	• Assists in diagnosing turbine malfunction
		• May takes manual control of turbine
		• Restore header pressure
		• Perform power reduction with the turbine in manual
		• Trip the turbine when reactor power reaches <12%
		  o Establish turbine load 50 MWe (45 to 55)
		  o Ensure TBVs controlling header pressure
		  o Trip turbine

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Rev.: 01

Event Description: When the turbine is tripped a steam leak in containment will occur on the "A" OTSG. **(MAJOR)** This will require a reactor trip and entry into EOP-2.

Time	Position	Applicant's Actions or Behavior

	RO	• Diagnoses steam leak in containment
		• Determines affected OTSG
		• Informs SRO of steam leak
		• When directed depresses the manual reactor trip pushbutton
		  o Performs Immediate Actions for EOP-2, Vital System Status Verification
		  ▪ Depress Rx Trip pushbutton
		  ▪ Verify Group 1 thru 7 rods are in
		  ▪ Verify NIs indicate Rx is shutdown
		  ▪ Depress Turbine Trip pushbutton
		  ▪ Verify TV's and GVs are closed
		  o Performs EOP-02 Immediate Actions verification with SRO
		• Perform Symptom Scan as directed by SRO

	SRO	• Assists in diagnosing steam leak
		• Directs RO to trip the reactor and perform Immediate Actions of EOP-2
		• Enters EOP-2 and verifies Immediate Actions are complete
		• Performs Symptom Scan
		  o Verifies No Unit Blackout
		  o Verifies No Inadequate Subcooling Margin
		  o Verifies No Inadequate Heat Transfer
		  o Verifies No Excessive Heat Transfer (Excessive Heat transfer may be present depending upon time taken to get through Immediate Actions and Immediate Actions verification. If so then transitions to EOP-05)
		  o Verifies No increase in OGSG tube leakage
		• When symptoms of Excessive Heat Transfer reported, transitions to EOP-05

Op-Test No.: 1 Scenario No.: 3 Event No.: 7 Rev.: 01

Event Description: When the turbine is tripped a steam leak in containment will occur on the "A" OTSG. **(MAJOR)** This will require a reactor trip and entry into EOP-2.

Time	Position	Applicant's Actions or Behavior
	BOP	• Assists in diagnosing steam leak • Post Trip, depresses Global Annunciator alarm silence pushbutton • May isolate the affected OTSG using "prompt and prudent" guidance • Perform Symptom Scan as directed by SRO
	ALL	• Perform symptom scan o Verify No Unit Blackout o Verify No Inadequate Subcooling Margin o Verify No Inadequate Heat Transfer o Verify No Excessive Heat Transfer (Excessive Heat transfer may be present depending upon time taken to get through Immediate Actions and Immediate Actions verification. If so then transitions to EOP-05) o Verify No increase in OGSG tube leakage

Op-Test No.: 1 Scenario No.: 3 Event No.: 8 Rev.: 01

Event Description: When the "A" OTSG is isolated an EFIC actuation will occur. EFV-56 will fail as is. **(MALF)** EOP-5 must be entered to valve is isolated by closing EFV-11. **(CT)**

Time	Position	Applicant's Actions or Behavior
	RO	• Ensures "A" OTSG is isolated • Performs EOP-13, Rule 3, EFW/AFW Control • Determines EFV-56 is not closed (FOGG should have closed valve) • Recognizes EFV-32 is closed due to previous PT failure • Informs SRO of control valve failure • Performs actions per EOP-5 as directed by SRO to isolate control valve o Depresses MS Isolation "A" OTSG on "A" and "B" EFIC trains o Depresses MFW Isolation "A" OTSG on "A" and "B" EFIC trains o Selects EFV-58 to Manual and demand at 0 o Selects EFV-56 to Manual and demand to 0 ▪ Reports failure of EFV-56 to SRO
		o Selects Manual Permissive of EFIC trains o Closes EFV-11 **(CT)**
	SRO	• Directs isolation of the "A" OTSG • Enters EOP-5 and directs followup actions o Depresses MS Isolation "A" OTSG on "A" and "B" EFIC trains o Depresses MFW Isolation "A" OTSG on "A" and "B" EFIC trains o Selects EFV-58 to Manual and demand at 0 o Selects EFV-56 to Manual and demand to 0 o When reported failure of EFV-56 ▪ Directs Manual Permissive of EFIC trains ▪ Directs Close EFV-11 • Ensures cooldown is stopped • Ensures EFW is controlled
	BOP	• May assist RO with OTSG isolation and EFW control

Op-Test No.: 1 Scenario No.: 3 Event No.: 9 Rev.: 01

Event Description: The steam leak will raise containment pressure above 4 psig. "B" Train RBIC will fail to actuate automatically and MUV-258 fails open. **(MALF)** Manual isolation of MUV-258 is required by closing MUV-253. **(CT)**

Time	Position	Applicant's Actions or Behavior
	BOP	• Ensures ES actuation occurred correctly o Recognizes MUV-258 out of position and attempts to close (not effective) o Recognizes "B" Train RBIC did not actuate • Informs SRO of malfunctions • Should manually initiate "B" Train RBIC
		o Ensures MUV-253 closes to isolate MUV-258 **(CT)**
		o Ensures all "B" Train components repositioned as designed • Should discuss with SRO the fact that HPI & LPI will not automatically actuate from a manual RBIC o May elect to manually actuate HPI & LPI – SRO decision • Performs EOP-13, Rule 2, HPI Control
	SRO	• Assists BOP with ES malfunctions • Directs BOP to manually actuate RBIC • May elect to manually actuate HPI • Directs BOP to control HPI IAW EOP-13 Rule 2
	RO	• Assists BOP with ES malfunctions