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CRYSTAL RIVER UNIT 3

PLANT OPERATING MANUAL

EM-225

DUTIES OF THE TECHNICAL SUPPORT CENTER ACCIDENT ASSESSMENT TEAM

TABLE OF CONTENTS

1.0 PURPOSE

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 Dose Assessment Team. 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]

2.0 REFERENCES

2.1 Developmental References

2.1.1 Response Technical Manual (RTM-96); USNRC; Volume 1, Rev. 3

2.1.2 Radiological Emergency Response Plan

2.1.3 Emergency Operating Procedures (EOPs)

2.1.4 NUREG-1228, Source Term Estimation During Incident Response to Severe Nuclear Power Plant Accidents

2.1.5 B&W Technical Bases Document

2.1.6 FPC IOC CR97-0122, Dated 12/23/97

2.1.7 NEI 91-04, Revision 1, Severe Accident Issue Closure Guidelines

2.1.8 FPC IOC SE99-0184, Dated 9/14/99

2.1.9 EEM-99-018, Rev. 0 Operating Limits for SWP-1A/SWP-1B under Minimum Flow Conditions.

2.1.10 EM-202, Duties of the Emergency Coordinator

2.1.11 EM-102, Operation of Technical Support Center

2.1.12 EM-103, Operation and Staffing of the CR-3 Control Room During Emergency Classification

2.1.13 CP-151, External Reporting Requirements

3.0 PERSONNEL INDOCTRINATION

3.1 Definitions

3.1.1 Accident Assessment Team (AAT) - Consists of Coordinator, TSC Ringdown Communicator, Control Room Ringdown Communicator, Engineer, Operations Support, and NRC Communicator.

3.1.2 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.

3.1.3 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.

3.1.4 Emergency Action Levels (EALs) - Conditions or indications that may be used as thresholds for initiating specific emergency measures (see EM-202, Enclosure 1).

3.1.5 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.

3.1.6 Protective Action Recommendations (PARs) - Emergency measures recommended for purposes of preventing or minimizing radiological exposures to the Generating Complex personnel or members of the general public.

3.1.7 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.

3.2 Responsibilities

3.2.1 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.

3.2.2 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 Enclosure 12 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 TSC Repairs Coordinator to the OSC.

3.2.3 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 Enclosure 12 to request operator actions outside CCHE or maintenance repair activities for the OSC that is requested by the Control Room or AAT.

3.2.4 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.

3.2.5 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). [NOCS 13010]
- 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 TSC Repairs Coordinator using Enclosure 12.
- Determine emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements.

3.2.6 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.

3.2.7 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.

3.2.8 Emergency Coordinator (EC) or designee

- Controls all activities at CR-3 during activation of the Radiological Emergency Response Plan.
- Implements EM-202.
- Determines EAL and PAR changes based on information obtained from the Accident Assessment Team and Dose Assessment Team.
- 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.

3.2.9 Dose Assessment Team

- 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 RCS PASS data (> 1 hour to obtain) on Radionuclide composition, Chloride concentration, Dissolved Hydrogen concentration, and Boron concentration.
- Provides Reactor Building and/or Auxiliary Building Atmosphere Radionuclide composition (> 1 hour to obtain).
- 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).
- Performs CH-632, Post Accident Sampling And Analysis of Reactor Coolant, Decay Heat, Reactor Building Sump, and Miscellaneous Waste Storage Tank, Enclosure 5 (if applicable) to determine core damage.

3.3 Limits And Precautions

3.3.1 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.

4.0 INSTRUCTIONS

4.1 Accident Assessment Initiation

4.1.1 AAT Coordinator or designee: PERFORM the duties of Enclosure 1, AAT Coordinator Checklist.

4.1.2 TSC Ringdown Communicator: PERFORM the duties of Enclosure 3, TSC Ringdown Communicator Checklist.

4.1.3 AAT Operations Support member: PERFORM the duties of Enclosure 4, AAT Operations Support Checklist.

4.1.4 AAT Engineers: PERFORM the duties of Enclosure 5, AAT Engineers Checklist.

4.1.5 Control Room Ringdown Communicator: REPORT to the Control Room and PERFORM the duties of Enclosure 6, Control Room Ringdown Communicator Checklist.

4.1.6 NRC Communicator. PERFORM the duties of Enclosure 7, NRC Communicator Checklist.

AAT COORDINATOR CHECKLIST

- ☐ Badge IN at TSC card reader and place name on TSC Staffing Board.
- ☐ Notify the EC that the Accident Assessment Team is operational when ALL of the following are accomplished:
  - ☐ Determine Critical Safety Functions (Enclosure 2)
  - ☐ Ability to brief EC on plant status to include impact of EALs or PARs through use of either SPDS or phone link established with Control Room.
- ☐ Determine current plant status and conditions.
- ☐ Ensure Enclosure 2 is complete. (normally by AAT Operations support)
- ☐ Ensure Critical Safety Functions Status Board is updated.
- ☐ Ensure phone link between Control Room and TSC Ringdown Communicators.
- ☐ Evaluate plant conditions and assist the EC in making timely and proper Emergency Classifications and Protective Action Recommendations.
- ☐ 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: _____
  - ☐ 2 Engineers: _____
  - ☐ NRC Communicator: _____
- ☐ Ensure all AAT members have badged in at TSC Card Reader.
- ☐ Determine parameters or parameter groups (SPDS and RECALL) to monitor and ensure the desired parameters are displayed.
- ☐ Ensure times and results of significant actions are documented throughout the emergency.
- ☐ Ensure AAT performs applicable enclosures in EM-225.
- ☐ Ensure OSC repair priorities are appropriate for plant conditions.
- ☐ Ensure the EC is informed of significant AAT activities and changes in plant status.
- ☐ If the EOF is staffed, establish communication with the EOF Technical Support Team using plant extensions (6720, 6205)
- ☐ During TSC briefing ensure Critical Safety Functions are addressed.
- ☐ Approve Enclosure 12 requests for operator actions outside CCHE or maintenance repair activities that have been initiated by the Control Room or AAT. This request should go through TSC Repairs Coordinator to the OSC.

TSC BRIEFING GUIDELINE

Refer to Enclosures 8 and 10 to aid in this evaluation.

I REACTOR SHUTDOWN — Yes ☐ No ☐

II. CORE ADEQUATELY COOLED — Yes ☐ No ☐

III. FISSION PRODUCT BARRIERS ASSESSMENT

Fuel clad	☐ Intact	☐ Challenged	☐ Lost	☐ Regained
RCS	☐ Intact	☐ Challenged	☐ Lost	☐ Regained
Containment	☐ Intact	☐ Challenged	☐ Lost	☐ Regained

IV. EMERGENCY ELECTRICAL POWER STATUS

Off-Site Power Available?	Yes ☐	No ☐
ES Buses Energized?	Yes ☐	No ☐
Emergency Diesel Generator's Available?	Yes ☐	No ☐
DC Power Available?	Yes ☐	No ☐

V. CONTROL COMPLEX STATUS

Ventilation/Cooling Available?	Yes ☐	No ☐
Necessary instrumentation Available?*	Yes ☐	No ☐

VI. OTHER CONDITIONS/CHALLENGES

_____

_____

_____

_____

_____

_____

_____

_____

* 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

- ☐ Establish contact with the Control Room Communicator via the Accident Assessment Ringdown phone.

- ☐ Ensure the Control Room is informed of changing radiological conditions, ongoing TSC maintenance and repair activities, accident mitigation priorities and operator actions outside the CCHE.

> **NOTE**
>
> The EOF Technical Support Team can monitor the Accident Assessment Ringdown phone, but cannot be heard.

- ☐ Maintain the Accident Assessment Team log book with all significant events, changes in plant status, and requests to and from the Control Room.

- ☐ Relay information and directions to the Control Room as appropriate.

- ☐ Monitor progression through EOPs and APs (using a copy of the applicable procedures), anticipating 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.

- ☐ Initiate Enclosure 12 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]

- ☐ Begin assessment of Critical Safety Functions to ensure adequate core cooling and fission product barrier preservation, using Enclosure 8 as applicable.

- ☐ Complete Enclosure 2 and provide the results to the AAT Coordinator. Enclosure 2 should be completed periodically or as conditions change.

- ☐ Maintain the CSF Status Board at the TSC.

- ☐ Complete Enclosure 9 and provide the results to the Dose Assessment Team Leader. If conditions change, Enclosure 9 should be reassessed and submitted to the Dose Assessment Team.

- ☐ Coordinates/processes requests for operator actions or maintenance support through the Repairs Coordinator using Enclosure 12. Refer to SP-306 for a list of EOB and EOL locations and contents.

- ☐ If RCS LOCA conditions exist, coordinate performance of EM-225A, "Post Accident RB Hydrogen Control." [NOCS 62767]

- ☐ If RCS LOCA conditions exist, coordinate performance of EM-225E, "Guidelines For Long Term Cooling."

- ☐ If SGTR exists monitor BWST depletion rate and initiate BWST MU early in the event if necessary (see Enclosure 11, page 2 of this procedure).

- ☐ If EFW or AFW is operating, coordinate performance of EM-225F, "Long Term Emergency Feedwater Management."

- ☐ If a Severe Accident is in progress, assist engineering in developing appropriate mitigation strategies using the Candidate High Level Actions in the CR-3 Severe Accident Guideline. [NOCS 100056]

- ☐ Using Enclosure 8, Part III, Fission Product Barrier Assessment, supply appropriate input to the Communication/Report Coordinator to update Florida Nuclear Plant Emergency Notification Form Supplemental Data Sheet for plant conditions information

- ☐ If any diesel operated equipment is running, evaluate the following parameters (OSC support and local observation might be required to obtain information on support systems and operating parameters):
  - Diesel support systems (i.e., ventilation, fuel transfer, cooling, etc.)
  - Diesel operating parameters
  - Operating EDG load limitation (loaded and unloaded)
  - Fuel and lube oil supplies

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

AAT ENGINEERS CHECKLIST
[NOCS 62764]

- ☐ Perform Enclosure 10. 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 Dose Assessment Team Leader.

- ☐ If RCS LOCA conditions exist, coordinate performance of EM-225B, "Post-Accident Boron Concentration Management."

- ☐ Maintain the Plant Parameters Status Board (if required). Based on plant conditions, place key parameters on status board for trending.

- ☐ Monitor for conditions listed in Enclosure 11. Provide the AAT Operations Support member with recommended actions.

- ☐ If RB temperatures are elevated, coordinate the performance of EM-225C, "Post Accident Monitoring Of Reactor Building Temperature."

- ☐ If any OTSG level is $\leq$ 12.5 inches (indicating a dry OTSG), coordinate the performance of EM-225D, "Guidance For Dry OTSG Tube To Shell Delta T Monitoring And Control."

- ☐ Evaluate the effects of proposed maintenance repair activities and operational manipulations on plant equipment.

- ☐ Develop contingency plans and support emergency repair efforts as applicable.

- ☐ If a Severe Accident is in progress, develop mitigation strategies using the Candidate High Level Actions in the CR-3 Severe Accident Guideline.

- ☐ 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, establish flow to the RB coolers or ensure only 1 SW pump is running.

- ☐ Additional computers may be obtained, as needed, from nuclear administrative building (i.e., engineering laptop computers), that can be used to access documentation on the network.

CONTROL ROOM RINGDOWN COMMUNICATOR CHECKLIST

- ☐ 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.

- ☐ Relay status of overall plant conditions, operator activities and questions to the TSC AAT.

- ☐ Relay instructions to Control Room Operators for mitigating actions as directed by the EC.

- ☐ 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

- ☐ EOPs or APs in use by Control Room.

- ☐ If a Severe Accident is in progress, direct Control Room personnel regarding mitigation strategies, based on actions approved by the TSC Emergency Coordinator.

- ☐ Relay requests for support from the Control Room to OSC teams, via the TSC Ringdown Communicator.

- ☐ 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)

- ☐ Inform TSC of operator actions being performed.

NRC COMMUNICATOR CHECKLIST

- ☐ Contact the TSC Report Preparation to determine if continuous communication with the NRC is required.
- ☐ Obtain copies of any previously submitted NRC reports.
- ☐ If the NRC has requested continuous communication, establish communication with the NRC Communicator on the Emergency Notification System (ENS). [NOCS 3054, 9405]
- ☐ 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.
- ☐ Maintain an open line on the ENS until the NRC agrees to terminate communications. [NOCS 10528]
- ☐ Log time(s) when NRC is notified of Emergency Classification changes.
- ☐ Log time(s) when NRC is notified of Protective Action Recommendations.
- ☐ When communication with the NRC is not required, provide support to other AAT members as needed.
- ☐ Make emergency and non-emergency notifications to the NRC as defined in CP-151, External Reporting Requirements.

CRITICAL SAFETY FUNCTION CHECKLIST

Monitor the parameters associated with the Critical Safety Functions. 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.

Notify the AAT Coordinator immediately if any of the CSFs cannot be verified.

I. REACTOR SHUTDOWN STATUS

REACTIVITY CONTROL

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			
Low Range NI-14/15		RECL-102,103			
Adequate Shutdown Margin	OP-103C Curve 18&19				

II. CORE COOLING STATUS:

ECCS/SUPPORT STATUS

PARAMETER	COMPUTER POINT	RECALL POINT			
Subcooling Margin	M114				
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			
RWPs operating 1/2A/2B/3A/3B					
DCPs operating A/B (yes/no)					
SWPs operating A/B/C					

SECONDARY SYSTEM STATUS

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					
EFW flow to A OTSG	S300	RECL-245			
EFW flow to B OTSG	S312	RECL-247			

III. FISSION PRODUCT BARRIER ASSESSMENT:

FUEL CLADDING BARRIER

☐ INTACT	☐ CHALLENGED	☐ LOST	☐ REGAINED
• No indication of cladding damage	• RCS condition warrant entry into EOP-07 • Core Exit Thermocouples > 700F	• RCS conditions in (or previously in) Region 3 or Severe Accident Region • PASS indicates increased RCS activity >300μCi/gr I_{131} (refer to CH-632) • RM-G29/30 > 100 R/hr for ≥ 15 minutes • Enclosure 10 indicates failed fuel	• Cooling restored, no further degradation expected.

REACTOR COOLANT SYSTEM BARRIER

☐ INTACT	☐ CHALLENGED	☐ LOST	☐ REGAINED
• Leakage is within normal makeup pump capacity	• 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	• HPI/PORV or HPI Code Safety Cooling stopped • Subcooling Margin restored and leak isolated

CONTAINMENT BARRIER

☐ INTACT	☐ CHALLENGED	☐ LOST	☐ REGAINED
• No evidence of containment leakage • Tube rupture release is only through condenser	• 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	• Repair efforts have isolated leak • Containment pressure has reduced to stop leakage

Performed By:_____ Date:_____ Time:_____

IV. 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 (Note 1)		
B-ES 480V BUS (Note 1)		

EMERGENCY DIESEL GENERATOR

PARAMETER	RECALL PT.	LOADED	AVAILABLE	UNAVAILABLE
A-EDG	RECL-133,171			
B-EDG	RECL-134,172			

DC ELECTRICAL

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

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

V. 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: _____

DOSE ASSESSMENT TEAM NOTIFICATION

1. The Accident Assessment Team is responsible for supplying the Dose Assessment Team with an evaluation of the accident type, the release pathway, and the release flow rate. The accident type affects the radionuclide distribution (i.e., percentage of each isotope) used by Dose Assessment to predict off-site doses.
2. The accident type is determined by physical parameters and instrument readings throughout the plant.
3. Complete the checklist below to the extent possible and give to the Dose Assessment Team Leader.

ACCIDENT TYPE

_____ LOCA	_____ W G Decay Tank Rupture	_____ OTSG Tube Leak
_____ Fuel Handling	_____ Other:_____	

☐ **LOSS-OF-COOLANT ACCIDENT** **TIME OF RX TRIP:**_____

a. Normal Activity _____ Clad damage ____ Fuel melt____ (from Enclosure 10)
b. Release pathway information (leak from where to where)_____
c. Release path flow rate (estimated for unmonitored releases)_____
d. Estimated duration_____ Unknown_____
e. Reactor Building spray on/off times_____
f. Aux. Bldg. Ventilation: Flow rate_____ Charcoal banks in service A:B:C:D
g. Containment pressure _____PSIG
h. Loose Parts Monitor indications No___ Yes___ Location:_____

☐ **WASTE GAS DECAY TANK RUPTURE**

a. Release pathway: Tank rupture_____ Valve leakage_____ Other_____
b. Tank volume_____ pressure_____
c. Release rate Unknown_____ Estimate _____CFM
d. Estimated duration: Unknown_____ Time_____
e. Aux. Bldg. Ventilation: Flow rate_____ Charcoal banks in service A:B:C:D

☐ **STEAM GENERATOR TUBE RUPTURE** **TIME OF RX TRIP:**_____

a. Primary-to-secondary leak rate:_____gpm
b. Core status: Cladding damage_____ Fuel melt_____ Normal_____
c. Leaking OTSG isolated: Yes_____ No_____
d. MSSV Open: Yes____ No____ ADV Open: Yes____ No____
e. Condenser vacuum: Yes____ No____ RM-A2 In Service?: Yes____ No____
f. Potential for change in status of leak: Yes_____ No_____
g. Estimated duration of leak:_____
h. Aux. Bldg. Ventilation: Flow rate_____ Charcoal banks in service A:B:C:D

☐ **FUEL HANDLING ACCIDENT**

a. Location of damaged fuel: Pool A____ Pool B____ Number of Elements_____
b. Damage caused by: Mechanical impact_____ Overheating_____ Unknown_____
c. Aux. Bldg. Ventilation: Flow rate_____ Charcoal banks in service A:B:C:D
d. Release pathway:_____ Unknown_____
e. Estimated duration_____ Unknown_____

Status as of _____ Date:_____ Completed By:_____

CORE DAMAGE ASSESSMENT

Determine if core damage has occurred using one or more of the following methods. Estimate the extent of the damage. Evaluate the status of the fission product barriers. Report the results of the evaluation to the AAT operations support member and the dose assessment team leader. Continue to re-assess core and fission product barrier status as conditions change.

☐ ESTIMATE CORE DAMAGE BASED ON RCS SAMPLES.

Core damage assessment based on Reactor Coolant samples will be evaluated by the Dose Assessment Team using CH-632, Enclosure 5. The results will be submitted to the AAT. (May take >2 hours to obtain results)

☐ ESTIMATE CORE DAMAGE BASED ON RM-G29/30 RADIATION LEVELS [NOCS 002153]

NOTE: **(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 PROGRESSION ONCE UNCOVERED

☐ IF inadequate subcooling margin exists,
THEN determine if the core is uncovered.

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.

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.

The Reactor Void Trend Subsystem (RC-169-XR) monitors void trends in the RCS when RCPs are running. RCP motor power and Tcold 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.

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

☐ UNCOVERED FOR 30 TO 90 MINUTES

Core temperature 2400-4200°F
Possible uncoolable 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

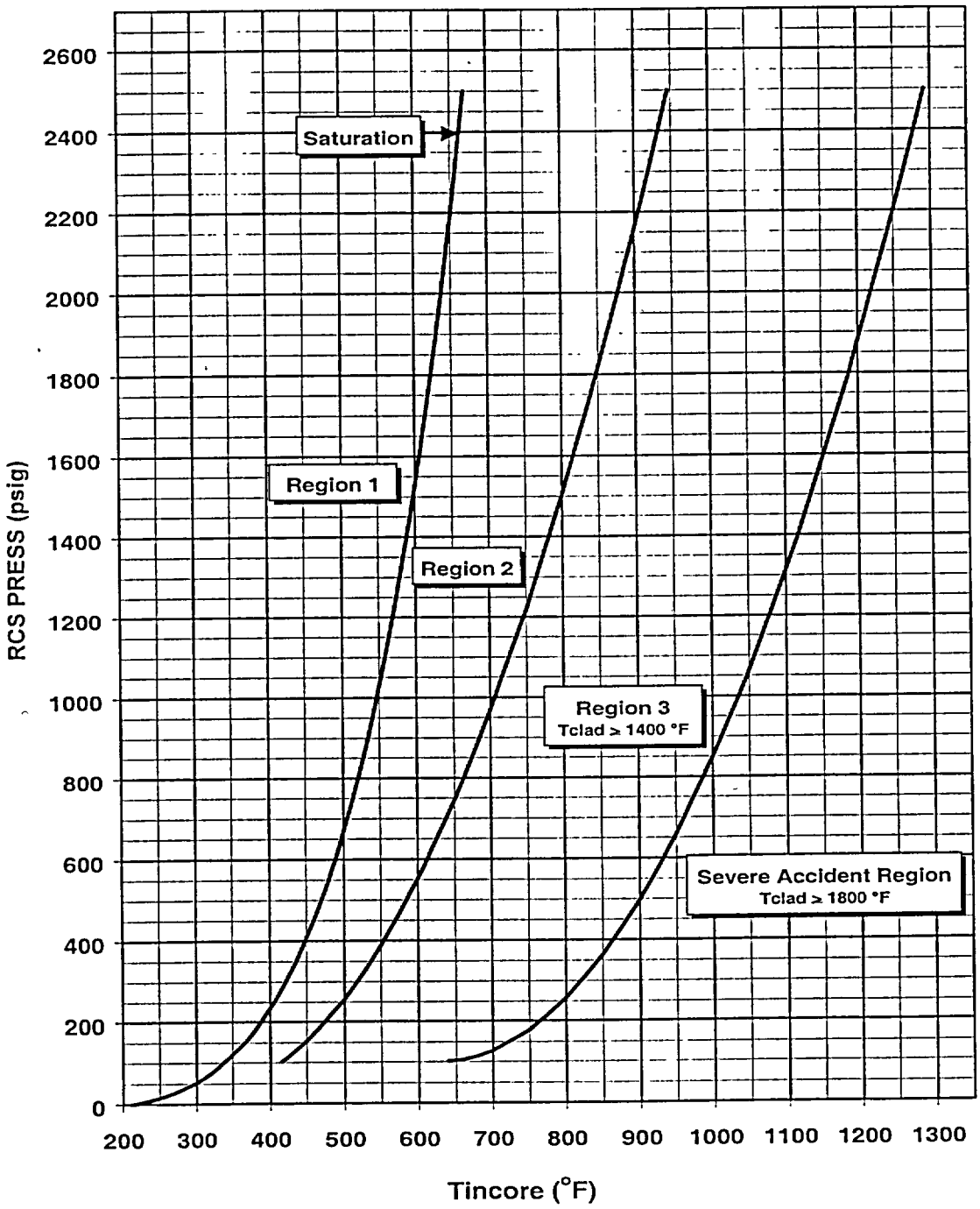
CORE DAMAGE ASSESSMENT BASED ON ICC CURVE

☐ ASSESS CORE DAMAGE BY PLOTTING RCS PRESSURE/INCORE TEMPERATURE ON THE ICC CURVE BELOW.

☐ Regions 1 and 2 indicate no fuel damage (normal RCS activity).

☐ Region 3 indicates possible gas gap failure.

☐ Severe Accident Region indicates possible core melt.



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, 6, 7, 8**	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, 8**	None	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.
Continue Cooldown With DHR System	**EOP-6, 8**	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.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
Steaming an isolated OSTG for TRACC	**EOP-6**	III.E	Steaming an affected OTSG may be desirable for the following reasons: o Increase cooldown rate o Prevent challenging tube to shell dT limits o 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* AND 2) Affected OTSG Level < 90%** AND 3) Any of the following conditions exists: • Steaming is required to avoid core damage • 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°) * 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. ** 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.
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: o Primary to secondary leak rate o BWST available inventory o BWST depletion rate o Current RCS temperature o BWST volume required to support cooldown (refer to OP-304) o 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 an available source. o Spent Fuel Pool (refer to OP-406) o BAST/DW addition (refer to OP-403B) o To prevent BWST boron concentration changes consider using SF pool inventory for BWST MU followed by BAST/DW MU to SF Pools.

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
RCS Leakage No Longer Exists	**EOP-8**	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-8**	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-8**	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-8**	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-8**	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, and RB Sump pH	**EOP-8**	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, and pH 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-8**	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-8**	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-8 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, 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-8**	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
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

TSC GUIDANCE FOR EOPs

PARAMETER	EOP	TBD REF.	TSC GUIDANCE
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 solidificaiton. 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

(SAMPLE)

TSC ACCIDENT ASSESSMENT TEAM
OSC Request Form

REQUEST NO. (UNIQUE NUMBER)	INITIATED BY: (AAT MEMBER)	TIME	DATE
REQUESTED ACTION:			
CONSEQUENCES IF NOT PERFORMED:			
TIME FRAME REQ'D	TAG NO:	TRAIN:	LOCATION:
APPROVAL (AAT COORDINATOR)			TIME:
RECEIVED BY: (TSC REPAIR COORDINATOR)			TIME:

INSTRUCTIONS:

1. Use this form for each requested action from the Control Room, or Accident Assessment Team
2. Obtain approval from the AAT Lead Coordinator
3. Obtain acknowledgement from TSC Repairs Coordinator
4. Make copy and give original to TSC Repairs Coordinator
5. Give copy to Ringdown Communicator
6. Feedback to the Control Room on status of request.

Revision Summary

SECTION	CHANGE
3.2.8 Enclosure 8 Enclosure 10	References to CH-632A and CH-632D changed to CH-632. All CH-632 series procedures have been combined into CH-632. PRR 85332
Enclosure 4	Added guidance for AAT to monitor BWST depletion and initiate BWST makeup if required.
Enclosure 11 (page 2)	Added TSC guidance for evaluating BWST depletion and initiating BWST refill if required.