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CRYSTAL RIVER UNIT 3

PLANT OPERATING MANUAL

EM-225

DUTIES OF THE TECHNICAL SUPPORT CENTER ACCIDENT ASSESSMENT TEAM

REVISION 29

TABLE OF CONTENTS

1.0 PURPOSE

1. This procedure provides guidance for the establishment and operation of the Technical Support Center Accident Assessment Team (AAT), for the determination of core and fission product barrier status, and for the interface with the Radiation Controls Coordinator. Information from these assessments will be used in conjunction with other guidance for development of accident mitigation strategies. This procedure also provides guidance to the AAT to perform actions described in the EOPs [NOCS 062718].
2. This procedure is an emergency plan implementing procedure. Any revisions to this procedure must be carefully considered for emergency plan impact.

2.0 REFERENCES

2.1 Developmental References

1. Response Technical Manual (RTM-96); USNRC; Volume 1, Rev. 3
2. Radiological Emergency Response Plan
3. Emergency Operating Procedures (EOPs)
4. NUREG-1228, Source Term Estimation during Incident Response to Severe Nuclear Power Plant Accidents
5. B&W Technical Bases Document
6. FPC IOC CR97-0122, Dated 12/23/97
7. NEI 91-04, Revision 1, Severe Accident Issue Closure Guidelines
8. FPC IOC SE99-0184, Dated 9/14/99
9. EEM-99-018, Rev. 0 Operating Limits for SWP-1A/SWP-1B under Minimum Flow Conditions
10. EM-202, Duties of the Emergency Coordinator
11. EM-102, Operation of Technical Support Center
12. EM-103, Operation and Staffing of the CR-3 Control Room During Emergency Classification
13. CP-151, External Reporting Requirements
14. Generic Letter 2004-02, Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors
15. EC 58982, RB Sump Strainer Modification
16. EC 59476, RB Sump Level Instrumentation Modifications
17. EC 55315, Alternate AC Diesel Generator
18. EC 66671, Installation of CR3 Intrusion Detection System (Firewall) and Refinement of the CR3 Cyber Security Defensive Model
19. INPO IER 11-2, Fukushima Daiichi Nuclear Station Sent Fuel Pool Loss of Cooling and Makeup
20. 10CFR50.54(x) or Section 24 of the Physical Security Plan
21. 10CFR50.72(a)(1)(i) and 10CFR50.72(b)(2)(i)

22. EEM-01-021
23. FSAR Table 4-10
24. IOC SE-99-0184
25. NOCS 62718, 62764, 62767, 96042, 100056, 100408, 100441, 100483, and 100568
26. IER 11-46 Extended Emergency Power Operations Following A Loss Of Off-Site Power
27. EC 84553, Minimum Expected EGDG Electrical Loads For R16 Extended Outage
28. Calc M89-0063, Waste Gas Decay Tank Rupture Environmental Condition
29. EC 92486, CR3 Response to NRC Request for Information Regarding Rescinding Fukushima Order
30. EC 76363, Radiation Monitors RM-A1/RM-A2 Replacement

2.2 **Implementing References**

1. CR-3 Severe Accident Guideline
2. Emergency Response Personnel Roster
3. AP-770, Emergency Diesel Generator Actuation
4. AP-990, Shutdown from Outside the Control Room
5. CH-632, Post Accident Sampling and Analysis of the Reactor Coolant, Decay Heat, and Reactor Building Sump
6. CP-151, External Reporting Requirements
7. EMG-NGGC-0002, Off-Site Dose Assessment
8. EM-103, Operation and staffing of CR-3 Control Room during Emergency
9. EM-202, Duties of the Emergency Coordinator
10. EM-206, Emergency Response Organization Notification
11. EM-225A, Post Accident RB Hydrogen Control
12. EM-225B, Post-Accident Boron Concentration Management
13. EM-225C, Post Accident Monitoring for Reactor Building Temperature
14. EM-225D, Guidance for Dry OTSG Tube to Shell Delta T Monitoring and Control
15. EM-225E, Guidelines for Long Term Cooling
16. EM-225F, Long Term Emergency Feedwater Management
17. EOP-3, Inadequate Subcooling Margin
18. EOP-5, Excessive Heat Transfer
19. EOP-6, Steam Generator Tube Rupture
20. EOP-7, Inadequate Core Cooling
21. EOP-8A, Loca Cooldown
22. EOP-8B, HPI Cooldown
23. EOP-9, Natural Circulation Cooldown
24. EOP-12, Station Blackout
25. EOP-14, Emergency Operating Procedure Enclosures
26. MP-575, Hydrogen Recombiner Installation
27. MP-815, Installation of Post Accident H2 Purge Flow Instruments
28. OP-103C, Cycle 17 Reactivity Worth Curves
29. OP-417B, Operation of the Post Accident Hydrogen Recombiner
30. SP-306, Routine Surveillance Log

3.0 DEFINITIONS

1. **Accident Assessment Team (AAT):** Consists of Coordinator, TSC Ringdown Communicator, Control Room Ringdown Communicator, Engineer, Operations Support, and NRC Communicator.
2. **Candidate High Level Actions (CHLA):** Actions described in the CR-3 Severe Accident Guideline which could be taken to mitigate a Severe Accident and are deemed appropriate based on Plant Damage Conditions.
3. **Critical Safety Functions (CSFs):** Those functions needed to ensure adequate core cooling and to preserve the integrity of the fission product barriers thereby protecting the health and safety of the general public and plant personnel. They include: reactivity control, coolant inventory control, decay heat removal capability, fission product barrier status, electrical power availability and control complex status.
4. **Inadequate Core Cooling:** Accident conditions that result in a loss of core cooling that requires entering EOP-7, Inadequate Core Cooling.
5. **Emergency Action Levels (EALs):** Conditions or indications that may be used as thresholds for initiating specific emergency measures (see EM-202, Duties of the Emergency Coordinator, Enclosure 1).
6. **Plant Damage Conditions (PDC):** Damage conditions used in the CR-3 Severe Accident Guideline to describe the status of the reactor coolant system, reactor core, and the containment during the progression of a Severe Accident.
7. **Protective Action Recommendations (PARs):** Emergency measures recommended for purposes of preventing or minimizing radiological exposures to the Energy Complex personnel or members of the general public.
8. **Severe Accident:** An accident (beyond that assumed in the CR-3 design and licensing basis) that results in catastrophic fuel rod failure, core degradation and fission product release into the Rx vessel, Reactor Building or the environment.
9. **Full HPI:** The conditions necessary to ensure ≥ the minimum required HPI flow assumed in the plant design basis. These conditions include: at least 1 MUP running with HPI flow through all 4 HPI nozzles (all 4 HPI valves open, or HPI crossties open with 1 train of HPI valves open) with one of the following:
   - HPI recirc to sump, MUP recirc, MU flowpath to the RCS, and RCP seal injection flowpaths isolated.
   - Total HPI flow is in the "Acceptable Region" of the "Minimum Required HPI Flow" figure.
10. **Less Than Full HPI** (Inadequate HPI flow, maximum cooldown in progress per EOP-3, Inadequate Subcooling Margin): Not all portions of the HPI flow path satisfy the independence criteria discussed in the CR3 ITS. Specifically, the HPI flow path downstream of the HPI/Makeup pumps is not separable into two distinct trains, and is therefore, not independent. As such, in the event of a postulated break in the HPI injection piping, injection flow is required through one of the following alignments:
    - A minimum of three (3) intact injection legs, assuming one pump operation
    - A minimum of two (2) intact injection legs, assuming two HPI pump operation.

4.0 RESPONSIBILITIES

1. Control Room Ringdown Communicator:

   - Reports to the Control Room and establishes communication with the TSC Ringdown Communicator on the Accident Assessment Ringdown phone. Brief TSC Ringdown Communicator on operator actions that are in progress.
   - Relays status of overall plant conditions, operator activities and questions to the TSC AAT.
   - Relays instructions to Control Room Operators for mitigating actions as directed by the Emergency Coordinator (EC).
   - If a Severe Accident is occurring, directs Control Room personnel regarding actions to take to mitigate the Severe Accident, based on actions approved by the TSC EC.
   - Relay request for support from the Control Room to OSC teams, via TSC Ringdown Communicator.
   - Once TSC is operational, request extra plant operators (if available) be sent to OSC for in plant support.
   - Inform TSC of in plant operator actions that are being performed.

2. AAT Coordinator:

- Informs the EC of any developments in plant status that may impact EALs and PARs.
- Ensures appropriate AAT personnel have staffed the TSC.
- Ensures additional AAT members are notified as needed.
- Identifies plant parameters to be tracked.
- Coordinates AAT activities and ensures that team members remain focused on objectives.
- Keeps the EC informed of AAT activities.
- If a Severe Accident is occurring, reviews recommended Candidate High Level Actions and mitigation plans prior to submitting to the Emergency Coordinator. [NOCS 100056]
- If a Severe Accident is occurring, coordinates efforts of the Accident Assessment team to ensure the development of mitigation strategies using the CR-3 Severe Accident Guideline.
- If additional resources are needed, coordinates with the EOF Technical Support Team to provide required support.
- Establishes communications with the Emergency Operating Facility (EOF) Technical Support Team, if the EOF is staffed.
- Approve Attachment 11, OSC Request Form to request operator actions outside CCHE or maintenance repair activities that have been initiated by the Control Room or AAT. This request should be processed through the OSC Manager to the OSC.
- Notifies Shift Manager in requal training for additional Operations support.
- Ensures TSC display screen computers are logged in. If computer room door is locked, contact Security for access.

3. TSC Ringdown Communicator:

- Establishes communications with the Control Room Ringdown Communicator on the Accident Assessment Ringdown phone.
- Relays information on changing radiological conditions and maintenance activities to the Control Room.
- Relays plant conditions from the Control Room to the TSC AAT.
- Maintains the Accident Assessment Team Log.
- Relays information and directions to the Control Room of actions required to mitigate a Severe Accident based on approved Candidate High Level Actions.
- Monitors progression through EOPs and APs.
- Initiate Attachment 11, OSC Request Form to request operator actions outside CCHE or maintenance repair activities for the OSC that is requested by the Control Room or AAT.

4. AAT Engineers:

   - Assesses plant conditions and provides engineering support for developing accident mitigation strategies as needed.
   - Aids in determining additional Engineering resources.
   - Monitors plant parameters for indications of core damage and status of fission product barriers.
   - During Severe Accident conditions, evaluates plant parameters, determines Plant Damage Conditions, and develops Candidate High Level Action recommendations using appropriate calculational aids from the CR-3 Severe Accident Guideline.

5. AAT Operations Support:

   - Monitors overall plant status during an emergency with emphasis on Critical Safety Functions.
   - Functions as a technical resource for Operations in assessing plant conditions and in development of accident mitigation strategies that are outside the scope of Emergency Operating Procedures (EOPs).
   - Maintains the CSF Status Board at the TSC.
   - During Severe Accident Conditions, provides support to the AAT Engineers in determining Plant Damage Conditions and developing mitigation strategies using the CR-3 Severe Accident Guideline.
   - Coordinates/processes requests for operator actions or maintenance support activities through the OSC Manager using Attachment 11, OSC Request Form.
   - Determine emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements.

6. NRC Communicator: [NOCS 96042]

   - Maintains an open, continuous communication line on the Emergency Notification System with the NRC Operations Center upon request by the Headquarters Operations Officer.
   - Log times NRC is notified of Emergency Classification changes and Protective Action Recommendations.
   - Make emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements.

7. EOF Technical Support Team:

   - Functions as a technical resource for the EOF Director in development of PARs by monitoring plant conditions (particularly the CSFs).
   - Assists the TSC AAT team as needed in development of mitigation strategies and in research of solutions to plant problems.
   - Responsible for the development of long-term recovery plans.

8. Emergency Coordinator (EC) or designee:

   - Controls all activities at CR-3 during activation of the Radiological Emergency Response Plan.
   - Implements EM-202, Duties of the Emergency Coordinator.
   - Determines EAL and PAR changes based on information obtained from the Accident Assessment Team and Radiation Controls Coordinator.
   - Functions as the decision maker during a Severe Accident. The EC will approve all recommended Severe Accident mitigation strategies prior to implementation.
   - Is authorized to declare 10CFR50.54(x and y) to implement emergency actions deemed necessary to protect the health and safety of the public. A separate notification is required to the NRC for each occasion. Once a Severe Accident is declared, only one notification to the NRC is required.

9. Radiation Controls Coordinator:

   - Supports the Accident Assessment team with on-site radiological data and with chemical and radiological analysis of samples as needed to assess the accident.
   - Provides Plant Radiation Monitor readings and assessments.
   - Provides projected radiological data (on-site and off-site doses, dose rates, and deposition) (> 1 hour to obtain).
   - Provides capability to obtain RCS samples for boron concentration.
   - Provides capability to obtain grab samples for RB Atmosphere and RB/AB Vent.
   - Provides in-plant radiological data.
   - Provides chemical and radiological analysis of OTSGs and secondary samples.
   - Provides Reactor Building sump boron concentration (> 1 hour to obtain).

5.0 PREREQUISITES

None

6.0 PRECAUTIONS, LIMITATIONS AND NOTES

Under Severe Accident Conditions, plant instrumentation may provide false or highly inaccurate readings due to harsh environments beyond their qualifications. Several instruments should be monitored along with trends to assess plant conditions.

7.0 SPECIAL TOOLS AND EQUIPMENT

None

8.0 ACCEPTANCE CRITERIA

None

9.0 INSTRUCTIONS

NOTE:	EM-225 attachments have been pre-marked with not applicable areas or known conditions based on a defueled reactor and Waste Gas Decay Tanks purged.

9.1 Accident Assessment Initiation

1. [AAT Coordinator or designee] PERFORM the duties of Attachment 1, AAT Coordinator Checklist.
2. [TSC Ringdown Communicator] PERFORM the duties of Attachment 3, TSC Ringdown Communicator Checklist.
3. [AAT Operations Support member] PERFORM the duties of Attachment 4, AAT Operations Support Checklist.
4. [AAT Engineers] PERFORM the duties of Attachment 5, AAT Engineers Checklist.
5. [Control Room Ringdown Communicator] REPORT to the Control Room **AND** PERFORM the duties of Attachment 6, Control Room Ringdown Communicator Checklist.
6. [NRC Communicator] PERFORM the duties of Attachment 7, NRC Communicator Checklist.

10.0 RECORDS

All attachments are quality records

TSC GUIDANCE FOR EOPS
[NOCS 62718, 62764, 62767]

This enclosure provides the relationship with the EOPs and TSC guidance during emergency events. It is management's expectation that the guidance steps will be implemented, based on the emergency condition of the plant, by either invoking 10 CFR 50.54 (x), (y), formal 10 CFR 50.59 reviews and approvals, or by existing approved procedures.

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
RB Hydrogen Control	EOP-3, EOP-6, EOP-7, EOP-8A, EOP-8B	HPIC, 5.4 III.F, 6.2, 10.0, 12.6b, 13.6b LBLO 4.4, 6.3 SBLO 12.4, 20.3, 9.3	1. Align hydrogen monitoring equipment using EOP-14, Enclosure 2, PPO Post Event Actions. 2. Monitor hydrogen concentrations using EOP-14, Enclosure 21, RB Hydrogen Monitor Log. 3. Purge RB when authorized per EM-225A. [NOCS 62767] Interfacing references are: • EM-206 for telephone number for procurement representative to obtain recombiners • MP-575 for installation of recombiners • OP-417B for operation of recombiners • MP-815 for installing H^2 purge flow indicators
Building Spray Termination Criteria	EOP-3, EOP-8A, EOP-8B EOP-14,Enc 19	None	If RB sump strainer blockage occurs consider alternate criteria for BSP shutdown (See EM-225E, Section 9.6) Verify all of the following before terminating Building Spray: 1. BS has been on for > or equal to 5 hours. 2. RB pressure is < 10 psig. 3. RB pressure is stable or lowering. 4. RB atmosphere is < 13 µci/cc I-131. 5. RB temperature is stable or lowering (also refer to EM-225C). 6. Concurrence is obtained from EC and Dose Assessment to terminate BS.
SFP Level and Temperature Trending	EOP-06, EOP-8A, EOP-8B, EOP-10 EOP-12 EOP-14 Enc 24	V1-IIIE V1-IIIA V1-IVA	Perform EOP-14 Enc 24, Monitoring Spent Fuel Parameters Interfacing references are: 1. AP-406, Loss of SFP Cooling 2. AP-1080, Refueling Canal, SFP level Lowering 3. AAG-05, Contingencies for Loss of SFP Level

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
Continue Cooldown With DHR System	EOP-6, EOP-8A, EOP-8B	FF, 11.5 NC, 11.4	Verify all of the following: 1. Begin establishing a Post Accident Recovery Plan (this can be done during plant cooldown). 2. The reactor is being cooled by DHR. 3. DHR cooling is consistent with maintaining adequate SCM. 4. The RCS is subcooled (use DH cooler outlet temperature for cooldown rates). 5. The RCS is depressurized. 6. Prohibit establishing any flow path that was isolated by the ES system unless the potential for radioactive releases is evaluated and the release path, doses, and methods have been approved by the EC. 7. Control of containment penetrations has been established. 8. Monitor and maintain RCS boron concentration for required shutdown margin.
Steaming an isolated OSTG for TRACC	EOP-6	III.E	Steaming an affected OTSG may be desirable for the following reasons: • Increase cooldown rate • Prevent challenging tube to shell dT limits • Prevent idle loop voiding when in natural circulation. All of the following conditions should be evaluated to determine if steaming an affected OTSG is appropriate: 1) BWST > 35 ft (1) **AND** 2) Affected OTSG Level < 90%(2) **AND** 3) Any of the following conditions exists: • Steaming is required to avoid core damage 1. Estimated OTSG leakage times RCS DE I-131 concentrations is < 0.4 OTSG Leakage (gpm) X Initial RCS DE I-131 (μci/gm) < 0.4 • Wind is blowing off-shore (Off-shore winds originate from NNE to SE sectors 011.2° to 146.3°)

Note (1) - If BWST level is < 35 ft, then determine if adequate BWST level is available for long term cooldown (Ref calc M89-1089) prior to steaming the OTSG.
(2) - If OTSG level is > 90%, then determine if OTSG level is low enough to prevent water carry-over. As long as water level can be ensured to be below the bottom of the main steam outlet nozzles there should not be any carry-over concern.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
BWST Makeup	EOP-6	III.E	Monitor BWST level trend and evaluate depletion rate. Ensure adequate BWST inventory is available to support RCS cooldown to DHR. Evaluation should include the following: • Primary to secondary leak rate • BWST available inventory • BWST depletion rate • Current RCS temperature • BWST volume required to support cooldown (refer to OP-304) • Potential for leak rate increase (leak before break) **IF** ECCS water supplies are insufficient to support cooldown to DHR, **THEN**, make preparations to initiate BWST makeup from spent fuel pools. • Refer to EM-225E, Enclosure 11, BWST Refill from Spent Fuel Pool
RCS Leakage No Longer Exists	EOP-8A, EOP-8B	None	1. The RCS is capable of being cooled by DHR. 2. Prohibit establishing any flow path that was isolated by the ES system unless the potential for radioactive releases is evaluated and the release path, doses, and methods have been approved by the EC. 3. Begin DHR.
Break size > 1 HPI Pump Capability or Unable to transition to DHR	EOP-8A, EOP-8B	None	1. Establish a Post Accident Recovery Plan. This plan is dependent on the scope of the applicable Emergency Event. 2. The Post Accident Recovery Plan is approved by the PNSC, and applicable regulatory agencies as determined by FPC Management. 3. Prohibit establishing any flow path that was isolated by the ES system unless the potential for radioactive releases is evaluated and the release path, doses, and methods have been approved by the EC. 4. The availability of borated water sources for required shutdown margin is maintained until the actions of the Post Accident Recovery Plan are completed or to the extent that plant and public safety is ensured. 5. Post and label protected train boundaries for the borated water sources and components that are available.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
Break size < 1 HPI Pump Capability and able to transition to DHR	EOP-8A EOP-8B	None	1. Transition to DHR cooldown. 2. Establish a Post Accident Recovery Plan. This plan is dependent on the scope of the applicable Emergency Event. 3. The Post Accident Recovery Plan is approved by the PNSC, and applicable regulatory agencies as determined by FPC Management. 4. Prohibit establishing any flow path that was isolated by the ES system unless the potential for radioactive releases is evaluated and the release path, doses, and methods have been approved by the EC. 5. The availability of borated water sources for required shutdown margin is maintained until the actions of the Post Accident Recovery Plan are completed or to the extent that plant and public safety is ensured. 6. Post and label protected train boundaries for the borated water sources and components that are available.
Establishing Primary to Secondary Heat Transfer to One or Both OTSGs		SS-2	1. Refer to the entry conditions and recommendations of the Emergency Operating Procedures Technical Basis Document (TBD), Section SS-2 for guidance related to establishing primary to secondary heat transfer to one or both OTSGs. 2. Accident Assessment personnel in the TSC will provide recommended guidance to the EC for when and how to establish heat transfer using one or both OTSGs. 3. The EC will approve any actions recommended.
Termination of HPI and Shutdown of RCPs	EOP-8A EOP-8B	LBLO, 2.2, 3.0	1. Recommended guidance is to stop HPI pumps and trip running RCPs when LPI flow has been in excess of 1400 gpm in each injection line for at least 20 minutes. Accident Assessment personnel will evaluate plant conditions and provide recommendations to the EC. 2. The EC will approve any actions recommended.
Control of Radioactive Release Paths from Containment Penetration Valves	EOP-8A EOP-8B	SBLO 12.0	1. Prohibit establishing any flow path that was isolated by the ES system unless the potential for radioactive releases is evaluated and the release path, doses and methods have been approved by the EC.
Monitoring of RB Sump Level, RB Sump Boron Concentration, RB Sump pH and RB Sump strainer ΔP	EOP-8A EOP-8B	None Other: IOC CR 97-0122	**NOTE:** With the installation of the TSP baskets, pH data is not required but still desired if feasible. 1. Accident Assessment personnel to monitor and trend RB sump level, boron concentration, pH and RB Sump strainer ΔP at intervals recommended by the EC. 2. Data for sump pH and boron concentration to be obtained using CH-632 or other PNSC approved alternate methods dependent on the Emergency Event.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
Venting of Non-Condensable Gases	EOP-8A EOP-8B	None	1. Once subcooling margin is regained, all of the noncondensable gas production will have ceased. However, as the RCS is depressurized these gases will come out of solution and should be vented. If natural circulation is lost to an available OTSG, Accident Assessment personnel will recommend to the EC when to vent noncondensable gases. 2. The EC will approve any actions recommended.
Reactor is Being Adequately Cooled Using HPI or LPI and OTSG Cooling is No Longer Desired	EOP-8A EOP-8B	SBLO, 17.7	1. Verify TBVs/ADVs are closed. 2. Fill available OTSGs to 90%. 3. Close EFW/AFW/MFW Valves. 4. Stop all EFW/AFW Pumps. 5. Stop MFWPs and MFWBPs.
Boron Concentration Management When Adequate Sub Cooling Margin Does Not Exist (Boron Precipitation)	EOP-8A EOP-8B EOP-14, Enc. 20	None	Refer to EM-225B **NOTE:** If a failure of ES MCC 3AB has occurred, ensure repair efforts are initiated to repower auxiliary pressurizer spray valve RCV-53 prior to the onset of boron precipitation.
RB Temperature Monitoring (To Preserve EQ Standards)			Refer to EM-225C
Feeding a Dry OTSG (Tube to Shell Delta T Monitoring and Control)	EOP-5, EOP-9, EOP-14, Enc. 3	III.D, 12.0 III.E, 17.7 NC, 5.2, 5.3, 6.4	Refer to EM-225D
Long-Term Core Cooling Using the RB Sump	EOP-8A EOP-8B	LBLO, 6.4a, 6.4b, 6.6, 6.7	Refer to EM-225E
EFW or AFW is Operating	EOP-14, Enc. 7 Enc. 22		Refer to EM-225F

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
TBP-3 is Running. TBP-2 is Not Running. Generator Purge Complete	EOP-14, Enc. 14		TBP-3 will drain non-1E battery during LOOP. Stopping TBP-3 before 24 hours may result in Turbine bearing damage. Refer to IOC SE-99-0184
Concentrated BA addition made and flush water not available.	EOP-14, Enc 18	None	If concentrated BA is allowed to remain in the boron injection path piping (letdown/DH purification piping) the BA will eventually cool down and solidify. Timely action is required to preclude this condition. 1. Direct the control room to reestablish a continuous BA injection at a flow rate of 2 - 3 GPM (Batch controller is the preferred method). 2. Monitor RCS boron concentration. **DO NOT** allow RCS boron concentration to exceed the values listed in FSAR Table 4-10. 3. Evaluate the following options. • If plant conditions permit, expedite restoration of RCS letdown (or DH purification). • If plant condition permit expedite restoration of power to at least one source of flush water (DWP-1A, DWP-1B, WDP-5A, WDP-5B, or WDP-5C). • If BA flow rate and AB temperature conditions permit, evaluate securing continuous BA addition and performing periodic batch additions to prevent boron solidification. 4. **IF** letdown or DH purification flow is established, **THEN** direct the control room to STOP concentrated BA additions. 5. **IF** any flush water source becomes available, **THEN** direct the control room to STOP concentrated BA additions and perform a line flush using EOP-14, Enclosure 18. Refer to EEM-01-021, FSAR Table 4-10

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF	TSC GUIDANCE
Indications of RB sump strainer blockage have occurred.	EOP-14, Enc. 19	None	ECCS pumps have been aligned to the RB sump and are now showing signs of sump strainer blockage (flow oscillations, pump amp swings, high RB strainer ΔP). Per EOP-14, Enclosure 19, ECCS Suction Transfer, LPI flows should have been reduced to 1400 gpm per pump. At least one BSP should be secured. If both trains of LPI are in service HPI should be secured. If only one train of LPI is in service, one train of HPI must be aligned to the operable LPI pump in piggy back mode. [NOCS 100483 and 100408] 1. Verify proper ECCS pump configuration 2. Closely monitor ECCS pump parameters, Incore temperatures and RB sump strainer ΔP (Ref. Recall Point 79). 3. Expedite BWST refill operation from spent fuel pool using EM-225E Enclosures 11 and 12. 4. Expedite mixing of boric acid for BAST makeup per OP-403B, Section 4.2, Boric Acid Production. 5. Refer to EM-225E, Section 9.6, Contingency Actions for RB Sump Strainer Blockage, for specific guidance.
Non-Vital Battery Hydrogen	EOP-12 AP-770	None	During operation of the Alternate AC Diesel the potential exists for hydrogen accumulation in the Non-vital battery room. A portable fan must be set up within the first 24 hours of continuous operation of the Alternate AC Diesel to promote ventilation and the dilution of any hydrogen gas. A 120 VAC duplex receptacle exists adjacent to ACDP-176.
CFT isolation not closed, RCS depressurizing	EOP-3 EOP-8A EOP-12		EOP-3, EOP-8A and EOP-12 have requirements to maintain RCS pressure above 140 psig if LPI is not available and CFT isolation valves are not closed to prevent the CFT from further being depleted. The continued depletion of the CFT below an RCS pressure of 140 psig can allow nitrogen gas used to pressurize the CFTs to enter the RCS. This nitrogen intrusion may result in voiding and interfere with primary to secondary heat transfer (Natural Circulation). Maintain RCS pressure > 140psig, re-establish LPI or close the CFT isolation valves.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF	TSC GUIDANCE
Station Blackout Guidance with only AAC Diesel supplying power to ES 4160V Bus. (no ES Diesel or offsite power available)	EOP-12	None	The AAC Diesel has more limitations then the ES Diesels based on additional loads on 4160 Rx Aux Bus 3 (i.e. Non-1E battery chargers). The AAC Diesel does not have the capability to load sequence and therefore ES is blocked from actuating when the AAC Diesel is powering the ES 4160V Bus. All actions for mitigating the event must be done manually. Actions outside of EOP-12 or procedures not referenced by EOP-12 may not work for all situations. Based on the situations which are beyond the scope of EOP-12 (i.e. LOCA, inadequate heat transfer, excessive heat transfer, SGTR, etc) the AAT needs to evaluate the specific guidance within other EOPs to develop mitigation strategy for the specific conditions. Based on the duration of the loss of offsite power or ES Diesels the following parameters need to be monitored and additional guidance given: • Monitor EFT depletion rate and heatup rate. Based on the depletion of EFT-2 give guidance to establish alternate EFW sources from the CST, FST or hotwell using cross-connect lines between the tanks if necessary (Ref EOP-14 Enclosures 22, Secondary Inventory Management). Refer to EM-225F. • Monitor BWST depletion rate. Based on BWST depletion rate establish guidance for transferring the ECCS or MUP suction to the RB sump if necessary (Ref EOP-14 Enclosure 19, ECCS Suction Transfer). Refer to EM-225E for guidance for filling BWST or allowable BWST level to support only a makeup pump. • Monitor Containment Temperatures. Ensure adequate RB cooling is being maintained. Refer to EM-225C.
Inadequate HPI flow, maximum cooldown in progress.	EOP-3		If multiple component/equipment failures or plant configuration results in inadequate HPI flow, then an alternate evaluation of less than FULL HPI flow can be considered based on ITS 3.5.2 bases, which states that the following injection flow path options can provide adequate HPI flow without meeting the configuration requirements of FULL HPI, as described in the definition section of this procedure: • A minimum of three (3) intact injection legs, assuming one pump operation • A minimum of two (2) intact injection legs, assuming two HPI pump operation.

EDG SCENARIOS TO ESTABLISH ADEQUATE LOADING

The following pumps and fans combinations will place an electrical loading on the EDGs greater than 600 kW (Reference EC 84553).

Case 1	Case 2
EGDG-1A Operating Loads Potential EDG Loading total – 686.0 KW • 272.9 KW - SWP-1A running • 383.3 KW - RWP-2A running (Note 1) • 29.8 KW - SFP-1A running	EGDG-1A Operating Loads Potential EDG Loading total – 689.4 KW • 63.4 KW - DCP-1A running • 160.1 KW - RWP-3A running • 215.4 KW - DHP-1A in recirculation mode to BWST at 3000 gpm (Note 2) • 155.4 KW - BSP-1A in recirculation mode to BWST at 1500 gpm (Note 2) • 95.1 KW - AHF-1A or AHF-1C running in high speed
EGDG-1B Operating Loads Potential EDG Loading total – 689.4 KW • 63.4 KW - DCP-1B running • 160.1 KW - RWP-3B running • 215.4 KW - DHP-1B in recirculation mode to BWST at 3000 gpm (Note 2) • 155.4 KW - BSP-1B in recirculation mode to BWST at 1500 gpm (Note 2) • 95.1 KW - AHF-1B or AHF-1C running in high speed	EGDG-1B Operating Loads Potential EDG Loading total – 686.0 KW • 272.9 KW - SWP-1B running • 383.3 KW - RWP-2B running (Note 1) • 29.8 KW - SFP-1B running

Note: (1) Operating both redundant pumps together can affect EDG loading in some cases due to load sharing between pumps (example: RWP-2A and RWP-2B).
(2) Monitor BWST water temperature to maintain below 92.5 deg F. Use of DHHE to cool the BWST may be required.

Other identified loads that should be available for operation to further increase the load if required or replace loads (example: BSP-1A/1B secured due to BWST temperature). Reference EC 84553 evaluation.

Load	Nameplate KW/HP	85% Nameplate KW	Comments
CHHE-1A/1B	194 kW	164.9	Electrical load is dependent on the CC heat load.
AHF-17A/17B AHF-18A/18B	60 HP	38.0	
AHF-19A/19B	20 HP	12.7	
AHF-24A/24B	15 HP	9.5	
AHF-29A/29B	10 HP	6.3	

AAT COORDINATOR CHECKLIST

NOTE: Attachment steps can be completed in any order ☐

1. BADGE IN at TSC card reader **AND** PLACE name on TSC Staffing Board ☐
2. NOTIFY the EC that the Accident Assessment Team is operational when ALL of the following are accomplished:
   - INITIATE Critical Safety Functions evaluation (Attachment 2, TSC Briefing Guideline) ☐
   - ESTABLISHED Communication via phone link with the control room or ability to monitor plant via computer (e.g. SPDS ☐
3. EVALUATE plant conditions **AND** ASSIST the EC in making timely and proper Emergency Classifications and Protective Action Recommendations ☐
4. ENSURE Attachment 2, TSC Briefing Guideline is complete. (normally by AAT Operations support) ☐
5. ENSURE Radiological Emergency Conditions Status Board is updated ☐
6. ENSURE phone link between Control Room and TSC Ringdown Communicators ☐
7. ENSURE each AAT position is staffed. REQUEST Security to contact additional AAT members as needed. (Refer to "Emergency Response Personnel Roster".)
   - Operations Support: _____
   - TSC Ringdown Communicator: _____
   - Control Room Ringdown Communicator: _____
   - Two Engineers: _____
   - NRC Communicator: _____
8. ENSURE all AAT members have badged in at TSC Card Reader ☐
9. DETERMINE parameters or parameter groups (SPDS and RECALL) to monitor **AND** ENSURE the desired parameters are displayed (Reference Attachment 12) ☐
10. ENSURE times and results of significant actions are documented throughout the emergency ☐

AAT COORDINATOR CHECKLIST

11. ENSURE AAT performs applicable attachments in EM-225 ☐

12. ENSURE OSC repair priorities are appropriate for plant conditions ☐

13. ENSURE the EC is informed of significant AAT activities and changes in plant status ☐

14. **IF** the EOF is staffed, **THEN** ESTABLISH communication with the EOF Technical Support Team via Accident Assessment Ringdown line, or extensions 6720/6205 N/A ☐ ☐

15. NOTIFY Off-Duty Shift Manager (requal crew or OSS crew) for additional Operations support ☐

16. APPROVE Attachment 11, OSC Request Form: (This request should go through the OSC Manager to the OSC)

    - Requests for operator actions outside CCHE ☐

      OR

    - Maintenance repair activities that have been initiated by the Control Room or AAT ☐

17. REVIEW Attachment 9, Dose Assessment Team Notification **AND** ENSURE updates are provided as plant conditions change ☐

NOTES:

1 AAG-005, Contingencies for Loss of SFP Level, contains guidance for establishing SF Pool makeup due to an extended loss of SF Pool cooling. ☐

2 Additional off-site equipment maybe needed to support guidance in AAG-005. ☐

3 Duke Energy Policy Statement PY-AD-ALL-0002 establishes an agreement with Duke nuclear fleet to provide an alternate PPIP. 1-1/2 inch fire hose may be obtained from on-site fire hose stations, local fire departments, fire equipment vendors, or other Duke sites, based on availability. ☐

18. **IF** additional equipment to control SF Pool level **OR** Spent Fuel Cooling is required, **THEN** request equipment from off-site Duke fleet resources with Emergency Coordinator approval. N/A ☐ ☐

TSC BRIEFING GUIDELINE

NOTE: REFER TO Attachment 8, Critical Safety Function Checklist and Attachment 10, Core Damage Assessment to aid in this evaluation ..... ☐

1.1 **REACTOR SHUTDOWN** ..... **Yes** ☒ **No** ☐

1.2 **CORE ADEQUATELY COOLED** (1) ..... **Yes** ☒ **No** ☐

1.3 **FISSION PRODUCT BARRIER ASSESSMENT** ..... ☒ **N/A (Defueled)** ☐

(Use Attachment 8,Critical Safety Function Checklist, Table 3)

1. Fuel Clad: Intact ☐ Potential Loss ☐ Loss ☐
2. RCS: Intact ☐ Potential Loss ☐ Loss ☐
3. Containment: Intact ☐ Potential Loss ☐ Loss ☐

1.4 **SPENT FUEL POOL STATUS:**

1. SF Pool Cooling Available? ..... Yes ☐ No ☐
2. SF Clad Intact? ..... Yes ☐ No ☐
3. SF Pool Level Stable (Indication On scale)? ..... Yes ☐ No ☐
4. SF Pool Temperature Stable? ..... Yes ☐ No ☐

1.5 **EMERGENCY ELECTRICAL POWER STATUS**

1. Off-Site Power Available? ..... Yes ☐ No ☐
2. ES Bus Energized? ..... Yes ☐ No ☐
3. Emergency Diesel Generator Available? ..... Yes ☐ No ☐
4. Alternate AC Diesel Generator Available? ..... Yes ☐ No ☐
5. DC Power Available? ..... Yes ☐ No ☐

1.6 **CONTROL COMPLEX STATUS**

1. Ventilation / Cooling Available? ..... Yes ☐ No ☐
2. Necessary Instrumentation Available? (2) ..... Yes ☐ No ☐

1.7 **OTHER CONDITIONS / CHALLENGES**

_____

_____

_____

_____

_____

Note (1) - Inadequate Core Cooling is accident conditions that result in a loss of core cooling that requires entering EOP-7, Inadequate Core Cooling (Ref step3.0.4)

(2) - Necessary refers to specific instruments and annunciators that are needed to identify, diagnose, and track the problems that are causing the emergency.

TSC RINGDOWN COMMUNICATOR CHECKLIST

NOTE: Attachment steps can be completed in any order ☐

1. ESTABLISH contact with the Control Room Communicator via the Accident Assessment Ringdown phone (receiver needs to be off the hook to use the headset) ☐
2. ENSURE the Control Room is informed of:
   - changing radiological conditions ☐
   - ongoing TSC maintenance and repair activities ☐
   - accident mitigation priorities ☐
   - operator actions outside the CCHE ☐
3. **IF** the EOF is staffed, **THEN** ESTABLISH communication with the EOF Technical Support Team via Accident Assessment Ringdown line, or extensions 6720/6205 N/A ☐ ☐
4. MAINTAIN the Accident Assessment Team log book with all significant events, changes in plant status, and requests to and from the Control Room ☐
5. RELAY information and directions to the Control Room as appropriate ☐
6. MONITOR progression through EOPs and APs,
   - Anticipate problems created by unavailable equipment or other unusual plant conditions ☐
   - MARK place keeping aids as appropriate to allow other AAT members to determine status of procedure usage. ☐
   - PROVIDE periodic status to AAT Operations Support member ☐
7. INITIATE Attachment 11, OSC Request Form:
   - Requests for operator actions outside CCHE ☐

     OR
   - Maintenance repair activities for the OSC that is requested by the Control Room or AAT ☐

AAT OPERATIONS SUPPORT CHECKLIST
[NOCS 62764]

NOTE: Attachment steps can be completed in any order ☐

1. BEGIN assessment of Critical Safety Functions to ensure adequate core cooling and fission product barrier preservation, USING Attachment 8, Critical Safety Function Checklist as applicable ☐
2. COMPLETE Attachment 2, TSC Briefing Guideline **AND** PROVIDE the results to the AAT Coordinator. Attachment 2, TSC Briefing Guideline should be completed periodically or as conditions change ☐
3. MAINTAIN the CSF Status Board at the TSC ☐
4. COMPLETE Attachment 9, Dose Assessment Team Notification **AND** PROVIDE the results to the TSC Radiation Controls Coordinator and the EOF Dose Assessment Team Leader. If conditions change, Attachment 9, Dose Assessment Team Notification should be reassessed and submitted to the Radiation Controls Coordinator ☐
5. Coordinates/processes requests for operator actions or maintenance support through the Repairs Coordinator using Attachment 11, OSC Request Form. REFER TO SP-306 for a list of EOB and EOL locations and contents ☐
6. **IF** RCS LOCA conditions exist, **THEN** COORDINATE performance of EM-225A, Post Accident RB Hydrogen Control [NOCS 62767] N/A ☒ ☐
7. **IF** RCS LOCA conditions exist, **THEN** COORDINATE performance of EM-225E, Guidelines For Long Term Cooling N/A ☒ ☐
8. **IF** SGTR exists, **THEN** MONITOR BWST depletion rate **AND** INITIATE BWST MU early in the event if necessary (see Enclosure 1, TSC Guidance for EOPs page 2 of this procedure) N/A ☒ ☐
9. **IF** EFW or AFW is operating, **THEN** COORDINATE performance of EM-225F, Long Term Emergency Feedwater Management N/A ☒ ☐
10. **IF** a Severe Accident is in progress, **THEN** ASSIST engineering in developing appropriate mitigation strategies using the Candidate High Level Actions in the CR-3 Severe Accident Guideline. [NOCS 100056] N/A ☒ ☐
11. PROVIDE appropriate input to the Communication/Report Coordinator to update Florida Nuclear Plant Emergency Notification Form Supplemental Data Sheet ☐

AAT OPERATIONS SUPPORT CHECKLIST
[NOCS 62764]

12. **IF** any diesel operated equipment is running, **THEN** EVALUATE the following parameters (OSC support and local observation might be required to obtain information on support systems and operating parameters) ..... N/A ☐ ☐

- Diesel support systems (i.e., ventilation, fuel transfer, cooling, etc.) ..... ☐
- Establish periodic monitoring of diesel operating parameters to ensure proper operation. Monitor every 4 hrs and adjust monitoring intervals as required based on trending results. For EDGs refer to OP-707, Operation Of The ES Emergency Diesel Generators and SP-354C, Functional Test Of The Alternate AC Diesel Generator EGDG-1C for operating parameters ..... ☐
- Operating EDG load limitation (loaded and unloaded) ..... ☐
- Fuel and lube oil supplies ..... ☐

NOTE: Low load/no load EDG Operation will accumulate unburned oil in exhaust system due to low exhaust temperatures, and may result in a challenge to EDG availability due to excessive exhaust back-pressure.

A key symptom of excessive exhaust back-pressure is erratic RPM/Frequency control followed by EDG Stall. When load is raised to burn off oil, ignited oil will be present in exhaust system. Dark smoke or possibly flame may be visible from the exhaust stack until excess oil is consumed, or removed..... ☐

13. **IF** any ES diesel loading is < 600 KW, **THEN** perform the following.

1) Ensure EDG is being monitored and Increase monitoring frequency to hourly interval and continue trending EDG parameters to determine if more frequent monitoring will be required. ..... ☐

NOTE: EDG Operational issues are expected after 2 hrs if no load or approx 6 hrs if loaded between 400 KW to 600 KW.

2) Determine equipment that can be added to maintain the EDG > 600 KW. Refer to Enclosure 2, EDG Scenarios To Establish Adequate Loading ..... ☐

3) Develop strategy for adding EDG loads ..... ☐

4) Obtain EC approval on developed strategies ..... ☐

5) Coordinate with the MCR on implementing strategies..... ☐

AAT OPERATIONS SUPPORT CHECKLIST
[NOCS 62764]

14. **IF** DHV-3 is required to be manually opened due to a Control Room fire resulting in AP-990, Shutdown from Outside the Control Room, entry, **THEN** COORDINATE RB entry activities.....N/A ☒ ☐

15. DETERMINE emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements ..... ☐

AAT ENGINEERS CHECKLIST
[NOCS 62764]

NOTE:	Attachment steps can be completed in any order.....	☐

1. PERFORM Attachment 10, Core Damage Assessment. PERFORM an initial and periodic assessment of core damage and fission product barriers, **AND** PROVIDE the results to the AAT Operations Support Member and the Radiation Controls Coordinator ..... ☐
2. **IF** RCS LOCA conditions exist, **THEN** COORDINATE performance of EM-225B, Post-Accident Boron Concentration Management..... N/A ☒ ☐
3. **IF** RCS LOCA conditions exist, **THEN** OBTAIN RB atmosphere I^{131} concentration **AND** TRANSMIT value to control room (for BS pump shutdown decision making)..... N/A ☒ ☐
4. MAINTAIN the Plant Parameters Status Board (if required). Based on plant conditions, PLACE key parameters on status board for trending ..... ☐
5. MONITOR for conditions listed in Enclosure 1, TSC Guidance for EOPs. PROVIDE the AAT Operations Support member with recommended actions..... ☐
6. **IF** RB temperatures are elevated, **THEN** COORDINATE the performance of EM-225C, Post Accident Monitoring Of Reactor Building Temperature..... N/A ☒ ☐
7. **IF** any OTSG level is ≤ 12.5 inches (indicating a dry OTSG), **THEN** COORDINATE the performance of EM-225D, Guidance For Dry OTSG Tube To Shell Delta T Monitoring And Control..... N/A ☒ ☐
8. EVALUATE the effects of proposed maintenance repair activities and operational manipulations on plant equipment..... ☐
9. DEVELOP contingency plans **AND** SUPPORT emergency repair efforts as applicable ..... ☐
10. **IF** a Severe Accident is in progress, **THEN** DEVELOP mitigation strategies using the Candidate High Level Actions in the CR-3 Severe Accident Guideline..... N/A ☒ ☐
11. Within 7 days, ENSURE SW minimum flow requirements are maintained. **IF** ES or RBIC has actuated and either SWV-353 or 354 has failed closed, **THEN** ESTABLISH flow to the RB coolers **OR** ENSURE only 1 SW pump is running. ..... ☐
12. **IF** additional computers are required **THEN** obtain, as needed, from nuclear administrative building (i.e., engineering laptop computers), that can be used to access documentation on the network..... N/A ☐ ☐
13. IDENTIFY AAT priorities using the AAT priority board in the AAT room ..... ☐

CONTROL ROOM RINGDOWN COMMUNICATOR CHECKLIST

NOTE: Attachment steps can be completed in any order ☐

1. ESTABLISH communication with the TSC Ringdown Communicator on the Accident Assessment Ringdown phone in the Control Room. BRIEF TSC Ringdown Communicator on operator actions that are in progress ☐
2. RELAY status of overall plant conditions, operator activities and questions to the TSC AAT ☐
3. RELAY instructions to Control Room Operators for mitigating actions as directed by the EC ☐
4. INFORM Control Room Operators of the following:
   - Changes in Emergency Classifications ☐
   - TSC repair efforts ☐
   - Operators activities dispatched from the TSC/OSC ☐
   - Changing radiological conditions ☐
   - Mitigation priorities ☐
5. MONITOR EOPs or APs in use by Control Room ☐
6. **IF** a Severe Accident is in progress, **THEN** DIRECT Control Room personnel regarding mitigation strategies, based on actions approved by the TSC Emergency Coordinator N/A ☒ ☐
7. RELAY requests for support from the Control Room to OSC teams, via the TSC Ringdown Communicator ☐
8. Once TSC is operational, REQUEST extra plant operators (if available) be sent to OSC for in plant support. (Ref. EM-103, Enclosure 1, Dispatching of Resources During Emergency Plan Entry) ☐
9. INFORM TSC of operator actions being performed ☐

NRC COMMUNICATOR CHECKLIST

NOTE: Attachment steps can be completed in any order ☐

1. CONTACT the Communication/Report Coordinator to determine if continuous communication with the NRC is required ☐
2. OBTAIN copies of any previously submitted NRC reports ☐
3. **IF** the NRC has requested continuous communication, **THEN** ESTABLISH communication with the NRC on the Emergency Notification System (ENS) N/A ☐ ☐
4. MAINTAIN a log book of significant communications between the NRC and CR-3, including a summary of responses to NRC questions and transmittal of information ☐
5. MAINTAIN an open line on the ENS until the NRC agrees to terminate communications ☐
6. LOG time(s) when TSC notifies NRC of Emergency Classification changes ☐
7. LOG time(s) when TSC notifies NRC of Protective Action Recommendations ☐
8. **WHEN** communication with the NRC is not required, **THEN** PROVIDE support to other AAT members as needed ☐
9. MAKE emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements. Examples include, but are not limited to:
   - Suspension of Safeguards (invoked under 10 CFR50.54(x), or Section 24 of the Physical Security Plan) ☐
   - The declaration of any of the Emergency Classes specified in EM-202, Duties of the Emergency Coordinator {10CFR50.72(a)(1)(i)} ☐
   - The condition of CR-3, including its principal safety barriers, being seriously degraded ☐
   - CR-3 being in an unanalyzed condition that significantly degrades plant safety ☐
   - One Hour Security Notifications for sabotage (10 CFR 73.71, Appendix G I(a)(2)) ☐

CRITICAL SAFETY FUNCTION CHECKLIST

NOTE: The parameter tables below are for reference only. It is not intended that the tables be completed during each evaluation. Plant computer point numbers or SPDS/RECALL point numbers are listed, if available. Using pre-established RECALL Groups based on accident type in progress is recommended.

1. MONITOR the parameters associated with the Critical Safety Functions. Qualified OSI PI EP folder has established Accident groups.("Start-Program-Business Apps-PI System-CR3 QPIM") ..... ☐

2. NOTIFY the AAT Coordinator immediately if any of the CSFs cannot be verified ..... ☐

TABLE 1: Reactor Shutdown Status

Reactivity Control ..... N/A ☒ ☐

PARAMETER	COMPUTER POINT	RECALL POINT			
All Rods at in-limits Y/N	P057	RECL-375			
Intermediate Range detector NI-3 amps	P212	RECL-150			
Intermediate Range detector NI-4 amps	P213	RECL-151			
Source Range NI-1 cps	P202	RECL-152			
Source Range NI-2 cps	P203	RECL-153			
Adequate Shutdown Margin	OP-103C Curve 18&19				

CRITICAL SAFETY FUNCTION CHECKLIST

TABLE 2: Core Cooling Status

ECCS/Support Status..... N/A ☒ ☐

PARAMETER	COMPUTER POINT	RECALL POINT			
Subcooling Margin					
A HPI Pump operating		RECL-209			
B HPI Pump operating		RECL-210			
C HPI Pump operating		RECL-211			
MUV-23 flow	W704	RECL-52			
MUV-24 flow	W706	RECL-54			
MUV-25 flow	W703	RECL-51			
MUV 26 flow	W705	RECL-53			
DHPs operating A/B (run/stop)	X063 X064	RECL-207 RECL-208			
DHP-1A flow	W409	RECL-55			
DHP-1B flow	W410	RECL-56			
CFT A level	P200				
CFT B level	P201				
CFT A press					
CFT B press					
BWST level (ft)	X335	RECL-57			
RWP-1 operating	X060				
RWP-2A operating	X061	RECL-222			
RWP-2B operating	X062	RECL-223			
RWP-3A operating		RECL-217			
RWP-3B operating		RECL-218			
DCP-1A operating (yes/no)		RECL-220			
DCP-1B operating (yes/no)		RECL-221			
SWP-1A operating		RECL-219			
SWP-1B operating					
SWP-1C operating					
RB Sump Strainer ΔP		RECL-79			

CRITICAL SAFETY FUNCTION CHECKLIST

TABLE 2: Core Cooling Status (Cont'd)

Secondary System Status ..... N/A ☒ ☐

PARAMETER	COMPUTER POINT	RECALL POINT			
EFIC OTSG A press	W449	RECL-252			
EFIC OTSG B press	W452	RECL-255			
OTSG A level	S285	RECL-92			
OTSG B level	S286	RECL-93			
MFW flow A	S301	RECL-100			
MFW flow B	S302	RECL-101			
EFPs operating 1/2/3/7					
EFP-1/3 Flow to A OTSG		RECL-246			
EFP-1/3 Flow to B OTSG		RECL-245			
EFP-2 Flow to A OTSG		RECL-248			
EFP-2 Flow to B OTSG		RECL-247			
Total EFW Flow to A OTSG	S300	RECL-408			
Total EFW Flow to B OTSG	S312	RECL-409			
EFW Tank Level		RECL-236			

CRITICAL SAFETY FUNCTION CHECKLIST

TABLE 3: Fission Product Barrier Assessment ..... N/A ☒ ☐

FUEL CLAD [NOCS 100441]		
☐ **INTACT**	☐ **POTENTIAL LOSS**	☐ **LOSS**
• Does **NOT** meet the criteria for "Potential Loss" or "Loss"	• RCS condition warrant entry into EOP-07, Inadequate Core Cooling • Core Exit Thermocouples > 700 degrees F	• RCS conditions in (or previously in) Region 3 or Severe Accident Region • RCS activity >300µCi/gr I^{131} dose equivalent. Additional indication is 100 mR/hr measured on RM-G3 or at one foot from sample lines in Nuclear Sample Room • RM-G29/30 > 100 R/hr for ≥ 15 minutes • Attachment 10, Core Damage Assessment indicates failed fuel
REACTOR COOLANT SYSTEM		
☐ **INTACT**	☐ **POTENTIAL LOSS**	☐ **LOSS**
• Does **NOT** meet the criteria for "Potential Loss" or "Loss"	• RCS leak or OTSG tube leak requiring one or more injection valves to maintain adequate subcooling margin • RCS pressure /Tincore relationship violates NDT limits • RCS leak or OTSG tube leak results in ES actuation on low RCS pressure. • HPI/PORV or HPI/Code Safety valve cooling is in progress	• RCS leak resulting in loss of adequate subcooling margin • OTSG Tube Rupture resulting in loss of adequate subcooling margin • RM-G29/30 >10R/hr for ≥ 15 minutes
CONTAINMENT		
☐ **INTACT**	☐ **POTENTIAL LOSS**	☐ **LOSS**
• Does **NOT** meet the criteria for "Potential Loss" or "Loss"	• RB pressure > 54 psig • RB hydrogen concentration > 4% • RB pressure > 30 psig with **NO** building spray available • RMG-29 or 30 reading > 25,000 R/hr • Core conditions in severe accident region of ICC curves for >15 min	• Containment isolation is incomplete and release path to environment exists. Confirmation may be from elevated radiation readings in areas adjacent to the RB. • OTSG Tube Rupture > 10 gpm exists and prolonged steaming to atmosphere or an unisolable steam leak outside RB from affected OTSG. • Containment pressure or sump level response **NOT** consistent with LOCA conditions • Rapid unexplained RB pressure decrease following an initial increase

CRITICAL SAFETY FUNCTION CHECKLIST

TABLE 4: Spent Fuel Pool Status

PARAMETER		YES	NO
SF Pool Cooling Available	• SF Pump, SWP, RW running OR • DHP aligned for SF Pool Cooling, DCP, RWP Running		
SF Clad Intact	• RM-G14/15 rising dose rate indication OR • Visual Report of Fuel Damage		
		STABLE	UNSTABLE
SF Pool Level	Indication On scale (Available MCB only) (Refer to EOP-14 Enclosure 24)		
SF Pool-Temperature	Ref to EOP-14 Enclosure 24		

TABLE 5: Emergency Electrical Power Status

Off-Site Power

PARAMETER	AVAILABLE	UNAVAILABLE
500 KV SWITCHYARD		
230 KV SWITCHYARD		
OFF-SITE POWER XFRM		
BEST		

ES Buses

PARAMETER	AVAILABLE	UNAVAILABLE
A-ES 4160V BUS		
B-ES 4160V BUS		
A- ES 480V BUS (1)		
B-ES 480V BUS (1)		

Emergency Diesel Generator

PARAMETER	RECALL PT.	LOADED	AVAILABLE	UNAVAILABLE
A-EDG	RECL-133,171			
B-EDG	RECL-134,172			
Alternate AC Diesel	N/A			

DC Electrical

PARAMETER (1)	AVAILABLE	UNAVAILABLE
A-BATTERY		
B-BATTERY		
C-BATTERY		

Note (1) - Battery failure will occur if associated battery chargers are de-energized.

CRITICAL SAFETY FUNCTION CHECKLIST

TABLE 6: Control Complex Status

Control Complex Ventilation Status

PARAMETER	AVAILABLE	OPERATING	UNAVAILABLE
A-TRAIN EMERGENCY RECIRC			
B-TRAIN EMERGENCY RECIRC			
A-CHILLER			
B-CHILLER			

Control Room Instrumentation Status

PARAMETER	AVAILABLE	UNAVAILABLE
NNI-X		
NNI-Y		
ICS		
EFIC		
RPS		
ESAS		

COMMENTS:_____

_____

_____

_____

_____

_____

_____

_____

_____

Performed By: _____ Date: _____/_____/_____ Time: _____

DOSE ASSESSMENT TEAM NOTIFICATION

NOTES: 1. The TSC/AAT supplies the TSC Radiation Control Coordinator and EOF DAT Leader with Attachment 9 to assist with the projection of off-site doses. ..... ☐

2 MARK items N/A or unknown based on information available at the time. ..... ☐

3 PROVIDE readily available information promptly **AND** FOLLOW UP with additional forms as more information becomes available. ..... ☐

4 Attachment 9 can be completed in any order. ..... ☐

- LOSS-OF-COOLANT ACCIDENT: Rx Trip Date/Time: _____/_____.....N/A ☒ ☐

a. Rx Fuel Cladding status: (from Attachment 10, Core Damage Assessment)

☐ Normal Activity (Spike Factor _____) (See General Information - Pg 3)
☐ Clad Damage
☐ Fuel melt

b. Rx Core Uncovered? (Rx Core covered is based on RCS NOT superheated)

☐ NO (Not in EOP-07, Inadequate Core Cooling)
☐ YES Uncovered - Date/Time _____/_____
Recovered - Date/Time _____/_____

c. Start of release to containment (start of the LOCA)

☐ Unknown
☐ Date/Time _____;

d. Release to atmosphere?

☐ NO
☐ YES
Date/Time _____/_____ Estimated duration _____
Release path (from where to where) _____
Release path flow rate (unmonitored releases):
☐ Estimated hole size _____ ☐ Diameter (in) or ☐ Area (in^2)
Containment pressure (RECL-82/83) _____ PSIG **OR**
☐ % RB Volume /day_____ (RB Volume is 2 $X10^6$ cu ft) **OR**
☐ gpm _____ **OR**
☐ Design Basis Leakage

e. Reactor Building Spray Actuated? (RECL-212/213)

☐ NO
☐ YES Dates/Times _____

f. Rx Bldg Vent flow rate (AH-1003-TIR Channel 4) _____
Charcoal banks in service ☐ YES / ☐ NO

g. Auxiliary Building ventilation (W351): flow rate _____
Charcoal banks in service ☐ YES / ☐ NO

h. Loose Parts Monitor indications?

☐ Unavailable / ☐ NO
☐ YES Location _____

DOSE ASSESSMENT TEAM NOTIFICATION

- WASTE GAS DECAY TANK RUPTURE: (See General Information-Pg 3)..... N/A ☒ ☐

  a. Release pathway:
  ☐ Tank rupture **OR**
  ☐ Valve leakage **OR**
  ☐ Other_____

  b. Tank volume _____ (Each WGDT volume = 1753 ft^3)
  Tank pressure _____ (RW203/204/205)

  c. Release rate ☐ Unknown **OR** ☐ _____ CFM

  d. Start of release
  ☐ Unknown **OR**
  ☐ Date/Time _____/_____ Estimated duration _____

  e. Auxiliary Building Ventilation (W351) Flow rate _____
  Charcoal banks in service ☐ YES / ☐ NO

- STEAM GENERATOR TUBE RUPTURE: Rx Trip Date/Time: _____/_____ N/A ☒ ☐

  a. Primary-to-secondary leak rate:
  ☐ Unknown **OR**
  ☐ _____ gpm **OR**
  ☐ Number of tubes _____

  b. Rx Fuel Cladding status: (From Attachment 10, Core Damage Assessment)
  ☐ Normal Activity (Spike Factor _____) (See General Information – Pg 3)
  ☐ Clad Damage
  ☐ Fuel melt

  c. Rx Core Uncovered? (Rx Core cover is based on RCS NOT superheated)
  ☐ NO (Not in EOP-07, Inadequate Core Cooling)
  ☐ YES Uncovered - Date/Time _____/_____
  Recovered - Date/Time _____/_____

  d. Leaking OTSG isolated? ☐ NO / ☐ YES Date/Time _____/_____

  e. Release Point:
  ☐ MSSV/ADV (intermittent/continuous) **OR**
  ☐ Condenser

  f. Start of leak
  ☐ Unknown **OR** ☐ Date/Time _____;

  g. OTSG Water Mass (See General Information – Pg 3)
  ☐ OTSG Water Mass _____ **OR**
  ☐ RASCAL default value of 93000 lbm

  h. OTSG Steaming Rate (See General Information – Pg 3)
  ☐ OTSG Steaming rate _____ **OR**
  ☐ RASCAL default 75000 lbm/hr

  i. Auxiliary Building Ventilation (W351): Flow rate _____
  Charcoal banks in service ☐ YES / ☐ NO

DOSE ASSESSMENT TEAM NOTIFICATION

- SPENT FUEL ACCIDENT: ..... N/A ☐ ☐

a. Spent Fuel uncovered?
☐ NO
☐ YES Date/Time _____/_____ Recovered Date/Time _____/_____

b. Spent Fuel Pool Empty?
☐ NO
☐ YES Date/Time _____/_____ Recovered Date/Time _____/_____

c. Fuel assembly damaged by dropped component/handling?
(See General Information below)
☐ NO
☐ YES Number of assemblies damaged _____ Damage Date/Time ____/____
Last irradiation Date _____ (use last refueling outage)
Damaged Fuel assembly underwater ☐ YES / ☐ NO / ☐ UNKNOWN

d. Auxiliary Building Ventilation (W351): Flow rate _____
Charcoal banks in service ☐ YES / ☐ NO

e. Dry Cask lost cooling?
☒ N/A ☐ NO
☐ YES <24 hrs_____ >24 hrs_____ Cask on fire _____;
Number assemblies in cask _____ Type of dry cask _____

GENERAL INFORMATION:

1. Initially use a spiking factor of 100. Adjusted spiking factor based on RCS sampling and analyses when accident conditions allow sampling to be performed. The Spiking Factor is used in RASCAL to distinguish the change in concentration of the fission products in the RCS due to a rapid drop in RCS pressure. The sudden RCS pressure drop increases the rate at which the radioactive fission products in the fuel rod cladding gap escape to the RCS.
2. Waste Gas Decay Tank Rupture information does not need to be completed if RM-A2 is in service monitoring release.
3. Use RASCAL default value if data is not known at the time of completing Attachment 9.
4. Fuel assembly damage is associated with damage from a dropped component and not clad failures due to overheating or flaws.

COMMENTS:_____

_____

_____

Performed By: _____ Date: _____/_____/_____ Time: _____

Reviewed By Accident Assessment Team Coordinator: _____

CORE DAMAGE ASSESSMENT

1. This attachment does not apply if the core is defueled ..... N/A ☐ ☒

2. DETERMINE if core damage has occurred using one or more of the following methods **AND** ESTIMATE the extent of the damage and status of the fission product barriers ..... N/A ☒ ☐

   - DETERMINE/ESTIMATE core damage based on RM-G29/30 radiation levels ..... ☐

NOTES:

1. Use of RM-G29/30 for determining core status requires a failure of the RCS (i.e., LOCA or PORV open).
2. Low monitor reading does not necessarily indicate lack of core damage. The release from the core may bypass the Containment, may be retained in the RCS, may be over a long period of time, or may not be uniformly mixed.
3. Inconsistent readings may be due to the uneven mixing in the Containment (e.g., steam rising to the top). It may take several hours for uniform mixing.

ASSUMPTIONS:

The below table assumes a short release. A long-term release cannot be characterized using these tables:

TIME	____:____	____:____	____:____	____:____	____:____
RM-G29	R/HR	R/HR	R/HR	R/HR	R/HR
RM-G30	R/HR	R/HR	R/HR	R/HR	R/HR

- No core damage ..... ☐
  - < 100 R/HR
- Possible clad failure and gas gap release ..... ☐
  - 100 - 25,000 R/HR with RB spray
  - 100 - 75,000 R/HR without RB spray
- Possible core melting ..... ☐
  - > 25,000 R/HR with RB spray
  - > 75,000 R/HR without RB spray

CORE DAMAGE ASSESSMENT

- DETERMINE/ESTIMATE core damage based on iodine ratios..... ☐

NOTE:	Core damage assessment based on Iodine Ratios will be evaluated by the Radiation Controls Coordinator using EMG-NGGC-0002, Off-Site Dose Assessment. Contact Dose Assessment Team to coordinate the activity of estimating core damage using this method. This method can take several hours based on the requirements to perform a gamma isotopic of a grab sample.

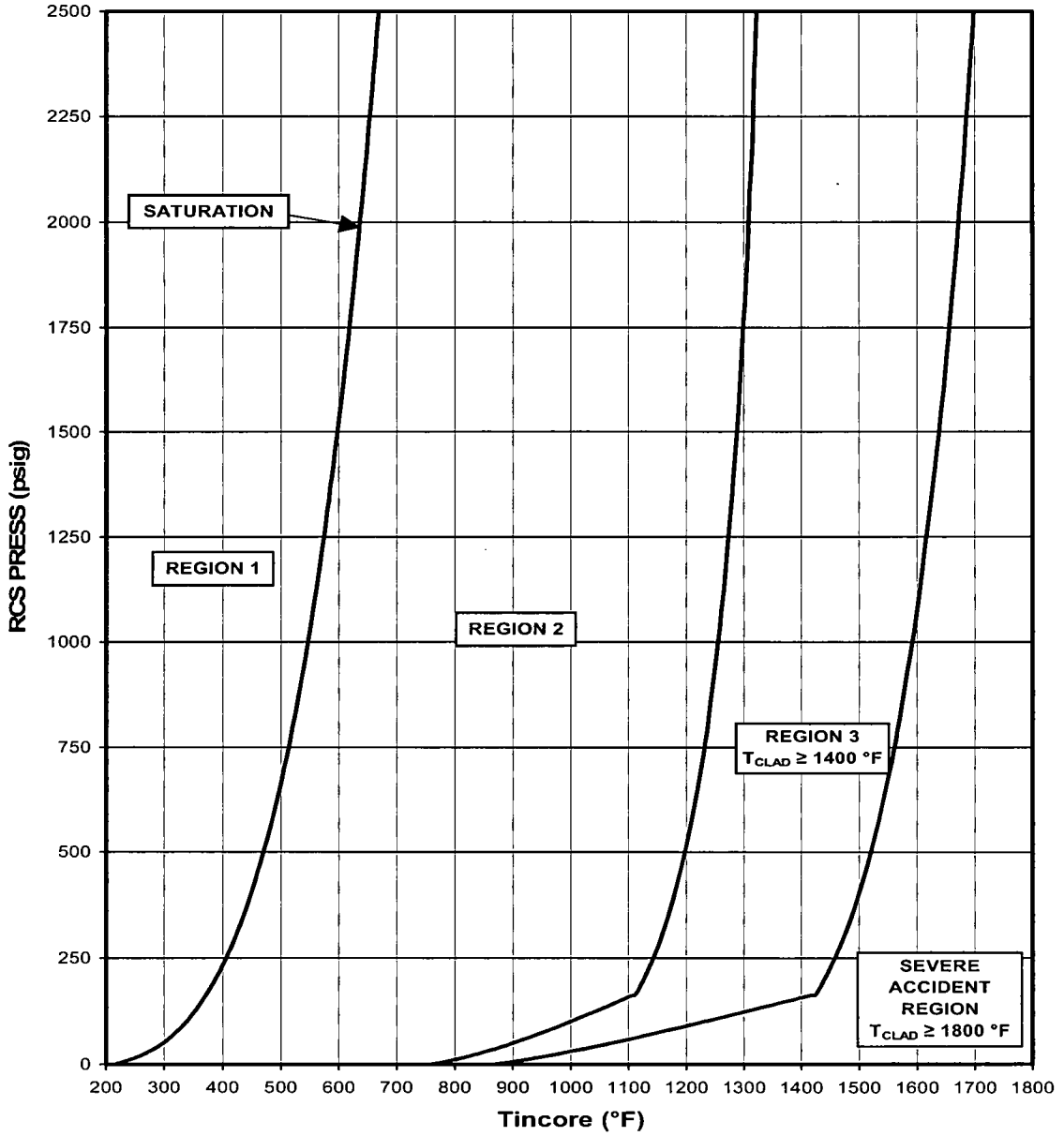
- No core damage..... ☐
  - I-131/Total Iodine < 0.05
- Possible clad failure and gas gap release / possible core melting(There is no way to distinguish between a gap release and a core melt release using iodine ratios) ..... ☐
  - I-131/Total Iodine ≥ 0.05

CORE DAMAGE ASSESSMENT

CORE DAMAGE ASSESSMENT BASED ON ICC CURVE

- DETERMINE/ESTIMATE core damage by plotting RCS pressure/Tincore temperature on the ICC curve below ..... ☐

NOTES:
1. Regions 1 and 2 indicate no fuel damage (normal RCS activity).
2. Severe Accident Region indicates possible core melt.
3. Region 3 indicates possible gas gap failure.



CORE DAMAGE ASSESSMENT

CORE DAMAGE PROGRESSION ONCE UNCOVERED

3. **IF** inadequate subcooling margin exists, **THEN** DETERMINE if the core is uncovered ..... N/A ☒ ☐

NOTES:
1. Reactor Coolant Inventory Tracking System (RCITS) provides a continuous indication of reactor vessel head and hot leg coolant inventory trend with the reactor coolant pumps in operation or tripped. RCITS consists of an RCS Hot Leg Level Subsystem, Reactor Vessel Level Subsystem and RC Void Trending Subsystem.
2. The RCS Hot Leg Level Subsystem (RC-163A/B-LR1) can monitor the top of the hot leg to the bottom of the hot leg with zero flow conditions. The Reactor Vessel Level Subsystem (RC-164A/B-LR1) can monitor the top of the reactor vessel to the bottom of the hot leg with zero flow conditions. The bottom of the hot leg is approximately two feet above the top of the fuel. An off-scale low reading would indicate a high probability of loss of level below core level. Any flow (including natural circulation) in the RCS will result in a lower than actual reading. Thus, any indicated level will provide assurance that coolant level is above the core.
3. The Reactor Void Trend Subsystem (RC-169-XR) monitors void trends in the RCS when RCPs are running. RCP motor power and T_{cold} are used to infer average density of fluid passing through the pump (liquid or two-phase). A 0% reading infers no voiding, while 100% reading infers complete voiding.
4. Recorders are on the PSA panel in the Control Room and display on RECALL (points 62, 63, 64, 65, 70, 71).

A-HOT LEG	B-HOT LEG	A-VESSEL	B-VESSEL	VOID TREND
RC-163A-LR1	RC-163B-LR1	RC-164A-LR1	RC-164B-LR1	RC-169-XR
RECALL PT 63	RECALL PT 70	RECALL PT 62	RECALL PT 65	RECALL PT 64,71

- Core remains covered ..... ☐
  - Tincore indicates saturated conditions
  - RCITS indicates any level
- Uncovered for 15 to 45 minutes ..... ☐
  - Core temperature 1800-2400°F
  - Fuel cladding failure (occurred in 34 minutes at Three Mile Island)
  - Rapid hydrogen generation
  - Release of fission products out of fuel pin gap (gas gap failure)
  - Local fuel melt

CORE DAMAGE ASSESSMENT

CORE DAMAGE PROGRESSION ONCE UNCOVERED (Cont'd)

- Uncovered for 30 to 90 minutes ☐
  - Core temperature 2400-4200°F
  - Possible un-coolable core
  - Possible slump of molten core
  - Rapid release of volatile fission products (grain boundary release)
- Uncovered for 1 to 3+ hours ☐
  - Core temperature > 4200°F
  - Maximum core melt and hydrogen generation
  - Maximum in-vessel fission product release
  - Possible melt-through of vessel

4. Report the results of the evaluation to the AAT operations support member and the Radiation Controls Coordinator ☐
5. Continue to re-assess core and fission product barrier status as conditions change ☐

(SAMPLE)

OSC REQUEST FORM

INSTRUCTIONS:

1. Use this form for each requested action from the Control Room, or Accident Assessment Team (multiple steps of EOPs/APs may be covered by one request)
2. Obtain approval from the AAT Coordinator
3. Obtain acknowledgement from OSC Manager
4. Make copy and give original to OSC Manager
5. Give copy to TSC Ringdown Communicator
6. Feedback to the Control Room on status of request.

REQUEST NUMBER: (UNIQUE NUMBER)	INITIATED BY:(AAT MEMBER)	TIME	DATE
REQUESTED ACTION(S):			
CONSEQUENCES IF NOT PERFORMED:			
TIME FRAME REQ'D	TAG NO:	TRAIN:	LOCATION:
APPROVAL (AAT COORDINATOR)			TIME:
RECEIVED BY: (TSC REPAIR COORDINATOR)			TIME:
FEEDBACK PROVIDED TO MAIN CONTROL ROOM (TSC RINGDOWN COMMUNICATOR)			TIME

SPDS OR RECALL DISPLAY SETUP FOR TSC PROJECTION SCREENS

NOTE: TSC plant computers are labeled EMCO-81 and EMCO-50. Rebooting any of the TSC plant computers will result in an alarm in the main control room. Call the control room before rebooting any TSC plant computer. Rebooting an NGG standard desktop computer will not result in an alarm.

1. In the projector room, CONNECT computer monitor to the desired computer interface box along the side of computer rack. **IF** the desired computer is not connected to an interface box, **THEN** CONNECT the video display cable from an interface box to the desired computer ..... ☐

2. **IF** the computer is an NGGC standard desktop computer, **THEN** USE the desired computer mouse to select the specific display desired: ..... N/A ☐ ☐

   a. LOG into the computer with a corporate ID ..... ☐

   b. SELECT start - programs - engineering - CR3 - CR3 PICS ..... ☐

   c. LOG into the pics access control client using system "CR3 PPCS" and "TSC" as the username and password ..... ☐

   d. For a specific recall display, SELECT "recall display program", SELECT one of the pre-established displays from the "workspaces" drop down menu, **AND** CLICK "open" ..... ☐

   e. For a specific SPDS display, SELECT "SPDS display" **AND** CLICK on the desired SPDS display buttons **OR** USE the keyboard (refer to the laminated card for commands). CNTRL H displays or hides the button bar. The button bar mimics the function panel on the MCB (Ref OP-509) ..... ☐

   f. For the subcooling margin monitor display, SELECT "t sat" ..... ☐

3. **IF** the computer is a TSC plant computer, **THEN** USE the desired computer mouse to select the specific display desired: ..... N/A ☐ ☐

   - For a specific recall display, SELECT one of the pre-established displays from the "*workspaces*" drop down menu, **AND** CLICK "open" ..... ☐
   - For a specific SPDS display, just CLICK on the desired SPDS display buttons **OR** USE the keyboard (refer to the laminated card for commands) ..... ☐

4. GO TO the touch screen (located in the main TSC room) which controls the projection screens. SELECT the desired projector room computer from the associated screen location (left, center, or right screen) ..... ☐

SUMMARY OF CHANGES
PRR 625518

NOTES:
1. Writers and Reviewers: Ensure that any changes to this procedure that affect information contained in Emergency Response Facility posters, enclosures, briefing cards, guidelines etc. are made to those items as well.
2. Writers and Reviewers: Changes to certain parts of this procedure may impact other Emergency Plan Implementing Procedures. Ensure appropriate PRRs are initiated as needed.

SECTION	CHANGE
Throughout	Change Revision to '29'
Section 2.1, Item 25	Add NOCS 100568 as a Developmental Reference (EDITORIAL)
Throughout	Change references to 'Repairs Coordinator' to 'OSC Manager' (EDITORIAL)
Attachment 7, Item 9	Added new bullet for 10 CFR 73.71 – One Hour Security Notifications for sabotage. Deleted 3rd bullet for plant shutdowns required by ITS, as the plant is permanently shut down. (PRR# 650001)