Nuclear Power Business Unit

U1R28 REDUCED-INVENTORY ORANGE PATH CONTINGENCY PLAN
Revision: 0

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PORC Approval (Rev. 0)	Mike Schug (Name (Print))	Michael Schug 3/16/04 (Signature)	PORC #:	2004-015
Plant Manager Approval:	Jim D Shaw (Name (Print))	(Signature)	Date:	3/16/04

SCOPE SUMMARY:

The purpose of this contingency plan is to address an Orange Risk Level (or Orange Path) for the Key Safety Functions of Core Cooling and Inventory which will be entered when Reactor Vessel Level is lowered below 55% (defined as reduced inventory) to approximately ¾ pipe level during Unit 1 Refueling Outage 28 (U1R28). The RCS will be drained to ¾ pipe twice during this outage to facilitate installation and removal of S/G nozzle dams. This plan defines the compensatory actions necessary to maintain defense-in-depth, restore defense-in-depth when system availability drops below the planned defense-in-depth, minimize the likelihood of a loss of key safety functions during higher risk evolutions, and to provide guidance for recovery once a key safety function is lost.

In accordance with NP 10.3.6, "Outage Safety Review and Safety Assessment", PORC approval is required for Rev. 0 of this plan for the entry into an Orange Path.

JUSTIFICATION:

Orange path entry for nozzle dam installation and removal will increase the efficiency of outage activities by allowing S/G eddy current testing during fuel motion.

Orange path entry is permitted in accordance with NP 10.3.6 provided contingency plans are in place to prevent or mitigate the consequences of further reduction in plant safety systems. In this case, the plans are necessary to prevent, or mitigate the consequences of, a loss of decay heat removal (DHR). Loss of DHR could lead to boiling in the core and core uncovery if DHR is not restored or alternate cooling methods are not initiated. However, operation in a reduced inventory condition is not a new evolution at Point Beach. Operations procedures and Shutdown Emergency Procedures are in place to address entry into a reduced-inventory condition, recover from degraded residual heat removal (RHR) capability, and provide direction for establishing alternate core cooling.

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CONTINGENCY PLAN DESCRIPTION

1. Maintaining Defense-in-Depth

Defense-in-depth will be maintained by identifying protected equipment in advance (see Protected Equipment List), including both trains of residual heat removal (RHR) and component cooling water (CCW), and their respective 4160/480 volt power supplies. In addition to the protected equipment, other equipment required will be available (see Required Status for OP-4F) to meet requirements for entry into reduced inventory.

Protected equipment is listed in daily plant/outage status reports and is posted on the Shutdown Safety Status Boards located throughout the plant to inform personnel of equipment needed for defense-in-depth. The areas where protected equipment is located will also be posted to heighten awareness of personnel working in the areas as to the importance of the equipment for shutdown safety. Work on protected equipment shall be prohibited, unless the work is required to maintain equipment operability (i.e., checking oil levels, adjusting packing, etc.).

Review of scheduled outage activities for impact on defense-in-depth / key safety functions is performed by Programs Engineering (EPP). EPP[1] shall review the entire outage schedule, added outage activities, and FIN team work activities for impact on defense-in-depth to ensure defense-in-depth is maintained and to verify that appropriate logic ties are in the schedule to preclude inappropriate work during the reduced inventory condition. Certain activities are not allowed to be conducted in the reduced inventory condition, unless a safety assessment is performed as identified in NP 10.3.6, Revision 11. This requirement is based on an NRC commitment transmitted via letter VPNPD-93-003 dated January 7, 1993. The following text is quoted from NP 10.3.6:

5.1.4 "If fuel is in the reactor vessel while the reactor coolant system is being operated in the reduced inventory condition, then the following work activities are not allowed:
a. All safety-related work
b. All electrical work
c. All primary system work on the refueling unit *(Note: VPNPD-93-003 states "on the unit in reduced inventory")*
d. All testing on either units

5.1.5 Exceptions to this restriction will be allowed (i.e., work activities may be performed) for those activities which have had an assessment as to potential impacts on outage safety. The assessment is performed by the Nuclear Safety Analysis (NSA) Group."

The physical listing of allowed work, eg., exceptions to the requirements described above, will be provided by Outage Planning[2] and will be attached to the copies of this document that are in the possession of the Shift Manager, Outage Control Center, and Control Room.

The Shift Technical Advisers (STAs) or Engineering personnel assigned, monitor Key Safety Functions once for each 12-hour shift and document this via form PBF-1562, PBNP Shutdown Safety Assessment and Fire

[1] Contact is Dave Black
[2] Contact is Mike Bull

Condition Checklist. The Key Safety Function monitor also conducts a walkdown of sensitive fire protection and equipment areas to ensure no fire risks exist in areas where RHR and CCW cabling is routed, to verify no work is being conducted on protected equipment and to verify credited equipment is available.

2. Restoring Defense-in-Depth

To avoid an entry into a Red Risk Level while in reduced inventory, two trains of RHR and CCW are required to be available (Core Cooling) and two Inventory flow paths are required to be available. If an RHR train becomes unavailable, Operations shall take immediate actions to restore the unavailable RHR Train. With only one RHR train available, the unit is in a RED risk level for Core Cooling. PORC approval is required to remain in a RED risk level. Two inventory flow paths shall be available at all times, either via SI and/or charging systems. If only one charging / SI flow path is available, then credit can be taken for RHR as an inventory flow path to avoid a RED Inventory risk level while in reduced inventory, provided the conditions in Step 2.3 under the Reactivity Checklist Definition of NP 10.3.6 are met (Note: Reactivity is correct here). Immediate action shall be taken to identify as available or restore to available another SI or charging inventory flow path.

3. Minimizing the Likelihood of a Loss of a Key Safety Function

Minimizing the likelihood of a loss of a key safety function is accomplished as follows:

(1) Engineering Programs performs continuing assessment of the outage schedule and emergent activities for impact on maintaining defense-in-depth and key safety functions.
(2) The PPG Outage Planning group shall ensure activities proposed to be added to the schedule and which might be scheduled while in a reduced inventory condition are reviewed by Engineering Programs. EPP will consult with Operations/SROs as needed. The PPG Manager or his designee will then approve the activity for inclusion in the outage schedule.
(3) Protected equipment and / or areas containing protected equipment shall be identified prominently in the field per the requirements of NP 10.3.6, "Outage Safety Review and Safety Assessment".
(4) The STAs or engineering designee monitor Key Safety Functions once for each 12-hour shift and document this via form PBF-1562, PBNP Shutdown Safety Assessment and Fire Condition Checklist.
(5) Critical evolutions for entering a reduced inventory condition are controlled by Operations via existing plant procedures as follows: OP 4D Part 1, "Draining the Reactor Coolant System" (IPTE); OP 4F, "Reactor Coolant System Reduced Inventory Requirements"; and OP 5A (IPTE for Section B), "Reactor Coolant Volume Control".
(6) The "Contingency Steps for Reduced Inventory" will be reviewed by Operations during each shift briefing while the RCS is in reduced inventory.
(7) The OCC will evaluate the impact of shift change on critical activities during reduced inventory. For example, raising RCS level to exit fill and vent, S/G manway installation or removal, or nozzle dam activities. The OCC will, in a timely manner, recommend actions to minimize or manage the impact of turnover on reduced inventory activities. Recommendations could include moving craft resources from other work, holding personnel over (subject to labor agreement), calling personnel in early or allowing the turnover to take place normally.

4. Loss of a Key Safety Function (DHR)

Should RHR system function become degraded, the following existing plant procedures will be entered to restore RHR capability, or to initiate alternate core cooling methods:

SEP-1, "Degraded RHR System Capability Unit 1"
SEP 1.1 Unit 1, "Alternate Core Cooling"

These procedures also provide direction to Operations with respect to evacuating containment, obtaining containment closure, and establishing containment cooling.

COMPENSATORY MEASURES
REDUCED INVENTORY WINDOW #1

	DESCRIPTION	Responsible Signature	Date In Place
	Controls in place to ensure activities added to the outage schedule, and FIN activities during reduced inventory are reviewed by EPP prior to approval. EPP/PPG		
	Safety assessment review of current schedule complete. EPP		
	The physical listing of allowed work, e.g., exceptions to the work activities that are restricted during mid loop(as defined by NP 10.3.6), will be provided by Outage Planning[3] and will be attached to the copies of this document that are in the possession of the Shift Manager, Outage Control Center, and Control Room. Outage Manager		
	Equipment shown on the Protected Equipment list is protected per NP 2.1.8 and plant tours initiated (prior to RCS drain to 55% RCS Level) Operations Manager		
	OP 4D IPTE Scheduled; Operations review of Contingency Plan during Shift Briefings scheduled; Containment Closure Checklist CL-1E in place, and maintained. Ensure a copy of this plan is available in the control room during mid loop. Operations Manager		
	Maintenance personnel working S/G manways and/or nozzle dam installation or removal are briefed that the plant is in an orange path each shift while in reduced inventory. Maintenance Manager		
	In the interest of efficient inter-group communications, an OCC representative will attend the Ops Shift Brief and Maint Mechanical Shift Brief while the plant is in reduced inventory. Outage Manager		

[3] Contact is Mike Bull

COMPENSATORY MEASURES
REDUCED INVENTORY WINDOW #1

	DESCRIPTION	Responsible Signature	Date In Place
	Plant personnel will be notified when the plant is in the reduced inventory orange path. Examples of communication methods that could be used are: South gate electronic display, shutdown safety status boards, postings, PBTV messages, etc. OCC		
	The OCC will evaluate the impact of shift change on critical activities during reduced inventory. For example, raising RCS level to exit reduced inventory, S/G manway installation or removal, or nozzle dam activities. The OCC will, in a timely manner, recommend actions to minimize or manage the impact of turnover on reduced inventory activities. Recommendations could include moving craft resources from other work, holding personnel over (subject to labor agreement), calling personnel in early or allowing the turnover to take place normally. OCC		
	Handouts will be developed and distributed to plant employees at south gate. The handouts will inform personnel that the plant is in a vulnerable condition in mid loop. Sara Cassidy		

	SHIFT OUTAGE MANAGER SIGNATURE	**DATE**
ORANGE PATH ENTRY IS AUTHORIZED (RCS DRAIN TO LESS THAN 55% LEVEL):		

	SCHEDULED	ACTUAL
Date/Time of Orange Path Entry (Drain RCS to 3/4 Pipe)		
Date/Time of Orange Path Exit (RCS Fill > 55% RV Level)		
Duration of Orange Path		

COMPENSATORY MEASURES
REDUCED INVENTORY WINDOW 2

	DESCRIPTION	Responsible Signature	Date In Place
	Controls in place to ensure activities added to the outage schedule, and FIN activities during reduced inventory are reviewed by EPP prior to approval. EPP/PPG		
	Safety assessment review of current schedule complete. EPP		
	The physical listing of allowed work, e.g., exceptions to the work activities that are restricted during mid loop(as defined by NP 10.3.6), will be provided by Outage Planning[4] and will be attached to the copies of this document that are in the possession of the Shift Manager, Outage Control Center, and Control Room. Outage Manager		
	Equipment on the Protected Equipment list is protected per NP 2.1.8 and plant tours initiated (prior to RCS drain to 55% RCS Level) Operations Manager		
	OP 4D IPTE Scheduled; Operations review of Contingency Plan during Shift Briefings scheduled; Containment Closure Checklist CL-1E in place, and maintained. Ensure a copy of this plan is available in the control room during mid loop. Operations Manager		
	Maintenance personnel working S/G manways and/or nozzle dam installation or removal are briefed that the plant is in an orange path each shift while in reduced inventory. Maintenance Manager		
	In the interest of efficient inter-group communications, an OCC representative will attend the Ops Shift Brief and Maint Mechanical Shift Brief while the plant is in reduced inventory. Outage Manager		

[4] Contact is Mike Bull

COMPENSATORY MEASURES
REDUCED INVENTORY WINDOW #2

	DESCRIPTION	Responsible Signature	Date In Place
	Plant personnel will be notified when the plant is in the reduced inventory orange path. Examples of communication methods that could be used are: South gate electronic display, shutdown safety status boards, postings, PBTV messages, etc. OCC		
	The OCC will evaluate the impact of shift change on critical activities during reduced inventory. For example, raising RCS level to exit reduced inventory, S/G manway installation or removal, or nozzle dam activities. The OCC will, in a timely manner, recommend actions to minimize or manage the impact of turnover on reduced inventory activities. Recommendations could include moving craft resources from other work, holding personnel over (subject to labor agreement), calling personnel in early or allowing the turnover to take place normally. OCC		
	Handouts will be developed and distributed to plant employees at south gate. The handouts will inform personnel that the plant is in a vulnerable condition in mid loop. Sara Cassidy		

	SHIFT OUTAGE MANAGER SIGNATURE	DATE
ORANGE PATH ENTRY IS AUTHORIZED (RCS DRAIN TO LESS THAN 55% LEVEL):		

	SCHEDULED	ACTUAL
Date/Time of Orange Path Entry (Drain RCS to 3/4 Pipe)		
Date/Time of Orange Path Exit (RCS Fill > 55% RV Level)		
Duration of Orange Path		

	OPERATIONS CONTINGENCY STEPS - REDUCED INVENTORY
1	If a emergency diesel generator (EDG) becomes unavailable, then realign and PROTECT the remaining EDG on that train.
2	Two inventory flow paths shall be available at all times, either via SI and/or charging systems. If only one charging/SI flow path is available, then credit can be taken for RHR as an inventory flow path to avoid a RED Inventory risk level while in reduced inventory, provided the conditions in Step 2.3 under the Reactivity Checklist Definition of NP 10.3.6 are met (Note: Reactivity is correct here.). Immediate action shall be taken to identify as available or restore to available another SI or charging inventory flow path.
3	If an RHR train becomes unavailable, Operations shall take immediate actions to restore the unavailable RHR Train. With only one RHR train available, the unit is in a RED risk level for Core Cooling. PORC approval is required to remain in a RED risk level.
4	If RHR system capability becomes degraded, then Operations will enter the existing plant procedure SEP-1, "Degraded RHR System Capability Unit 1," and restore one or both RHR trains.
5	If RHR system capability cannot be restored or established, then Operations will enter the existing plant procedure SEP 1.1 Unit 1, "Alternate Core Cooling."
6	Activities to evacuate containment, obtain containment closure, and establish containment cooling will be initiated by Operations as directed by SEP 1 and SEP 1.1.

PROTECTED EQUIPMENT		
Note 1: (Ref NP 10.3.6, 3.7.2) Work on Protected Equipment is prohibited. Work prohibited on Protected Equipment is defined as those activities involving intrusive work on or external contact with the equipment. Activities performed by Operations to monitor the operation or condition of Protected Equipment is **NOT** work on Protected Equipment. **Note 2:** (Ref NP 2.1.8, 4.6) The Shift Manager will determine if any activity can be performed on a piece of protected equipment.		
U1 RHR A Train	U1 CCW A Train	
U1 RHR B Train	U1 CCW B Train	
1A-05 and 1B-03 Electrical Buses	1A-06 and 1B-04 Electrical Buses	1B-32/1B-42 Electrical Buses
U1 SI: one Train to establish Upper Plenum Injection (per OP-4F) with a suction from the RWST (40% min)		
Note: min RWST level is 16% (CO logs) One of the following makeup sources to the RCS (per OP-4F): P-33 Refueling Water Circ Pump with a suction from the RWST, OR 1P-2A OR 1P-2B OR 1P-2C Charging Pumps with a suction from the RWST, OR P-12 SFP Cooling Pump		
Vital Instrument Buses 1Y-01 (Red), 1Y-02 (Blue) and 1Y-04 (Yellow) [*for RHR flow instrumentation and RV level Instruments*]		
U1 RV Level Transmitters LT-447/LT-447A		
IF one EDG on a Train becomes unavailable, THEN PROTECT the remaining EDG on that Train.		
One Containment Accident Fan with SW supply (per OP-4F)		

Required Equipment Status for OP-4F Reactor Coolant System Reduced Inventory Requirements
The equipment hatch is installed
The transfer tube gate valve is shut.
At least one door of the 66'and 26' personnel access hatches are capable of being closed.
At least 2 core exit thermocouples are connected and functional with readouts on the PPCS
The reactor vessel head is in place and the upper internals are installed.

CONTACTS (OWNERS)

CONTACT NAME	DEPT	PHONE	PAGER
Dave Dyzak (Outage Manager)	PPG	6812	5088
Brian Dungan	OPS	6826	6503
Mike Bull	PPG	6597	5780
Duane Schoon	PPG	6680	3127
Jim Brander (acting Maintenance Manager)	MTN	6432	4459
Rick Wood	EPP	7434	3124
Dave Black	PE/PRA	6204	6076
Sara Cassidy	Comm	6748	6398