Question 072 During a Site Area Emergency which one of the following personnel man the ENS - NRC Emergency Notification System.

A. An off-shift qualified operator called to the Control Room.

B. An on-shift qualified operator on watch in the Control Room.

C. An off-shift operator called to the Off-site Emergency Operations Facility.

D. An on-shift operator familiar with the event dispatched to the Off-site Emergency Operations Center.

Approved Answer: B.

Bases for Approved Answer: In accordance with EP-IP-210, Control Room Augmentation, pgs 6 & 7, (attached) the Emergency Plant Operations Supervisor is directed to assign an off-shift Operator or designated individual, upon arrival, to establish communications with the NRC over the ENS phone and maintain a communications log.

Issue: The question stem does not adequately identify the appropriate time period to be considered by a student to ensure only one answer is correct. Depending on the candidate's frame of reference, and the knowledge of the PNPS Emergency Plan, two answers are correct.

Prior to the Emergency Plant Operations Supervisor arriving to the control room and calling in off-shift operators to assist, the responsibility for manning the ENS phone remains with the on-shift personnel. It could be up to an hour before an off-shift operator arrives to the control room. EP-IP-100, Emergency Classification and Notification governs the response of the control room to the emergency. This procedure directs that "*after contact with the NRC is established, ensure that the line is continuously staffed with a knowledgeable individual to provide additional event notification and plant information to the NRC*" (page 44 of 92). This step necessitates assigning on-shift personnel to man the ENS.

Therefore prior to the arrival of the off-shift operator the ENS is manned by on on-shift personnel which makes answer "B" correct. After the control room staff is augmented, answer "A" is correct.

Proposed Resolution: Accept "B" as an alternative answer.

Question Validity Determination:	Based on level of difficulty, question remains valid after accepting two answers. Appendix B of NUREG 1021, discusses that individual test items should fall in the 70 to 90 percent difficulty range. Accepting an alternative answer will still not exceed this range. Number of validators: 7 Number selecting "A": 4 Number selecting "B": 1 Number selecting "C" : 2 Pass rate of validators if two answers are accepted: 71.4% Number of candidates: 9 Number selecting "A": 2 Number selecting "B": 3 Number selecting "C" : 4 Pass rate of candidates if two answers are accepted: 55.6% Overall pass rate of both validators and candidates if two answers are accepted: 62.5%
References Included:	1. EP-IP-210, Control Room Augmentation 2. EP-IP-100, Emergency Classification and Notification

RTYPE H8.24

PILGRIM NUCLEAR POWER STATION

Procedure No. EP-IP-210

CONTROL ROOM AUGMENTATION

Justification for original answer.

Stop
Think
Act
Review

REFERENCE USE

6.0 PROCEDURE

6.1 ACTIVATION

[1] Emergency Plant Operations Supervisor

(a) Upon notification that an emergency has been declared and classified at the Alert level or higher or as otherwise directed by the SM/ED, initiate a call-out of off-shift Operators as necessary to augment the Control Room, TSC, and OSC staff. This call-out shall, as a minimum, include:

(1) One Operator or suitably qualified individual to man the PDP.

(2) One Operator or suitably qualified individual to man the ENS phone.

NOTE

The Emergency Plant Operations Supervisor may relieve the SM of the role of Emergency Director upon arrival in the Control Room if not already relieved by the on-call Emergency Director in the EOF. The Emergency Plant Operations Supervisor would then perform the duties of the Emergency Director until relieved by the on-call Emergency Director in the EOF.

(b) Report to the Control Room and assume the role of Emergency Plant Operations Supervisor.

(c) Assign an off-shift Operator or designated individual, upon arrival, to complete a copy of the Plant Data Form (Attachment 1) and establish communications with the TSC and the EOF over the PDP.

(d) Assign an off-shift Operator or designated individual, upon arrival, to establish communications with the NRC over the ENS phone and maintain a communications log.

(e) Assign an off-shift SRO, upon arrival, to assume the role of OSC Operations Coordinator in the OSC.

(f) Establish an open line of communication with the TSC via the Mitigation Line.

(g) Inform the Emergency Plant Manager that minimum Control Room augmentation has been established.

(h) If the event includes a loss of off-site power, request a fuel management plan from the TSC to ensure adequate long-term fuel supply for the Emergency Diesel Generators.

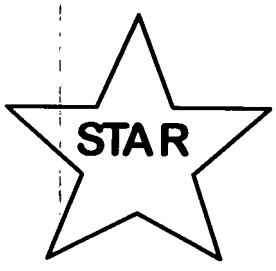
RTYPE H8.24

PILGRIM NUCLEAR POWER STATION

Procedure No. EP-IP-100

EMERGENCY CLASSIFICATION AND NOTIFICATION

Justification
for accepting alternative
answer



Stop
Think
Act
Review

REFERENCE USE

SITE AREA EMERGENCY

ASSEMBLY AREA DESIGNATION

Determine the Assembly Area based on meteorological conditions as follows: [ ]

Assembly Area	Wind Direction (° from)
☐ Support Building Cafeteria	000°-289° or 324°-360°
☐ Chiltonville Training Center	290°-323°

NOTIFICATION OF SECURITY (IF NOT PREVIOUSLY DONE)

1. Inform Security of the location of the designated Assembly Area and the official declaration time of the Site Area Emergency. [ ]
2. Direct Security to ensure that personnel in the Support Building are sent to their assembly area. [ ]
3. Direct Security to initiate personnel accountability procedures. [ ]
4. Direct Security to verify public access areas are being/have been evacuated. [ ]

Time Notified: _____

NOTIFICATION OF STATION PERSONNEL

CAUTION

During a security threat, it may be advisable **NOT** to sound an alarm.

Ensure appropriate message content is prepared before announcement.

Consider radiological conditions when preparing to evacuate personnel. If high dose rates will be encountered, it may be better to shelter nonessential personnel on-site.

Continued on next page

SITE AREA EMERGENCY (Continued)

NOTIFICATION OF STATION PERSONNEL (CONTINUED)

Sound/have the Control Room sound the Emergency Site Evacuation Alarm and make the following announcement over the public-address system TWICE:

A. **If entering from no event:**
"Attention all personnel, attention all personnel: a Site Area Emergency has been declared due to (*brief description of event*). Members of the Emergency Response Organization - (*Choose one:*)

(1) Remain in place; await further instructions.

(2) Report to your assigned Emergency Response Facility.

(3) CR/TSC/OSC staff report to Chiltonville staging area and EOF/Media Center staff report to your assigned Emergency Response Facility.

All other personnel - *(Choose one:)*

(1) Remain in place; await further instructions.

(2) Evacuate to *(Assembly Area)"*. [ ]

If upgrading from an Unusual Event or Higher:
"Attention all personnel, attention all personnel: a Site Area Emergency has been declared due to (*brief description of event*)."

NOTE
Next part of the announcement does not have to be announced unless response location needs to be revised from previous classifications or announcements.

"Members of the Emergency Response Organization - *(Revise designated response location as deemed appropriate from previous classification or announcement and then choose one:)*

(1) Remain in place; await further instructions.

(2) Report to your assigned Emergency Response Facility.

(3) CR/TSC/OSC staff report to Chiltonville staging area and EOF/Media Center staff report to your assigned Emergency Response Facility.

All other personnel - *(Revise designated response location as deemed appropriate from previous classification or announcement and then choose one:)*

(1) Remain in place; await further instructions.

(2) Evacuate to *(Assembly Area)"*. [ ]

B. If there is a localized emergency (for example; high radiation, fire), announce its type and location and instruct personnel to stand clear of this area. [ ]

C. If there is a potential for an airborne radiological release, consider announcing that there will be no eating, drinking, or smoking until further notice. [ ]

Time Completed: _____

SITE AREA EMERGENCY (Continued)

NOTIFICATION OF THE ERO - EMERGENCY FACILITY ACTIVATION

NOTE

If at any time CANS cannot be contacted or does not respond as expected, go to Attachment 10 for backup ERO activation.

If all emergency response facilities have been activated and staffed, subsequent CANS activation is not required unless directed by the Emergency Director. (Example includes a change in the ERO response due to a security event - the 3rd digit.)

In the event of a security incident, the Shift Manager or Emergency Director and Security Shift Supervisor should be consulted to determine appropriate CANS three-digit activation code and text message.

A. If not previously done or it is determined that notification of the ERO needs to be revised from previous CANS messages, obtain the correct CANS three-digit activation code to be sent to the ERO:

1st Digit	2nd Digit:	3rd Digit:
3 = Site Area	1 = Security Event	1 = NOTIFICATION ONLY - NO RESPONSE
	0 = No Security Event	2 = ALL ERO STAFF SHOULD RESPOND TO THEIR ASSIGNED EMERGENCY RESPONSE FACILITIES.
		3 = CR/TSC/OSC staff should respond to the staging area (Chiltonville). EOF/Media Center staff should report to the EOF/Media Center. ERO staff should NOT report to the site.
		4 = ERO staff should remain in place if onsite. CR/TSC/OSC staff should report to the staging area if offsite. EOF/Media Center staff should report to the EOF/Media Center if offsite. ERO staff should NOT report to the site.

CODE: 3 _____ _____ [ ]

B. Contact CANS using one of the following:
   1. Preprogrammed speed dial button located on the designated Control Room Notification telephone (phone located in E-Plan Cabinet); **OR**
   2. Any touch-tone telephone line by calling 1-508-732-6687. [ ]

C. Listen for the CANS introductory message: "This is the remote activation module. Please enter your scenario activation password followed by the # sign". [ ]

SITE AREA EMERGENCY (Continued)

NOTE

The nine-digit scenario activation password is preprogrammed on a speed dial button located on the designated Control Room Notification telephone or is listed in the Immediate Notification (blue tab) section of the PNPS Emergency Telephone Directory.

D. After hearing the CANS introductory message, implement one of the following:
   1. Press the preprogrammed speed dial button for the scenario activation password on the designated Control Room Notification telephone; **OR**
   2. Manually enter the nine-digit scenario activation password followed by the # sign. [ ]

E. After CANS accepts the scenario activation password, CANS will then state the following two verbal prompts:
   1. "To start a scenario, enter the scenario ID, followed by the # sign".
   2. "Press # alone for more options." [ ]

F. Start scenario by entering the scenario ID (i.e., CANS activation code) as follows:
   1. If a DRILL, enter "**37455**" followed by the CANS three-digit activation code and then the # sign.
   2. If NOT A DRILL, enter the CANS three-digit activation code followed by the # sign. [ ]

G. After entering the CANS activation code, the CANS will state the following two verbal prompts:
   1. "To start the scenario, press 3".
   2. "To return to main menu, press #". [ ]

H. Press 3 to start scenario and CANS will prompt you that "the scenario is building" and then immediately state the following verbal prompts:
   1. "To start a scenario, press 1".
   2. "To stop a scenario, press 2".
   3. "To check scenario information, press 3".
   4. "To enter a different scenario activation password, press 4".
   5. "To end this call, press #". [ ]

I. If CANS verbal prompt "the scenario is building" is heard, press # to end call and the ERO notification has started; **OR**
   If CANS verbal prompt "the scenario is building" is not heard, press 1 to re-enter the scenario. [ ]

SITE AREA EMERGENCY (Continued)

INITIAL NOTIFICATIONS (COMMONWEALTH AND LOCAL AUTHORITIES)

NOTE

All initial notifications to the Commonwealth and local authorities must be transmitted with 15 minutes of the event classification.

A. Within 15 minutes of the event classification, transmit an Initial Notification Form to the Commonwealth and local authorities.

B. In the event the classification changes before the initial notification is transmitted, then implement on the of following actions:

1. If a revision CAN be completed within the original 15-minute time limit from the previous classification, then revise the Initial Notification Form with the most current event classification and transmit the information to the Commonwealth and local authorities.

OR

2. If a revision CANNOT be completed within the original 15-minute time limit, then transmit the original, unrevised Initial Notification Form within the 15-minute time period with a caveat (if possible or as time permits) that a change in classification is forthcoming and in addition prepare and transmit the notification for the change in classification within its 15-minute time limit.

NOTE

DNN operating instructions are contained in Attachment 11, if needed.

C. Initiate DNN Initial Notification instructions as follows:

1. Record EAL number and time declared in space provided. [ ]

EAL Number: ____ . ____ . ____ . 3 (Obtain from ED) Time Declared: _____

2. Open the "DNN" program (icon available on "DNN" computer desktop) to fill out and transmit the Initial Notification Form. If the automated DNN system is not available, then go to Attachment 7 and implement backup notification instructions. [ ]

3. Verify Blocks 1 - 7 are complete and obtain ED approval. Hard copy for ED signature should be printed. For guidance on individual block descriptions, refer to base document Section 5.7. [ ]

4. Press the onscreen "Send" button. [ ]

5. Record the onscreen "Notification Initiated" time/date in Block 7 of the hard copy, if printed, or log in the shift log. [ ]

Time Transmission Completed: _____

6. Record above the transmission time of completion and inform the Emergency Director that transmission was completed. [ ]

SITE AREA EMERGENCY (Continued)

NRC NOTIFICATION

NOTE

NRC notification must be initiated immediately after the Commonwealth and local authorities but not later than 1 hour after the emergency classification declaration.

Notify the NRC using the ENS or a commercial telephone (1-301-816-5100) or backup number (1-301-951-0550 or 1-301-415-0550) and read the information in Blocks 1 through 6 from the Initial Notification Form.

Name of NRC Contact: _____

Time Completed: _____

After contact with the NRC is established, ensure that the line is continuously staffed with a knowledgeable individual to provide additional event notification and plant information to the NRC.

Time Completed: _____

SITE AREA EMERGENCY (Continued)

RADIATION PROTECTION NOTIFICATION (IF NOT PREVIOUSLY DONE)

Contact (or direct an assistant to contact) the on-shift Radiation Protection Supervisor/Technician and direct them to review EP-IP-231 and assume the responsibilities of the Onsite Radiological Supervisor for emergency exposure controls until relieved by the on-call Onsite Radiological Supervisor.

Time Completed: _____

VERIFY ACCOUNTABILITY

Security should report within 30 minutes of declaration of a Site Area Emergency that accountability is complete and provide the names of missing persons, if any. Log the time that accountability was completed.

Time Completed: _____

ACTION VERIFICATION (IF NOT PREVIOUSLY DONE)

Ensure Security has evacuated and closed public access areas.

Time Completed: _____

SITE AREA EMERGENCY (Continued)

VERIFY CANS NOTIFICATION (IF REQUIRED)

Verify CANS operability by ensuring that any pager has activated and the proper CANS message was sent. Allow approximately 5 minutes for CANS to activate the pager. [ ]

VERIFY THE DNN NOTIFICATION

A. Select the onscreen "Reports" drop-down menu.

B. Click on the "Immediate Report Update" to receive the latest DNN notification report.

C. View the screen output or print the DNN notification report to confirm receipt of DNN notification for appropriate response locations.

CONTROL ROOM INSTRUCTIONS:

1. Check the box below for each listed Warning Point location that shows "FILLED" as indicated from the report notification status column.

☐ State Police Phone (1-508-923-4014)	☐ Carver PD Phone (1-508-866-2000)	☐ Marshfield PD Phone (1-781-834-6655)
☐ MEMA SEOC Phone (1-508-820-2000)	☐ Duxbury PD Phone (1-781-934-5656)	☐ Plymouth PD Phone (1-508-746-1212)
☐ Bridgewater FD Phone (1-508-697-0900)	☐ Kingston PD Phone (1-781-585-2121)	☐ Taunton PD Phone (1-508-823-5000)

2. Contact the Warning Point locations that have not responded (unchecked boxes).

   a. Notify via BECONS or commercial telephone.

   b. Read information on the Initial Notification Form.

Time Completed: _____ [ ]

SITE AREA EMERGENCY (Continued)

EOF INSTRUCTIONS:

1. Check the box below for both listed local Warning Point location and State/Local EOC location that shows "FILLED" as indicated from the report notification status column.

LOCAL WARNING POINT LOCATIONS: (Do not contact if DNN notification function has been transferred to respective Local EOC town location.)

☐ Bridgewater FD Phone (1-508-697-0900)	☐ Kingston PD Phone (1-781-585-2121)	☐ Taunton PD Phone (1-508-823-5000)
☐ Carver PD Phone (1-508-866-2000)	☐ Marshfield PD Phone (1-781-834-6655)	
☐ Duxbury PD Phone (1-781-934-5656)	☐ Plymouth PD Phone (1-508-746-1212)	

STATE/LOCAL EOC LOCATIONS:

☐ State Police Phone (1-508-923-4014)	☐ Carver EOC Phone (1-508-866-5219)	☐ Plymouth EOC Phone (1-508-746-4076)
☐ MEMA SEOC Phone (1-508-820-2000)	☐ Duxbury EOC Phone (1-781-934-7141)	☐ Taunton EOC Phone (1-508-821-1026)
☐ Braintree EOC Phone (1-781-794-8188)	☐ Kingston EOC Phone (1-781-585-3135)	
☐ Bridgewater EOC Phone (1-508-697-6191)	☐ Marshfield EOC Phone (1-781-834-7100)	

2. Contact each local Warning Point location that has not responded (unchecked box and where the DNN notification function has not been transferred over to the Local EOC town location respectively).

   a. Notify via BECONS or commercial telephone.

   b. Read information on the Initial Notification Form.

3. Contact each State location and each respective Local EOC town location that have not responded (unchecked box):

   a. Notify via BECONS or commercial telephone.

   b. Read information on the Initial Notification Form.

Time Completed: _____ [ ]

SITE AREA EMERGENCY (Continued)

ORGANIZE THE REPORT

Obtain the printed report(s) from the DNN fax machine and staple to this form. [ ]

EOF NOTIFICATION (IF NOT PREVIOUSLY DONE)

If the Emergency Operations Facility (EOF) is activated and has not contacted the Control Room after approximately 35 to 40 minutes from the time CANS notification of the ERO was completed, then check ERO personnel response by following CANS verification instructions in Attachment 11 (Notification Equipment Operation). [ ]

FOLLOW-UP NOTIFICATIONS

Provide periodic updates (hourly or whenever conditions change) to the Commonwealth and local authorities using the DNN (Attachment 6). [ ]

RETURN TO THE PROCEDURE (EITHER STEP 5.2[3], 5.3[1], OR 5.4[3])

Question 075

A General Emergency exists.

A piece of equipment required for mitigation of the accident must be operated locally in a radiation field of 60 Rem per hour. There is NO immediate danger to the public.

A 52 year old worker volunteers to perform the required manipulation. He has 0 mrem accumulated dose for this calendar year.

Which ONE of the following describes the (1) amount of time spent in the area until the volunteer's annual TEDE limit is reached, and (2) the MAXIMUM dose he is authorized to receive to perform this operation?

A. (1) Three minutes
(2) 10 Rem

B. (1) Three minutes
(2) 25 Rem

C. (1) Five minutes
(2) 10 Rem

D. (1) Five minutes
(2) 25 Rem

Approved Answer: C

Bases for Approved Answer: In accordance with EP-IP-440, Emergency Exposure Controls (included), 25 Rem is the limit for life saving operations and protection of large populations, whereas 10 Rem is the limit for "protecting valuable property".

Issue: The stem to this question states that a General Emergency is in progress. EP-IP-100, Emergency Classification and Notification defines a General Emergency as follows (page 9):

> *"General Emergency - Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with the potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area."*

Additionally, a General Emergency requires that a Protective Action Recommendation (PAR) be issued to protect the general public. EP-IP-100, page 53 of 92 states: Offsite Protective Action Recommendations (PARs) issued in accordance with EP-IP-400 (included) are mandatory for a General Emergency classification."

The minimum PAR to be issued per EP-IP-400 is to *"evacuate the 2-mile ring and 5 miles downwind of the affected EPZ subareas along with sheltering of all other EPZ subareas will be recommended unless sheltering as an alternative to evacuation is recommended".*

The difference between the approved answer and distractor "D" is whether the dose to be received is for life saving or protecting large segments of the population or whether the task is for protecting valuable property. Although the stem states that there is no immediate danger to the public, the public remains at risk due to the event and sheltering and evacuation of large segments of the population must be in progress. Since a General Emergency has been declared it is reasonably expected that the EPA exposure limits for the public will be exceeded (definition of a GE) and which necessitate a PAR, any action required to ***"mitigate"*** the accident can be interpreted as required to protect large segments of the population.

Additionally Environmental Protection Agency, EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (included) provides guidance as to when the higher 25 Rem exposure to "protect large segments of the population" is justified. In accordance with this document, the higher exposure to the workers is justified when the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved (page 2-11). Since the action to be taken will ***"mitigate"*** the accident, it is reasonable to assume that the collective dose to the public would be significantly larger if the action is not taken. This in turn justifies the higher exposure.

Proposed Resolution: Change the approved answer to "D"

References Included:

1. EP-IP-440, Emergency Exposure Controls
2. EP-IP-100, Emergency Classification and Notification
3. EP-IP-400, Protective Action Recommendations
4. Environmental Protection Agency, EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

RTYPE H8.24

PILGRIM NUCLEAR POWER STATION

Procedure No. EP-IP-440

EMERGENCY EXPOSURE CONTROLS

Stop
Think
Act
Review

REFERENCE USE

1.0 PURPOSE

This Procedure provides guidelines and administrative controls for radiation exposure received by PNPS controlled emergency workers during the course of a declared emergency.

2.0 REFERENCES

[1] Environmental Protection Agency, EPA-400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents

↖ also provided

[2] EP-PP-01, "PNPS Emergency Plan"

[3] International Atomic Emergency Agency (IAEA), Technical Report No. 152, Evaluation of Radiation Emergencies and Accidents

[4] National Council on Radiation Protection (NCRP) Report 39, Basic Radiation Protection Criteria

[5] National Council on Radiation Protection (NCRP) Report 55, Protection of the Thyroid Gland in the Event of Releases of Radioiodine

[6] The Food and Drug Administration Approved Patient Package Insert for Commercially Packaged Potassium Iodide

[7] Food and Drug Administration (Health and Human Services), Guidance - Potassium Iodide as a Thyroid Blocking Agent in Radiation Emergencies, December 2001

3.0 DEFINITIONS

[1] Corrective Action - Includes surveillance and/or assessment actions and plant operations necessary to minimize further deterioration of the level of plant safety or to mitigate the consequences of the accident, if failure to perform these actions could result in a significant increase in offsite exposures.

[2] Emergency Exposure - Radiation exposure received by an emergency worker conducting accident mitigating or life saving actions during a declared emergency.

[3] Emergency Exposure Limits

Dose Limit*	Activity	Conditions
5 rem	All	
10 rem	Protecting valuable property.	Lower dose not practical.
25 rem	Life saving or protection of large populations.	Lower dose not practical.
> 25 rem	Life saving or protection of large populations.	Only on a voluntary basis to persons fully aware of the risks involved.

* EPA TEDE values for nonpregnant adults from exposure and intake during an emergency situation in rem. Workers performing services during emergencies should limit dose to the eyes to three times the listed value and dose to any other organ (including skin and body extremities) to ten times the listed value.

[4] Emergency Worker - An individual who holds an emergency response function as indicated by the PNPS Emergency Plan during a declared emergency.

[5] Life Saving Action - Actions related to the search for and rescue of injured persons, or corrective or protective actions to mitigate conditions which could result in imminent injury or substantial overexposure to an individual.

[6] Total Effective Dose Equivalent (TEDE) - Sum of the external Deep Dose Equivalent (DDE) and the internal Committed Effective Dose Equivalent (CEDE).

4.0 DISCUSSION

None

RTYPE H8.24

PILGRIM NUCLEAR POWER STATION

Procedure No. EP-IP-100

EMERGENCY CLASSIFICATION AND NOTIFICATION

Stop
Think
Act
Review

REFERENCE USE

[18] General Emergency - Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with the potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

[19] Hostile Action - An act toward PNPS or plant personnel that includes the use of violent force to destroy equipment, takes hostages, and/or intimidates plant personnel to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on PNPS. Nonterrorism-based EALs should be used to address such activities (e.g., violent acts between individuals in the owner controlled area).

[20] Hostile Force - One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

[21] Initial Notification Form - The form used to initiate and document initial emergency classification notifications to offsite authorities.

[22] Non-Emergency Response - Any plant condition that is deemed by the Shift Manager to warrant an increased level of readiness on the part of the Emergency Response Organization. Such situations might be due to a need for increased readiness due to security or plant equipment operability concerns, anticipated severe weather conditions, or any other condition where the Emergency Response Organization might be required to support the plant in any capacity for any reason. Declaration of a Non-Emergency Response may include simple notification to members of the Emergency Response Organization of a heightened state of awareness or actual response by the Emergency Response Organization to the Emergency Response Facilities (TSC, OSC, EOF, Media Center, Staging Area). Activation of SONS should be considered in accordance with PNPS 1.3.12.1, *"Non-Emergency Notification of Management"*.

[23] Nonessential Personnel - Personnel and visitors to PNPS who are not assigned specific emergency response duties.

[24] Owner Controlled Area - For purpose of EAL classification, the "owner controlled area" is the Entergy owned property on the north side of Rocky Hill Road.

[25] Potassium Iodide (KI) - A thyroid blocking agent consisting of stable iodine used as a prophylactic to aid in the reduction of radiation exposure to the thyroid gland from radioactive iodine.

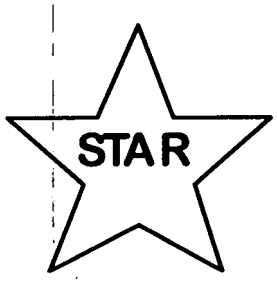
[26] Primary System - The pipes, valves, and other equipment which connect directly to the Reactor Pressure Vessel (RPV) such that a reduction in RPV pressure will effect a decrease in the steam or water being discharged through an unisolated break in the system.

RTYPE H8.24

PILGRIM NUCLEAR POWER STATION

Procedure No. EP-IP-400

PROTECTIVE ACTION RECOMMENDATIONS



Stop
Think
Act
Review

REFERENCE USE

6.0 PROCEDURE

6.1 BACKGROUND

[1] Protective Action Recommendations (PARs) are made by PNPS personnel whenever a General Emergency is declared. Additionally, if in the opinion of the Emergency Director conditions warrant the issuance of PARs, a General Emergency will be declared (PNPS will not issue PARs for any accident classified below a General Emergency).

[2] The possible Protective Action Recommendations (PARs) issued by PNPS at a General Emergency include:

(a) At a minimum, a plant-based PAR to evacuate the 2-mile ring and 5 miles downwind of the affected EPZ subareas along with sheltering of all other EPZ subareas will be recommended unless sheltering as an alternative to evacuation is recommended; or

(b) Depending on the plant conditions, evacuation of a 5-mile radius and 10 miles downwind of the affected EPZ subareas along with sheltering of all other EPZ subareas will be recommended unless sheltering as an alternative to evacuation is recommended; or

(c) In the event of a short duration release (see Definition 3.0[14]), then sheltering instead of evacuation for the affected land-based EPZ subareas will be recommended; and

(d) In addition to the plant-based PARs, off-site dose projections will be used to determine whether plant-based PARs are adequate. This will include comparing the off-site dose assessment results with the EPA Protective Action Guidelines for dose-based PARs.

(e) In all of the above cases, a reminder is provided that state and local authorities should consider the administration of potassium iodide (KI) for the general public in accordance with their plans and procedures.

[3] PAR results will be issued as follows:

(a) PARs are included with the initial and follow-up notifications issued at a General Emergency.

(b) The PAR must be provided to the Commonwealth within 15 minutes, and to the NRC within 60 minutes of:

(1) The General Emergency classification.

(2) Any change in recommended protective actions.

(c) When issuing PARs with the initial and follow-up notification forms, the KI notation provides a reminder that the state and local authorities should consider the administration of potassium iodide (KI) to the general public in accordance with their plans and procedures.

400R92001

MANUAL OF PROTECTIVE ACTION GUIDES

AND

PROTECTIVE ACTIONS

FOR NUCLEAR INCIDENTS

Excerpt
Only.

Office of Radiation Programs
United States Environmental Protection Agency
Washington, DC 20460

Revised 1991

Second printing, May 1992

models, to the extent practicable. Doses incurred prior to initiation of a protective action should not normally be included. Similarly, doses that might be received following the early phase should not be included for decisions on whether or not to evacuate or shelter. Such doses, which may occur from food and water, long-term radiation exposure to deposited radioactive materials, or long-term inhalation of resuspended materials, are chronic exposures for which neither emergency evacuation nor sheltering are appropriate protective actions. Separate PAGs relate the appropriate protective action decisions to those exposure pathways (Chapter 4). As noted earlier, the projection of doses in the early phase need include only those exposure pathways that contribute a significant fraction (e.g., more than about 10 percent) of the dose to an individual.

In practical applications, dose projection will usually begin at the time of the anticipated (or actual) initiation of a release. For those situations where significant dose has already occurred prior to implementing protective action, the projected dose for comparison to a PAG should not include this prior dose.

2.5 Guidance for Controlling Doses to Workers Under Emergency Conditions

The PAGs for protection of the general population and dose limits for workers performing emergency services are derived under different assumptions. PAGs consider the risks to individuals, themselves, from exposure to radiation, and the risks and costs associated with a specific protective action. On the other hand, workers may receive exposure under a variety of circumstances in order to assure protection of others and of valuable property. These exposures will be justified if the maximum risks permitted to workers are acceptably low, and the risks or costs to others that are avoided by their actions outweigh the risks to which workers are subjected.

Workers who may incur increased levels of exposure under emergency conditions may include those employed in law enforcement, fire fighting, radiation protection, civil defense, traffic control, health services, environmental monitoring, transportation services, and animal care. In addition, selected workers at institutional, utility, and industrial facilities, and at farms and other agribusiness may be required to protect others, or to protect valuable property during an emergency. The above are examples - not designations - of workers that may be exposed to radiation under emergency conditions.

Guidance on dose limits for workers performing emergency services is summarized in Table 2-2. These limits apply to doses incurred over the duration of an emergency. That is, in contrast to the PAGs, where only the future dose that can be avoided by a specific protective action is considered, all doses received during an emergency are included in the limit. Further, the dose to workers performing emergency

Table 2-2 Guidance on Dose Limits for Workers Performing Emergency Services

Dose limit[a] (rem)	Activity	Condition
5	all	
10	protecting valuable property	lower dose not practicable
25	life saving or protection of large populations	lower dose not practicable
>25	lifesaving or protection of large populations	only on a voluntary basis to persons fully aware of the risks involved (See Tables 2-3 and 2-4)

[a]Sum of external effective dose equivalent and committed effective dose equivalent to nonpregnant adults from exposure and intake during an emergency situation. Workers performing services during emergencies should limit dose to the lens of the eye to three times the listed value and doses to any other organ (including skin and body extremities) to ten times the listed value. These limits apply to all doses from an incident, except those received in unrestricted areas as members of the public during the intermediate phase of the incident (see Chapters 3 and 4).

services may be treated as a once-in-a-lifetime exposure, and not added to occupational exposure accumulated under nonemergency conditions for the purpose of ascertaining conformance to normal occupational limits, if this is necessary. However, any radiation exposure of workers that is associated with an incident, but accrued during nonemergency operations, should be limited in accordance with relevant occupational limits for normal situations. Federal Radiation Protection Guidance for occupational exposure recommends an upper bound of five rem per year for adults and one tenth this value for minors and the unborn (EP-87). We recommend use of this same value here for the case of exposures during an emergency. To assure adequate protection of minors and the unborn during emergencies, the performance of emergency services should be limited to nonpregnant adults. As in the case of normal occupational exposure, doses received under emergency conditions should also be maintained as low as reasonably achievable (e.g., use of stable iodine, where appropriate, as a prophylaxis to

reduce thyroid dose from inhalation of radioiodines and use of rotation of workers).

Doses to all workers during emergencies should, to the extent practicable, be limited to 5 rem. There are some emergency situations, however, for which higher exposure limits may be justified. Justification of any such exposure must include the presence of conditions that prevent the rotation of workers or other commonly-used dose reduction methods. Except as noted below, the dose resulting from such emergency exposure should be limited to 10 rem for protecting valuable property, and to 25 rem for life saving activities and the protection of large populations. In the context of this guidance, exposure of workers that is incurred for the protection of large populations may be considered justified for situations in which the collective dose avoided by the emergency operation is significantly larger than that incurred by the workers involved.

Situations may also rarely occur in which a dose in excess of 25 rem for emergency exposure would be unavoidable in order to carry out a lifesaving operation or to avoid extensive exposure of large populations. It is not possible to prejudge the risk that one should be allowed to take to save the lives of others. However, persons undertaking any emergency operation in which the dose will exceed 25 rem to the whole body should do so only on a voluntary basis and with full awareness of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and numerical estimates of the risk of delayed effects.

Tables 2-3 and 2-4 provide some general information that may be useful in advising emergency workers of risks of acute and delayed health effects associated with large doses of radiation. Table 2-3 presents estimated risks of early fatalities and moderately severe prodromal (forewarning) effects that are likely to occur shortly after exposure to a wide range of whole body radiation doses. Estimated average cancer mortality risks for emergency workers corresponding to a whole-body dose equivalent of 25 rem are given in Table 2-4, as a function of age at the time of exposure. To estimate average cancer mortality for moderately higher doses the results in Table 2-4 may be increased linearly. These values were calculated using a life table analysis that assumes the period of risk continues for the duration of the worker's lifetime. Somewhat smaller risks of serious genetic effects (if gonadal tissue is exposed) and of nonfatal cancer would also be incurred. An expanded discussion of health effects from radiation dose is provided in Appendix B.

Some workers performing emergency services will have little or no health physics training, so dose minimization through use of protective equipment cannot always be assumed. However, the use of respiratory protective equipment can reduce dose from inhalation, and clothing can reduce beta dose. Stable iodine is also recommended for blocking thyroid

Joseph DAntonio

From: Fallacara, Vincent [vfallac@entergy.com]
Sent: Thursday, April 09, 2009 8:36 AM
To: Joseph DAntonio
Subject: Licensed Operators Available on Shift At PNPS

Joe:

As per our conversation this morning, the following information is provided:

- During the first hour of any emergency requiring entry into the E-Plan, notification to the state and local governments is completed within 15 minutes of declaration. EP-IP-100 is the procedure executed to accomplish those notifications.

- The station's expectation and our past practice in actual E-Plan events at PNPS has been that the NRC Operations Center is notified immediately after the state and local governments. This notification occurs literally within minutes of the notification to the state and local governments. We train our control room staffs in this manner and it is the expectation of station management that this communication occurs as early as possible. EP-IP-100 prompts that notification to occur and requires a sign off in the attachment of the procedure.

- Our real life experience with the NRC Operations Center operators has been that once an ENS notification occurs, they (strongly) request that the ENS line be manned with an individual to communicate with them continuously (i.e.: a knowledgeable individual).

- We would, and have in the past, assigned one of two personnel to execute this task of continuous communication with the NRC Operations Center: a spare reactor operator **or** the shift's third SRO (**all** shifts are manned by three SRO's). Many times we staff the shift with a third RO, which is one above the minimum staffing requirements, but this is not guaranteed to occur. On the other hand, staffing the watch with one SRO above the minimum staffing requirements has been a PNPS practice for the last 15 years. In the mid-nineties Pilgrim converted all of the STAs to licensed senior reactor operators. The third SRO on every shift serves in the dual role as the shift STA and Field Support Supervisor. He/She is always available to augment the control room following an entry into the EPlan. We train the crews in this manner during Licensed Operator Requalification training and EPlan drills. Since the third SRO is the shift STA, his/her position **is** required for minimum shift manning. PNPS does not have any non-licensed STAs. In either case (RO or SRO); the ENS would be manned by a licensed operator prior to full control room augmentation occurring per the requirements of EP-IP-210.

Hope this helps. We're working on the Recombiner question in parallel.

Vin

Vincent Fallacara

Manager, Training

Pilgrim Nuclear Power Station

Office: 508-830-8100

Mobile: 508-930-5159

Pager: 508-387-1395

JPM ID: Admin JPM COO01

JPM Title: Verify AOG Recombiner Operation/Direct Field Monitoring

Issue:

1. The job performance measure (JPM) directs response to a high augmented offgas system hydrogen concentration. The candidate enters and executes abnormal procedure 2.4.141, Abnormal Recombiner Operation; section 4.2 High Hydrogen Concentration Downstream of the Recombiners. Procedure step 4.2 [3] directs verification of recombiner operation for the power level being maintained by referring to Attachment 1 or Attachment 2 as applicable. The JPM cues directed that both Attachments 1 and 2 be used to assess proper recombiner operation and defined these assessments as a critical step. Attachment 1 is a graph of recombiner ΔT (°F) versus reactor power. The graph defines recombiner ΔT as recombiner exit temperature minus preheater exit temperature. Candidates utilized diverse indication for recombiner exit temperature in the attachment 1 assessment.
2. The JPM did not establish any specific system parameters the candidates were expected to evaluate to determine if charcoal ignition downstream of the recombiners occurred. Although hydrogen concentration downstream of the recombiners was consistent with a recombiner that was not functioning properly, no specific parameter indicating ignition was provided. As a result, the reliance on the statement presented in 2.4.141 Step 4.2 [5] did not provide evaluators with sufficiently clear operational instructions.

Discussion:

1. The recombiner exit temperature is a parameter that does not have available plant instrumentation to accurately monitor and the piping is inaccessible with plant operating at the conditions prescribed in the JPM cue. The JPM was developed with an erroneous assumption that the recombiner top temperature displayed on a control room recorder was a valid recombiner exit temperature. The assumption is invalid since the recombiner top temperature monitors a zone of the vessel containing platinum catalyst within the active recombination zone of the vessel. System engineering has reviewed and concurs with this assessment. Therefore, the step to assess proper recombiner operation using 2.4.141 attachment 1 directs a step that cannot be accomplished and is therefore not a valid critical step. Condition report CR-PNP-2009-01081 and revision 23 to procedure 2.4.141 have been issued to correct this condition.
2. Any system pressure and offgas flow rate instrumentation that monitors process flow would provide a valid indication for assessment of charcoal ignition.

Proposed Resolution:

1. Delete calculation of proper recombiner operation using attachment 1 of 2.4.141 from grading criteria. Evaluate candidate performance based on

assessment performed using attachment 2 only.
2. Accept any offgas or augmented offgas system process flow rate and pressure instrumentation for assessment of charcoal ignition.

References Included:
1. 2.4.141 Revision 22
2. 2.4.141 Revision 23

Corrective Actions: Condition report CR-PNP-2009-01081 and revision 23 to procedure 2.4.141 have been issued to correct this condition.

Entergy	CONDITION REPORT	CR-PNP-2009-01081

Originator: Noyes,David E
Originator Phone: 8117
Originator Site Group: PNP Operations Mgmt PNP
Operability Required: N
Supervisor Name: Smith,Robert Gerard
Reportability Required: N
Discovered Date: 03/26/2009 13:14
Initiated Date: 03/26/2009 13:27

Condition Description:

Procedure errors identified during a job performance measure (JPM) in initial operations license examination. Procedure 2.4.141, Abnormal Recombiner Operation, attachment 1 contains a graph to assess proper operation of the AOG system recombiner. Use of the graph requires a determination of the recombiner exit temperature which cannot be accurately determined using existing plant instrumentation. Additionally, step 4.2[5] directs monitoring temperature drop across vault refrigeration unit. The procedure should more accurately assess the temperature drop across the in-service air handling unit (VAC -302 A or B) as the refrigeration will indicate a rise (not a drop) in temperature. Procedure should also be enhanced to provide instrumentation nomenclature wherever monitoring or evaluation is directed.

Immediate Action Description:

No immediate action necessary.

Suggested Action Description:

Assign to operations support to prioritize (high) and process procedure change.

TRENDING (For Reference Purposes Only):

Trend Type	Trend Code
KEYWORDS	KW-PROCEDURAL DEFICIENCY
AP	OPMG
REPORT WEIGHT	1
INPO BINNING	OP1
KEYWORDS	KW-CONTINOUS USE
HU C-LATENT CONDITION	OPMG
HEP FACTOR	P

Appendix C	Job Performance Measure Worksheet	Form ES-C-1

Facility: PILGRIM Task No.:

Task Title: Verify Recombiner Operation JPM No.: 2009 NRC RO/SRO JPM COO1

K/A Reference: 2.1.25 2.8 / 3.1

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom _____ Simulator X Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The plant is operating at 50% power. High hydrogen concentration is occurring downstream of the AOG Recombiners.

Task Standard: Determines recombiner delta-temperature indicates recombiner is overheated.

Required Materials: N/A

General References: PNPS 2.4.141

Initiating Cue: You have been directed to perform PNPS 2.4.141 "Abnormal Recombiner Operation".

SRO ONLY - Take appropriate actions for abnormal conditions, if any.

Time Critical Task: NO

Simulator Booth: **TAKE SIMULATOR OUT OF FREEZE**

Validation Time:

SIMULATOR SETUP

1. Initialize simulator to 50% power.

2. Insert Instructor Overrides on CP600 Hydrogen Recorder AR-R603 so that both channels indicate 2.80%

3. Turn on CP-600L Alarms:
   A-7 "H2 Analyzer A H2 CONC HI"
   B-7 "H2 Analyzer B H2 CONC HI"

4. Turn off CP-600L Alarm:
   A-8 " After CNDSR LOOP SEAL LVL HILO"

5. Insert malfunction **OG05** "Water In Offgas System". Allow the simulator to run until the Recombiner Exit temperature, Pt.5 on Recorder TR-9250, Lowers to < 425 degrees.

6. Freeze Simulator

7. Place Danger tags on the MO-9205 and MO-9204.

8. Ensure Preheater exit temperature is >350 degrees (procedure NOTE at step 4.2 [1])

(Critical Steps denoted with a check (√) mark)

START TIME: _____

Performance Step: 1 Section 3.0 – If the recombiner temperature exceeds 1000 degrees F AND a reactor scram has not been initiated, THEN SCRAM the reactor AND ENTER PNPS 2.1.6, "Reactor Scram".

Standard: Determines that temperature has not exceeded 1000 degrees and a reactor scram is not required.

Comment: **Recombiner temperature can be determined at point 5 on recorder TR-9250.**

Performance Step: 2 Proceeds to PNPS 2.4.141 Section 4.2 - High Hydrogen Concentration Downstream of the Recombiners.

Standard: Enters PNPS 2.4.141 Section 4.2

Comment:

√ **Performance Step: 3** Section 4.2 Step [1] - TRIP the ETS using "ETS SHUTDOWN" push button on Panel CP600.

Standard: Depresses "ETS SHUTDOWN" pushbutton

Comment:

SIM BOOTH: Ensure Preheater exit temperature is >350 degrees

NOTE

Reducing Reactor power will reduce recombiner exit temperature by reducing hydrogen production. Preheater exit temperature should be greater than 350°F at 100% power.

Performance Step: 4 Section 4.2 Step [2] - If both H2 analyzers are indicating greater than or equal to 4%....

Standard: Reviews above NOTE.

Determines that both H2 analyzers are not greater than 4% and continues in procedure

Comment:

√ **Performance Step: 5** Section 4.2 [3] - Verify recombiner operation for the power level being maintained by referring to Att. 1 or Att. 2 as applicable.

Standard: Evaluates recombiner delta-temperature utilizing Att. 1 and determines recombiner delta-temperature is in the questionable region of the graph.

Reports results to CRS (examiner)

Evaluator Note: For Att.1, Recombiner ΔT is determined by subtracting Preheater Exit Temperature (Indicator TI-R601A) from Recombiner TOP Temperature (Point 5 on Recorder TR-9250). Reactor power is provided in the initiating cue.

This will result in a point residing in the questionable region of the graph.

Comment: NOTE **The procedure step states to use Att.1 OR Att.2. Prompt candidate to evaluate using both graphs if only one is used.**

√	**Performance Step: 6**	Evaluate recombiner delta-temperature utilizing Attachment 2
	Standard:	Determines recombiner delta-temperature is below the Low Limit of the graph Reports results to CRS (examiner)
	Evaluator Note:	For Att.2, Recombiner temperature is read on Recorder TR-9250 Point 5. Reactor power is provided in the initiating cue. This will result in a point residing below the Low Limit line on the graph.
	Comment:	**Termination for RO ONLY, SRO continues to next step**
	Performance Step: 7	Direct placing the standby recombiner in service.
	Standard:	AOG will be directed to be bypassed IAW PNPS 2.2.106 while maintaining steam dilution and air purge through the recombiner and the charcoal beds
	Cue:	If the standby recombiner is directed to be placed in service, **"the 'B' recombiner is unavailable"**
√	**Standard:**	Direct maintaining steam dilution and air purge on the 'A' recombiner.
	Cue:	**An operator has been assigned to initiate air purge on 'A' recombiner and the charcoal beds.**
	Evaluator Note:	The candidate may indicate a power reduction is necessary when performing the following step. If so, it has been directed to the 905 operator.
√	**Standard:**	Direct bypassing the AOG system IAW PNPS 2.2.106
	Cue:	**An operator is bypassing AOG IAW PNPS 2.2.106**

√ **Performance Step: 8** Procedure Step 4.2 [5]a,b,c - whenever the H2 concentration downstream of the recombiner is greater than or equal to 2% continuously monitor:

(a) Differential pressure on PRE-FILTER D/P Indicator DPIS-R611 and OFF-GAS FILTERS D/P Indicator DPIS-R616 on Panel CP600

(b) System pressure

(c) Indications on RECOMBINER and ADSORBER TEMPERATURES Recorder TR-9250 and ADSORBER VAULT TEMP Recorder TRS-R615 on Panel CP600

Standard: Continuously monitors above parameters at step at Panel CP 600.

Comment:

√ **Performance Step: 9** Step 4.2 [5]d,e - whenever the H2 concentration downstream of the recombiner is greater than or equal to 2% continuously monitor:

(d) Temperature drop across vault refrigeration unit

(e) Offgas flow rate

Standard: Directs a field operator to continuously monitor the parameters for recombiner operations locally at Panel C75.

Comment: **SRO termination of the JPM.**

Terminating Cue: **This JPM is complete.**

STOP TIME: _____ _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2009 NRC JPM RO/SRO COO1

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS: The plant is operating at 50% power. High hydrogen concentration is occurring downstream of the AOG Recombiners.

INITIATING CUE: You have been directed to perform PNPS 2.4.141 "Abnormal Recombiner Operation".

SRO ONLY - Take appropriate actions for abnormal conditions, if any.

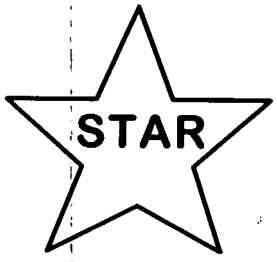
RTYPE H6.02

PILGRIM NUCLEAR POWER STATION

Procedure No. 2.4.141

ABNORMAL RECOMBINER OPERATION

Procedure JPM was written to.



Stop
Think
Act
Review

CONTINUOUS USE

020161

2.4.141 Rev. 22

1.0 SYMPTOMS

1.1 ALARMS

	ANNUNCIATOR	WINDOW
[1]	**"RECOMBINER TEMP HI/LO"**	CP600L-A4
[2]	**"PRE-TREATMENT RAD HI"**	CP600R-B4
[3]	**"PRE-TREATMENT RAD HI-HI"**	CP600R-A4
[4]	**"H_2 ANALYZER A H_2 CONC HI"**	CP600L-A7
[5]	**"H_2 ANALYZER B H_2 CONC HI"**	CP600L-B7
[6]	**"OFF GAS OUTLET FLOW HI"**	CP600L-C2
[7]	**"RECOMBINER A INLET TEMP LO"**	CP600L-B4
[8]	**"RECOMBINER B INLET TEMP LO"**	CP600L-C4

1.2 PLANT INDICATIONS

[1] Recombiner inlet temperature equal to outlet temperature.

[2] Higher than normal offgas temperatures.

[3] Increased offgas radiation levels.

[4] Low H_2 concentration upstream of AOG System.

[5] Lower offgas flow and/or high Reactor water conductivity.

2.0 AUTOMATIC ACTIONS

None

3.0 IMMEDIATE OPERATOR ACTIONS

[1] **IF** the recombiner temperature exceeds 1000°F **AND** a Reactor Scram has NOT been initiated, **THEN SCRAM** the Reactor **AND ENTER** PNPS 2.1.6, *"Reactor Scram"*.

4.0 SUBSEQUENT OPERATOR ACTIONS

CAUTION

Do not rely solely on any one instrument or indication. A comparison of applicable instrumentation may provide evidence to determine the cause of an event. Frequently monitor instrumentation to determine the trend of various parameters. Verify that appropriate instruments are tracking correctly. **[SOER 93-01]**

PROCEED TO the appropriate section of this Procedure to mitigate the abnormal condition:

4.1 PREMATURE RECOMBINATION

NOTE

Simultaneous occurrence of all symptoms contained in Section 1.2 is symptomatic of a rapid recombination transient.

[1] **IF** all symptoms listed in Section 1.2 occur together, **THEN PERFORM** the following:

(a) **TRIP** the ETS using "ETS SHUTDOWN" push button Panel CP600.

(b) **REDUCE** Reactor power in accordance with PNPS 2.1.14 Sections 7.10 and 7.11 to mitigate symptoms of premature recombination.

(c) **PLACE** an additional secondary jet into service.

(d) **MONITOR** CONDENSER VACUUM Recorder PR-3392 on Panel C2 and offgas temperature on EPIC (OGS004).

(1) **IF** Condenser vacuum decreases, **THEN SECURE** one secondary jet.

(e) **IF** required, **NOTIFY** Chemistry **AND VERIFY** the gross gamma activity rate of the noble gases is $\leq$ 500,000 μCi/sec once within 4 hours after a $\geq$ 50% increase in the nominal steady-state fission gas release after factoring out increases due to changes in thermal power level. **[Tech Spec Section 4.8.1.1.b]**

(f) **WHEN** indication of proper recombiner operation is evident, **THEN SECURE** one secondary jet.

(g) **IF** rapid recombination cannot be stopped **OR IF** combustion is occurring upstream of the steam jet air ejectors, **THEN SHUT DOWN** the Reactor in accordance with PNPS 2.1.5, *"Controlled Shutdown From Power"*, Section A (Controlled Shutdown with Manual Scram).

(h) **SHUT DOWN** the ETS in accordance with PNPS 10.2.4.

4.2 HIGH HYDROGEN CONCENTRATION DOWNSTREAM OF THE RECOMBINERS

[1] **TRIP** the ETS using "ETS SHUTDOWN" push button on Panel CP600.

NOTE

Reducing Reactor power will reduce recombiner exit temperature by reducing hydrogen production. Preheater exit temperature should be greater than 350°F at 100% power.

[2] **IF** both H_2 analyzers are indicating greater than or equal to 4%, **THEN REDUCE** Reactor power in accordance with PNPS 2.1.14 Sections 7.10 and 7.11 until H_2 concentration is less than 4%.

[3] **VERIFY** recombiner operation for the power level being maintained by referring to Attachment 1 or Attachment 2 as applicable.

NOTE

When securing a recombiner or bypassing AOG in the following steps, steam dilution and air purge flow should be maintained for at least 1 hour to prevent drawing hydrogen back into an idle recombiner. **[SIL 497]**

[4] **IF** the operating recombiner temperature is low for the present Reactor power level, **THEN**:

(a) **PLACE** the standby recombiner in service.

(b) **MAINTAIN** steam dilution and air purge on the idled recombiner for 1 hour.

(c) **IF** a standby recombiner is NOT available, **THEN BYPASS** the AOG System in accordance with PNPS 2.2.106, **BUT MAINTAIN** steam dilution and air purge through the recombiner and the charcoal beds. **[SIL 497]**

NOTE

A significant change in any of the below items indicates charcoal ignition has occurred.

[5] **WHENEVER** the hydrogen concentration downstream of recombiner is greater than or equal to 2%, **CONTINUOUSLY MONITOR**:

(a) Differential pressure on PRE-FILTER D/P Indicator DPIS-R611 and OFF-GAS FILTERS D/P Indicator DPIS-R616 on Panel CP600

(b) System pressure

(c) Indications on RECOMBINER and ADSORBER TEMPERATURES Recorder TR-9250 and ADSORBER VAULT TEMP Recorder TRS-R615 on Panel CP600

(d) Temperature drop across vault refrigeration unit

(e) Offgas flow rate

[6] **IF** a charcoal ignition has occurred, **THEN ISOLATE** the charcoal beds until the bed temperature and the temperature drop across the vault refrigeration unit are normal.

(a) **IF** temperatures do NOT return to normal within 2 hours, **THEN**:

(1) **DISCONTINUE** isolation of downstream side of charcoal vessels.

NOTE

A nitrogen purge may be accomplished by attaching a gaseous nitrogen supply (bottles or supply truck) to the inlet side of 8-HO-192, Post-Treatment Rad Monitor Return Valve to Process Gas, Retention Building 23'.

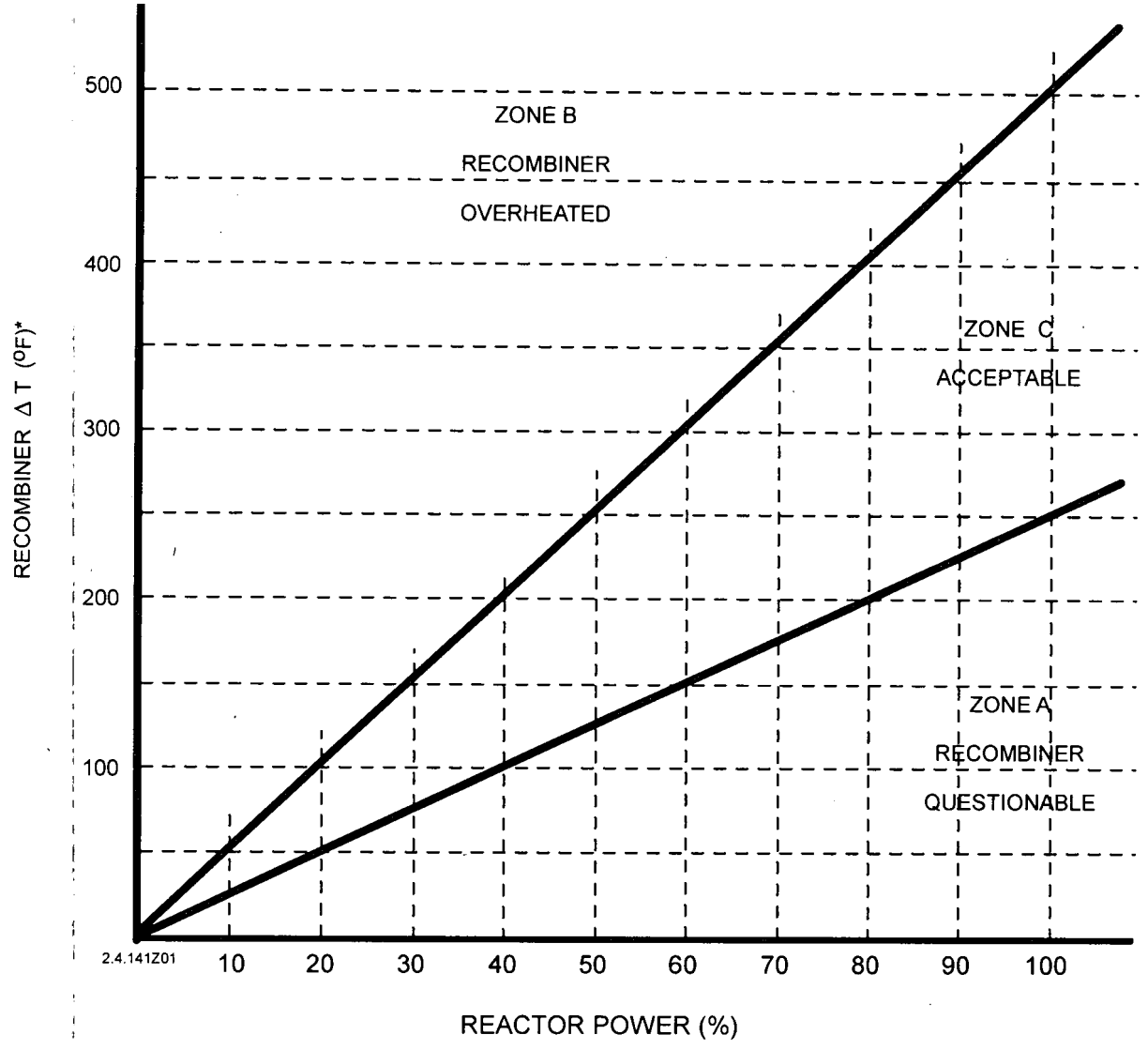
(2) **BEGIN** a nitrogen purge until all temperatures are stabilized within normal values.

[7] **CHECK** that the steam supply to the tube side of the preheater is on and the traps on the exit side are unloading properly.

[8] **CHECK** dilution steam flow to the jet compressor.

[9] **IF** any H_2 analyzer indicates higher than normal H_2 content, **THEN NOTIFY** the Radiochemistry Lab to sample offgas to verify the indication.

PILGRIM NUCLEAR POWER STATION AUGMENTED OFFGAS SYSTEM
RECOMBINER ΔT VERSUS REACTOR POWER



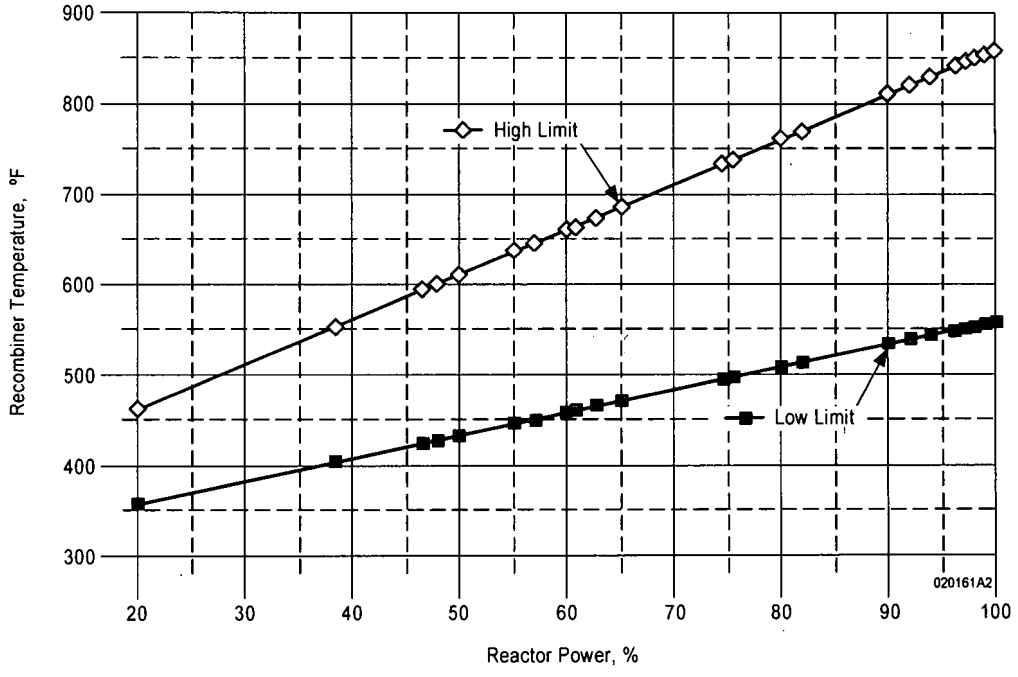
*Recombiner Exit Temperature minus Preheater Exit Temperature

ATTACHMENT 2
Sheet 1 of 1

RECOMBINER TEMPERATURE VERSUS REACTOR POWER

High Limit, °F = 360 + (5 X % Power)

Low Limit, °F = 310 + (2.5 X % Power)



RTYPE H6.02

PILGRIM NUCLEAR POWER STATION

Procedure No. 2.4.141

ABNORMAL RECOMBINER OPERATION

Revised Procedure

Stop
Think
Act
Review

CONTINUOUS USE

2.4.141 Rev. 23

1.0 SYMPTOMS

1.1 ALARMS

	ANNUNCIATOR	WINDOW
[1]	**"RECOMBINER TEMP HI/LO"**	CP600L-A4
[2]	**"PRE-TREATMENT RAD HI"**	CP600R-B4
[3]	**"PRE-TREATMENT RAD HI-HI"**	CP600R-A4
[4]	**"H_2 ANALYZER A H_2 CONC HI"**	CP600L-A7
[5]	**"H_2 ANALYZER B H_2 CONC HI"**	CP600L-B7
[6]	**"OFF GAS OUTLET FLOW HI"**	CP600L-C2
[7]	**"RECOMBINER A INLET TEMP LO"**	CP600L-B4
[8]	**"RECOMBINER B INLET TEMP LO"**	CP600L-C4

1.2 PLANT INDICATIONS

[1] Recombiner inlet temperature, TI-R601A/B (CP600), equal to outlet temperature, TR-9250 points 3, 5 or 2, 4, 6.

[2] Higher than normal offgas temperatures.

[3] Increased offgas radiation levels.

[4] Low H_2 concentration upstream of AOG System.

[5] Lower offgas flow and/or high Reactor water conductivity.

2.0 AUTOMATIC ACTIONS

None

3.0 IMMEDIATE OPERATOR ACTIONS

[1] **IF** the recombiner temperature exceeds 1000°F **AND** a Reactor Scram has NOT been initiated, **THEN SCRAM** the Reactor **AND ENTER** PNPS 2.1.6, *"Reactor Scram"*.

4.0 SUBSEQUENT OPERATOR ACTIONS

CAUTION

Do not rely solely on any one instrument or indication. A comparison of applicable instrumentation may provide evidence to determine the cause of an event. Frequently monitor instrumentation to determine the trend of various parameters. Verify that appropriate instruments are tracking correctly. **[SOER93-01]**

PROCEED TO the appropriate section of this Procedure to mitigate the abnormal condition:

4.1 PREMATURE RECOMBINATION

NOTE

Simultaneous occurrence of all symptoms contained in Section 1.2 is symptomatic of a rapid recombination transient.

[1] **IF** all symptoms listed in Section 1.2 occur together, **THEN PERFORM** the following:

(a) **TRIP** the ETS using the ETS SHUTDOWN push button Panel CP600.

(b) **REDUCE** Reactor power in accordance with PNPS 2.1.14 Sections 7.10 and 7.11 to mitigate symptoms of premature recombination.

(c) **PLACE** an additional secondary jet into service by opening the opposite train SJAE secondary jet's gas supply valve (S-8-14 or S-8-13) **AND THEN OPEN** the secondary jet steam supply valve (S-1-12 or S-1-13).

(d) **MONITOR** CONDENSER VACUUM Recorder PR-3392 on Panel C2 and offgas temperature on EPIC (OGS004).

(1) **IF** Condenser vacuum decreases, **THEN SECURE** one secondary jet.

(e) **IF** required, **NOTIFY** Chemistry **AND VERIFY** the gross gamma activity rate of the noble gases is $\leq$ 500,000 μCi/sec once within 4 hours after a $\geq$ 50% increase in the nominal steady-state fission gas release after factoring out increases due to changes in thermal power level. **[Tech Spec Section 4.8.1.1.b]**

(f) **WHEN** indication of proper recombiner operation is evident, **THEN SECURE** one secondary jet.

(g) **IF** rapid recombination cannot be stopped **OR IF** combustion is occurring upstream of the steam jet air ejectors, **THEN SHUT DOWN** the Reactor in accordance with PNPS 2.1.5, *"Controlled Shutdown From Power"*, Section A (Controlled Shutdown with Manual Scram).

(h) **SHUT DOWN** the ETS in accordance with PNPS 10.2.4.

4.2 HIGH HYDROGEN CONCENTRATION DOWNSTREAM OF THE RECOMBINERS

[1] **TRIP** the ETS using the ETS SHUTDOWN push button on Panel CP600.

NOTE

Reducing Reactor power will reduce recombiner exit temperature by reducing hydrogen production. Preheater exit temperature should be greater than 350°F at 100% power.

[2] **IF** both H_2 analyzers are indicating greater than or equal to 4%, **THEN REDUCE** Reactor power in accordance with PNPS 2.1.14 Sections 7.10 and 7.11 until H_2 concentration is less than 4%.

[3] **VERIFY** recombiner operation for the power level being maintained by referring to Attachment 1.

NOTE

When securing a recombiner or bypassing AOG in the following steps, steam dilution and air purge flow should be maintained for at least 1 hour to prevent drawing hydrogen back into an idle recombiner. **[SIL497]**

[4] **IF** the operating recombiner temperature is low for the present Reactor power level, **THEN**:

(a) **BYPASS** AOG **AND PLACE** the standby recombiner in service. **THEN PLACE** AOG back in service in accordance with PNPS 2.2.106.

(b) **MAINTAIN** steam dilution and air purge on the idled recombiner for 1 hour.

(c) **IF** a standby recombiner is NOT available, **THEN BYPASS** the AOG System in accordance with PNPS 2.2.106, **BUT MAINTAIN** steam dilution and air purge through the recombiner and the charcoal beds. **[SIL497]**

NOTE

A significant change in any of the below items indicates charcoal ignition has occurred.

[5] **WHENEVER** the hydrogen concentration downstream of recombiner is greater than or equal to 2%, **CONTINUOUSLY MONITOR**:

(a) Differential pressure on PRE-FILTER D/P Indicator DPIS-R611 and OFF-GAS FILTERS D/P Indicator DPIS-R616 on Panel CP600

(b) System pressure - PI-R002A (B) on Panel CP001

(c) Indications on RECOMBINER and ADSORBER TEMPERATURES Recorder TR-9250 and ADSORBER VAULT TEMP Recorder TRS-R615 on Panel CP600

(d) Temperature drop across vault air handling unit VAC-302A (B) as read on local TI-H331/H332/H334/H312 in the AOG Building

(e) Charcoal vault space temp TI-H303

(f) Offgas flow rate as read on FI-3725 located on Panel C2 and FI-9247 on CP003

(g) Recombiner inlet temperature at TI-R601A/B on CP600 (approximately 300°F)

[6] **IF** a charcoal ignition has occurred, **THEN ISOLATE** the charcoal beds until the bed temperature and the temperature drop across the vault refrigeration unit are normal.

(a) **IF** temperatures do NOT return to normal within 2 hours, **THEN**:

(1) **DISCONTINUE** isolation of downstream side of charcoal vessels.

NOTE

A nitrogen purge may be accomplished by attaching a gaseous nitrogen supply (bottles or supply truck) to the inlet side of 8-HO-192, Post-Treatment Rad Monitor Return Valve to Process Gas, Retention Building 23'.

(2) **BEGIN** a nitrogen purge until all temperatures are stabilized within normal values.

[7] **CHECK** that the steam supply to the tube side of the preheater is on and DT-9A and DT-9B traps on the exit side are draining properly. Proper draining is confirmed by a temperature drop across the drain trap using a hand-held measurement device.

[8] **CHECK** dilution steam flow to the jet compressor on FIS-9262 on Panel C75.

[9] **IF** any H_2 analyzer indicates higher than normal H_2 content, **THEN NOTIFY** the Radiochemistry Lab to sample offgas to verify the indication.

[10] **IF** the concentration of hydrogen in the AOG treatment system is greater than 2% by volume **BUT** less than or equal to 4% by volume, **THEN RESTORE** the concentration of hydrogen to less than or equal to 2% by volume at the outlet of the AOG recombiner within 48 hours **OR BE** in a Cold Shutdown condition within 24 hours.
[FSAR Section 9.4]

[11] **SHUT DOWN** the ETS in accordance with PNPS 10.2.4.

4.3 AOG PRESSURE REDUCING STATION FAILURE

4.3.1 Failure Of PCV-9238, Steam Supply To Augmented Offgas

[1] **OBTAIN** the Shift Manager's permission to bypass the AOG Steam Dilution Low Flow interlock.

(a) **POSITION** the AOG Steam Dilution Low Flow Bypass Switch (FIS-9262) on Panel C10 to "BYPASS".

CAUTION

The opening of 1-HO-153 and the closing of 1-HO-146 may need to be performed in parallel to maintain system operation.

[2] **SLOWLY THROTTLE OPEN** 1-HO-153 [S-1-25], AOG Steam Supply Line PV-9238 Bypass Valve, to maintain downstream pressure approximately 36 psig as indicated on PI-9238 on Panel CP600.

[3] **CLOSE** 1-HO-146 [S-1-23], AOG Steam Supply PV-9238 Inlet Isolation Valve.

[4] **CLOSE** 1-HO-145 [S-1-24], AOG Steam Supply PV-9238 Outlet Isolation Valve.

[5] **CONTROL** the AOG steam supply pressure (approximately 36 psig) by adjusting 1-HO-153 [S-1-25], AOG Steam Supply Line PV-9238 Bypass Valve, as necessary.

[6] **RETURN** the AOG Steam Dilution Low Flow Bypass Switch (FIS-9262) on Panel C10 to "NORMAL".

[7] **REFER TO** PNPS 2.2.106 to return PCV-9238 to service.

4.3.2 Failure Of PCV-9239, Jet Compressor Reducer

[1] **OBTAIN** the Shift Manager's permission to bypass the AOG Steam Dilution Low Flow interlock.

(a) **POSITION** the AOG Steam Dilution Low Flow Bypass Switch (FIS-9262) on Panel C10 to "BYPASS".

CAUTION

The opening of 1-HO-154 and the closing of 1-HO-149 may need to be performed in parallel to maintain system operation.

[2] **SLOWLY THROTTLE OPEN** 1-HO-154 [S-1-22], AOG Steam Supply Line PV-9239 Bypass Valve, to maintain downstream pressure approximately 300 psig as indicated on PI-9239 on Panel CP600.

[3] **CLOSE** 1-HO-149 [S-1-20], AOG Steam Supply PV-9239 Inlet Isolation Valve.

[4] **CLOSE** 1-HO-159 [S-1-21], AOG Steam Supply Line PV-9239 Outlet Isolation Valve.

[5] **CONTROL** the AOG steam supply pressure (approximately 300 psig) by adjusting 1-HO-154 [S-1-22], AOG Steam Supply Line PV-9239 Bypass Valve, as necessary.

[6] **RETURN** the AOG Steam Dilution Low Flow Bypass Switch (FIS-9262) on Panel C10 to "NORMAL".

[7] **REFER TO** PNPS 2.2.106 to return PCV-9239 to service.

5.0 DISCUSSION

[1] Normally, if the recombiner temperature is high for a specific Reactor power level, the problem could be attributed to a loss or reduction of dilution steam to the jet compressor. On the other hand, if the recombiner temperature is too low, there are four possible causes:

(a) Low Reactor power (i.e., low H_2 production)

(b) Too high dilution steam flow

(c) Recombiner not functioning (i.e., the H_2 and O_2 are not being recombined); therefore, little or no heat is being generated.

(d) High moisture in the recombiner

[2] Step 5.0[1](c) can be easily checked by looking at H_2 concentration as monitored by the H_2 analyzer or a Chemistry Lab sample.

[3] In the event it appears that the recombiner may not be operating, it is possible that rapid recombination may be occurring upstream in the Offgas System. Indications of such an occurrence may include increased offgas radiation levels, zero recombiner temperature rise, higher offgas temperatures, low H_2 concentration upstream of AOG System, lower offgas flow, and/or high Reactor water conductivity. In addition, radiation levels in the area of the recombiner itself will be reduced.

[4] If rapid recombination is suspected, a secondary steam jet can be placed into service to suppress or "move" recombination to the recombiners. This should be done at a reduced power level. During this operation, offgas temperature and condenser vacuum should be trended to monitor the expected condenser backpressure degradation.

[5] If dilution steam flow to the jet compressor is lost while at high Reactor power combined with a failure of the isolation logic on the Main Condenser Vapor Valves, the recombiner temperature would exceed normal temperature limits and perhaps do harm to the catalyst. Immediate Operator action to manually Scram the Reactor should occur if the recombiner temperature exceeds 1000°F.

[6] In BWRs, the ignitions experienced so far have all occurred in the vicinity of the Augmented Offgas System and the combustion has propagated upstream consuming the hydrogen "fuel" until it reaches the after-condenser. Since sustained combustion is dependent on a continuing supply of process gas for "fuel", sustained combustion can only occur when plant operation is continued after an offgas ignition.

[7] If high hydrogen concentration is experienced downstream of the recombiner, securing steam dilution flow could cause hydrogen to be drawn back into the recombiner due to the collapsing steam volume. This could result in hydrogen ignition due to the lack of diluting steam.

[8] Technical Specifications Amendment No. 177 relocated the requirements (3/4.8.F.1, Table 3.8.2, and Table 4.8.2 Instrument #4 and the notes for the tables) for the Offgas Treatment Explosive Gas Monitoring System to FSAR Section 9.4.

[9] In accordance with FSAR Section 9.4, in the event of the failure of a nonredundant AOG System component or hydrogen buildup, provisions are made to bypass the AOG System and operate the Station using the installed 30 minute Offgas Holdup System until maintenance of the AOG System can be completed.

6.0 REFERENCES

[1] FSAR Section 9.4, Gaseous Radwaste System

[2] ODCM 3.3.4, Gaseous Effluent Treatment

[3] PDC87-78B, Improvements to Nameplates, Labels on Main Control Room Panels

[4] Procedures

(a) PNPS 2.1.5, *"Controlled Shutdown From Power"*

(b) PNPS 2.1.6, *"Reactor Scram"*

(c) PNPS 2.1.14, *"Station Power Changes"*

(d) PNPS 10.2.4, *"Extended Test System Operating Procedure"*

(e) PNPS 10.2.9, *"Electrolytic Hydrogen Water Chemistry System"*

(f) PNPS 2.2.106, *"Augmented Offgas System"*

[5] RFI89-521

[6] Service Information Letters (SIL)

(a) 246, "Control of Sustained Combustion in Offgas Systems"

(b) 497, "Hydrogen Ignition in Offgas System"

[7] Technical Specifications Amendment No. 177

7.0 ATTACHMENTS

ATTACHMENT 1 - GRAPH OF RECOMBINER TEMPERATURE VERSUS REACTOR POWER

REVISION LOG

REVISION 23 **Date Originated 3/09**

Pages Affected	Description
2	Add specific points to monitor.
4	Add clarifications for placing additional jets in service.
5,11	Delete Graph of Recombiner ΔT Versus Reactor Power Attachment.
5	Add reference to PNPS 2.2.106
6	Add details to points to continuously monitor whenever hydrogen concentration downstream of recombiner is $\geq$ 2%.
6,7	Add details to check for proper draining.

REVISION 22 **Date Originated 3/06**

Pages Affected	Description
	(Revision 21 omitted due to MERLIN revision numbering scheme.)
3,7,8	Add Section 4.3 to address AOG steam pressure reducing station failures. (CR-PNP-2006-1024)
9	Add Discussion regarding the relationship between the dilution steam flow and recombiner temperatures.

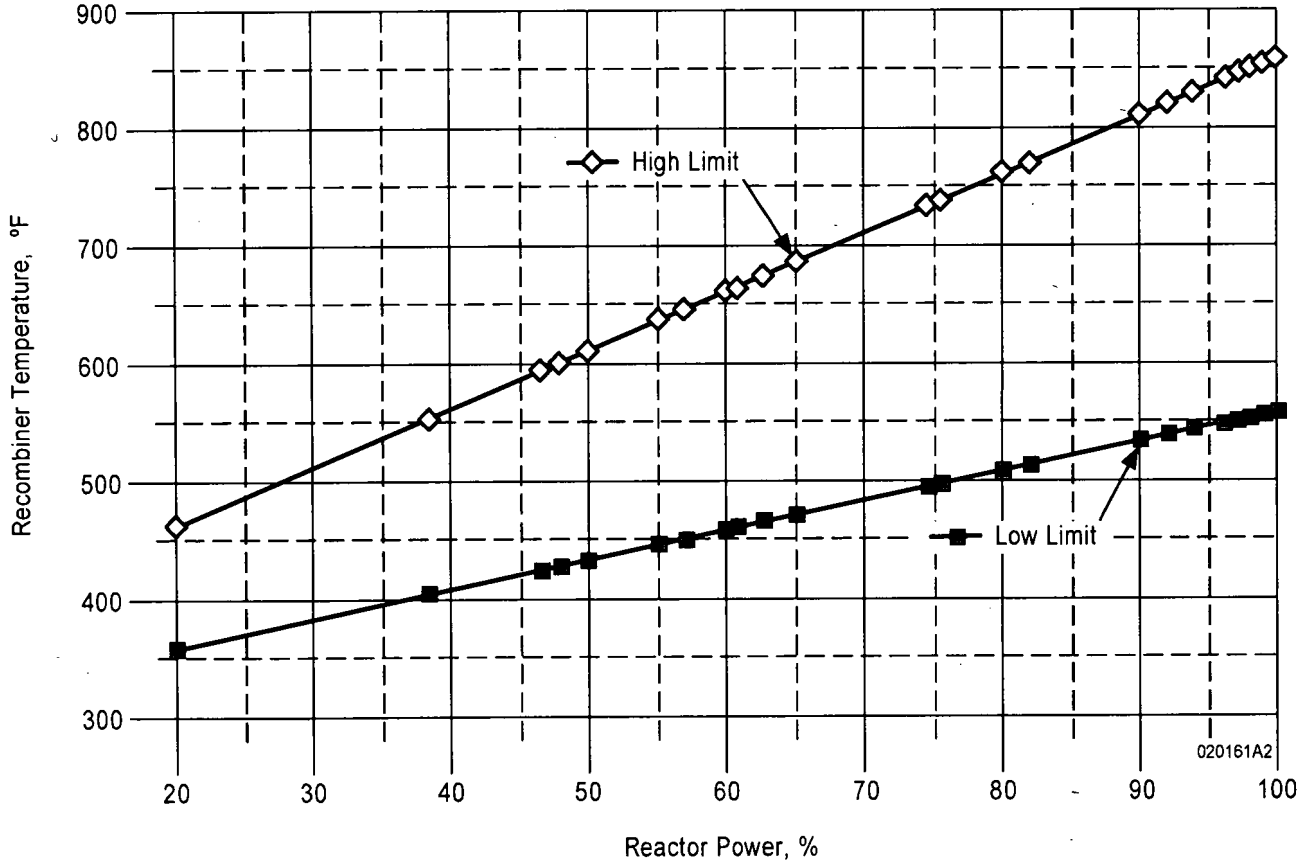
REVISION 20 **Date Originated 8/04**

Pages Affected	Description
4,5	Clarify ETS is tripped from a push button.
4,5,7	Delete reference to EHWCS as the system is not available for service.

RECOMBINER TEMPERATURE VERSUS REACTOR POWER

High Limit, °F = 360 + (5 X % Power)

Low Limit, °F = 310 + (2.5 X % Power)



JPM ID: Simulator JPM S-4

JPM Title: Transfer Pressure Regulation from MPR to EPR with EPR Failure

Issue: Step 4 of this JPM involving the adjustment of the "spread" between the MPR and the EPR setpoints was identified as a critical step within the JPM. Examiners requested that the facility make a determination as to whether this step is actually critical.

Discussion: The procedure for transferring pressure regulation from the MPR to the EPR is covered in 2.2.99, Main Turbine Generator, Section 7.4.4 (included). After the EPR is initially placed in control of reactor pressure via step [3] of the procedure, step [4] directs that the MPR setpoint be adjusted to establish a spread between the MPR and EPR of approximately 11 to 13%. Step [5] then directs that the EPR pressure setpoint be adjusted as required to maintain reactor pressure within the prescribed band of Attachment 7 of 2.2.99.

While adjusting the EPR in accordance with step [5] a malfunction was inserted requiring the candidate to diagnose a pressure regulator malfunction, transition to an off-normal procedure and remove the EPR from service.

As discussed in off-normal procedure 2.4.37, Turbine Control System Malfunctions (included), a backup pressure regulator is assumed to be operable in the PNPS transient Analysis. Whenever a backup pressure regulator is not available the Technical Specification is not considered satisfied for MCPR considerations.

Due to the malfunction being inserted while the EPR was being adjusted to raise reactor pressure to the specified band, the EPR was never fully returned to service. Pressure regulation is considered fully operable when reactor pressure is within the prescribed band of Attachment 7 to 2.2.99 and backup pressure regulation is available. Backup pressure regulation is available to respond to an over pressure condition when the MPR pressure setpoint is set approximately 5 psi above the EPR setpoint. This corresponds to a spread in servo positions of 11-13%. Therefore the step to establish the 11-13% spread is not critical until after the EPR has been adjusted to control pressure within the prescribed band.

Additionally, even if the spread between the two regulators was allowed to reach 20%, an in-service pressure regulator failure during the transfer would result in reactor pressure rising only 8 psig before the backup pressure regulator took control. If the spread was allowed to reach 40%, pressure would rise only 16 psig. These settings would still provide significant margin to the high pressure scram trip of 1060 psig. A spread less than 11% would result in a very small pressure rise (< 5 psig).

However the sequence for returning the EPR to service in procedure 2.2.99 has the operator establish the 11 to 13 % spread and then adjust the EPR as required to achieve the required reactor pressure. In actuality, the process of raising the EPR setpoint to establish the desired pressure also requires periodic adjustments of the MPR to prevent the MPR re-assuming pressure control. Procedure 2.2.99 does not provide this guidance and this action had previously been considered a "skill of the craft".

Since the EPR was never fully returned to service during the JPM prior to inserting the EPR malfunction, step 4 of the JPM should not have been marked as a critical step.

Proposed Resolution:	Evaluate candidate performance based on step 4 of the JPM being a non-critical step.
References Included:	1. 2.2.99, Main Turbine Generator, Section 7.4.4 2. 2.4.37, Turbine Control System Malfunctions
Corrective Actions	PNPS Condition Report CR-2009-01157 has been generated to revise procedure 2.2.99 to eliminate the need to rely on the skill of the craft and to revise the sequence of steps to more accurately reflect the process for returning the EPR to service.

Entergy	CONDITION REPORT	CR-PNP-2009-01157

Originator: Noyes,David E
Originator Phone: 8117
Originator Site Group: PNP Operations Mgmt PNP
Operability Required: N
Supervisor Name: Smith,Robert Gerard
Reportability Required: N
Discovered Date: 04/02/2009 09:51
Initiated Date: 04/02/2009 10:26

Condition Description:

Administration of the 2009 ILO examination identified inadequate procedural guidance in procedure 2.2.99 Main Turbine Generator. Section 7.4.4 Transfering the MPR to the EPR directs establishing an 11 to 13 % control position spread between the controlling EPR and the backup MPR. The procedure then directs adjusting reactor pressure to the required band without direction for continuing to maintain the required spread. This sequence may result in the MPR taking control depending on the magnitude of the required pressure adjustment.

Immediate Action Description:

Initiated this condition report.

Suggested Action Description:

Assign to ops support to revise procedure and validate other sections of the procedure that adjust reactor pressure have provisions to maintain the required control position spread.

PILGRIM 2009 NRC JPM S-4

NUCLEAR PLANT OPERATOR JOB PERFORMANCE MEASURE (RO/SRO)

TITLE: **TRANSFER PRESSURE REGULATION FROM MPR TO EPR WITH EPR FAILURE (ALTERNATE PATH)**

OPERATOR: _____ **DATE:** _____

EVALUATOR: _____ **EVALUATOR SIGNATURE:** _____

CRITICAL TIME FRAME:	Required Time (min):	**NA**	Actual Time (min):	**NA**
PERFORMANCE TIME:	Average Time (min):	15	Actual Time (min):	

JPM RESULTS*: SAT UNSAT NEEDS IMPROVEMENT
(Circle one) *Refer to Grading Instructions at end of JPM

COMMENT SHEET ATTACHED: Yes / No (circle one) (Required for Unsat, Needs Improvement or Follow-Up Questions)

SYNOPSIS: With the reactor at full power, MHC pressure regulation is being controlled by the MPR following a failure of the EPR. Following repairs to the EPR, pressure regulation will be restored to the EPR. The operator will energize the EPR and place the EPR in service, when EPR is in service the EPR fails. Operator takes actions in accordance with 2.4.37.

TASK STANDARD: The EPR will be energized and placed in service IAW 2.2.99. The procedure should be followed with no failure of critical elements. There will be no unacceptable pressure transients resulting from this transition (Rx scram, Bypass valve operation)

EVALUATION METHOD:

X Perform
Simulate

EVALUATION LOCATION:

Plant
X Simulator
Control Room

Prepared: _____ **Date:** _____

Reviewed: _____ **Date:** _____

Approved: _____ **Date:** _____
Superintendent, Operations Training (or Designee)

TASK Title:	Task Number	K&A SYSTEM:	K&A RATING:
RESPOND TO EPR-MPR MALFUNCTION.	248-04-01-002	241000 A4.19	3.5/3.4

REFERENCES:

PNPS 2.2.99, Rev.46

SIMULATOR CONDITIONS:

1. Initialize to full power IC
2. Transfer MHC pressure regulation to the MPR IAW 2.4.37.
3. Adjust MPR so that RPV pressure is within the prescribed band of 2.4.37.
4. Take EPR power to off
5. Pend EPR oscillation failure (UT1EP-TCO6 when H_A2_A1_M3_GT 936)
6. When MPR set point is raised the EPR will fail.

GENERAL TOOLS AND EQUIPMENT:

1. None

CRITICAL ELEMENTS:

Critical elements are shaded in gray within the body of this document.

OPERATOR BRIEF:

1. State the following paragraph IF this is the first performance in this setting:
   a) "All actions associated with this job performance measure are to be performed. You will be provided access to any tools or equipment you determine necessary to perform the task. When a second checker is called for, the evaluator will perform the role of second checker and will always be in agreement with your actions. Before you start, the evaluator will state the task conditions and answer any questions, then provide a cue to begin".
2. The task conditions are as follows:
   i) The plant is at rated power
   ii) Following a failure of the EPR, the MPR was placed in service IAW 2.4.37
   iii) The EPR has been repaired
3. Solicit and answer any questions the operator may have.

INITIAL CONDITIONS:

- The plant is at rated power
- Following a failure of the EPR, the MPR was placed in service IAW 2.4.37
- The EPR has been repaired

INITIATING CUE:

IAW with 2.2.99, section 7.4.4, energize the EPR and restore pressure control to the EPR.

PERFORMANCE:

Notes This task is covered in 2.2.99, Section 7.4.4

All components are located on Panel C2 horizontal and vertical section unless otherwise noted

All critical steps must be performed in order written unless otherwise noted

START TIME: _____

1.	**Procedure Step:**	7.4.4 Transferring from MPR to EPR NOTE When the EPR is initially energized, the pressure setpoint will automatically ramp to maximum pressure, prior to placing the EPR in control and energizing the Operator's setpoint control switch (EPR SETPT). This will take approximately 5 minutes to occur. **CAUTION** Adjust pressure regulators SLOWLY to avoid pressure transients. [1] **PLACE/VERIFY** EPR POWER switch to "NORM" at Panel C2.
	Standard	EPR Power Switch placed in NORM position EPR power failure alarm clears.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

2.	**Procedure Step:**	[2] **WAIT** 1 minute from the time EPR SETPT Indicator ZI-3013 reaches its maximum setpoint of 1010 psi**g**.
	Standard	Operator waits long enough for Indicator ZI-3013 to go full scale.
	Cue	
	Notes	If operator does not wait long enough the EPR control switch will not respond in the next step.
	Results	SAT ☐ UNSAT ☐

3.	**Procedure Step:**	NOTE Once the EPR takes control, the red PRESS CONTROL light over the EPR SETPT switch on Panel C2 will come on and EPR CONTROL POSITION Indicator ZI-3014 will rapidly increase to the setpoint indicating the EPR has control. The red PRESS CONTROL light above the MPR SETPT switch will go off and the green NOT IN CONTROL light will come on. This rapid increase is an instrument response and will not result in a pressure transient. [3] **RESTORE** the EPR to control slowly by placing the EPR SETPT C/S to "LOWER" until the EPR takes control from the MPR (red PRESS CONTROL light above EPR SETPT C/S comes on).
	Standard	Operator goes to LOWER on EPR control switch. Red "Press Control" light illuminates above the EPR setpoint switch.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

4.	**Procedure Step:**	[4] **ADJUST** MPR SETPT C/S so that MPR CONTROL POSITION Indicator ZI-3020 is set approximately 11 to 13% lower than EPR CONTROL POSITION Indicator ZI-3014. (a) **IF** EPR controlling pressure deviation is > 13%, **THEN LOWER** the MPR pressure setpoint indicated on ZI-3021 by taking the MPR Set Point Control Switch to "LOWER". (b) **IF** EPR controlling pressure deviation is < 11%, **THEN RAISE** the MPR pressure setpoint indicated on ZI-3021 by taking the MPR Set Point Control Switch to "RAISE".
	Standard	Operator adjusts the MPR pressure setpoint to establish a deviation between 11 and 13%, with the EPR control position indicator being the higher of the two.
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

5.	**Procedure Step:**	[5] **SET** EPR SETPT to maintain PI-640-25A, REACTOR PRESSURE for CH A, and PI-640-25B, REACTOR PRESSURE for CH B, on Panel C905 at ≤ 1035 psig.
	Standard	Operator adjusts EPR setpoint as required. PI-640-25A/B stable at a pressure of 1025 to 1045 psig
	Cue	
	Notes	
	Results	SAT ☐ UNSAT ☐

6.	**Procedure Step:**	[1] **IF** Reactor pressure approaches 1060 psig **OR** 810 psig during a pressure control malfunction event, **THEN SCRAM** the Reactor **AND ENTER** PNPS 2.1.6. [2] **IF** necessary, **REDUCE** power in accordance with PNPS 2.1.14 Sections 7.10 and 7.11 to ≤ 90% CTP to mitigate the possibility of an APRM Hi Flux Scram.
	Standard	Operator recognizes the pressure oscillations when the EPR fails and enters 2.4.37
	Cue	
	Notes	If required the operator will lower core flow to obtain lee than or equal to 90% power
	Results	SAT ☐ UNSAT ☐

7.	**Procedure Step:**	[1] **ATTEMPT TO TAKE CONTROL** of Reactor pressure with the MPR by holding the MPR SET PT control switch in the "LOWER" position. (a) **IF** MPR takes control, **THEN PLACE** the EPR POWER control switch to the "OFF" position.
	Standard	Operator reduces the MPR set point until the MPR takes control and takes the EPR control switch to OFF position.
	Cue	
	Notes	Operator takes EPR to off. This completes this JPM.
	Results	SAT ☐ UNSAT ☐

STOP TIME: _____

INITIAL CONDITIONS:

- The plant is at rated power
- Following a failure of the EPR, the MPR was placed in service IAW 2.4.37
- The EPR has been repaired

INITIATING CUE:

IAW with 2.2.99, section 7.4.4, energize the EPR and restore pressure control to the EPR.

RTYPE H6.02

PILGRIM NUCLEAR POWER STATION

Procedure No. 2.2.99

MAIN TURBINE GENERATOR

Stop
Think
Act
Review

CONTINUOUS USE

REACTIVITY CONTROL RELATED

2.2.99 Rev. 46

7.4.4 Transferring From MPR To EPR

NOTE

When the EPR is initially energized, the pressure setpoint will automatically ramp to maximum pressure, prior to placing the EPR in control and energizing the Operator's setpoint control switch (EPR SETPT). This will take approximately 5 minutes to occur.

CAUTION

Adjust pressure regulators SLOWLY to avoid pressure transients.

[1] **PLACE/VERIFY** EPR POWER switch to "NORM" at Panel C2.

[2] **WAIT** 1 minute from the time EPR SETPT Indicator ZI-3013 reaches its maximum setpoint of 1010 psig.

NOTE

Once the EPR takes control, the red PRESS CONTROL light over the EPR SETPT switch on Panel C2 will come on and EPR CONTROL POSITION Indicator ZI-3014 will rapidly increase to the setpoint indicating the EPR has control. The red PRESS CONTROL light above the MPR SETPT switch will go off and the green NOT IN CONTROL light will come on. This rapid increase is an instrument response and will not result in a pressure transient.

[3] **RESTORE** the EPR to control slowly by placing the EPR SETPT C/S to "LOWER" until the EPR takes control from the MPR (red PRESS CONTROL light above EPR SETPT C/S comes on).

[4] **ADJUST** MPR SETPT C/S so that MPR CONTROL POSITION Indicator ZI-3020 is set approximately 11 to 13% lower than EPR CONTROL POSITION Indicator ZI-3014.

(a) **IF** EPR controlling pressure deviation is > 13%, **THEN LOWER** the MPR pressure setpoint indicated on ZI-3021 by taking the MPR Set Point Control Switch to "LOWER".

(b) **IF** EPR controlling pressure deviation is < 11%, **THEN RAISE** the MPR pressure setpoint indicated on ZI-3021 by taking the MPR Set Point Control Switch to "RAISE".

CAUTION

During power increases, maintain Reactor pressure less than or equal to approximately 1025 psig to avoid pressure drifts and loss of adequate SRV/RV simmer margin.

[5] **SET** EPR SETPT to maintain Pressure Recorder PR/FR/LR-640-28 on Panel C905 within the limitations of Attachment 7. Reactor pressure at 100% power should be maintained 1025 to 1030 psig.

7.5 VOLTAGE REGULATOR OPERATION

7.5.1 Changing Voltage Regulator Modes

[1] To change to the voltage regulator mode from Manual to Automatic, **PERFORM** the following:

(a) **VERIFY** that the VOLTAGE REGULATOR XFER SWITCH is in the "MANUAL" position.

(b) **ADJUST** the automatic VOLTAGE REGULATOR SETPOINT ADJUSTER to obtain a "0" reading on the VOLTAGE REGULATOR TRANSFER VOLTMETER.

(c) **PLACE** the VOLTAGE REGULATOR XFER SWITCH to the "AUTO" position.

(d) **NOTIFY** ISO New England that the voltage regulator has been placed into the Automatic mode of operation.

[2] To change to the voltage regulator mode from Automatic to Manual, **PERFORM** the following:

(a) **VERIFY** that the VOLTAGE REGULATOR XFER SWITCH is in the "AUTO" position.

(b) **ADJUST** the manual VOLTAGE REGULATOR SETPOINT ADJUSTER to obtain a "0" reading on the VOLTAGE REGULATOR TRANSFER VOLTMETER.

(c) **PLACE** the VOLTAGE REGULATOR XFER SWITCH to the "MANUAL" position.

(d) **NOTIFY** ISO New England that the voltage regulator has been placed into the Manual mode of operation and for the approximate duration. **[NERC TOP-001-1]**

(e) **WHEN** the Main Generator is on line **AND** voltage regulation is in MANUAL, **THEN INCREASE** the frequency of Operator rounds to ensure voltage schedules are maintained. **[VAR-002-1]**

RTYPE H6.02

PILGRIM NUCLEAR POWER STATION

Procedure No. 2.4.37

TURBINE CONTROL SYSTEM MALFUNCTIONS

Stop
Think
Act
Review

CONTINUOUS USE

REACTIVITY CONTROL RELATED

5.0 DISCUSSION

[1] The Station Transient Analysis assumes operable backup pressure regulation. GESIL614 Rev. 1 identified that the loss of either Reactor pressure regulating device represents a plant condition that is outside the analyzed design bases for Station operation. Upon the loss of backup pressure regulation (i.e., MPR or EPR), Technical Specifications surveillance requirement 4.11.C.1 for MCPR cannot be considered satisfied and an entry into Technical Specifications LCO 3.11.C.1 is required.

[2] The EPR is normally in control with the MPR set at a higher pressure setpoint. If the EPR drives the valves closed, resulting in increasing pressure, pressure will increase until it matches the MPR setpoint. The MPR will then take control and prevent a further pressure increase. If the EPR drives the valves open, pressure will decrease. The MPR will not take control since it is at a higher pressure than the EPR. If not stopped, pressure will decrease until the low steam line closure of the MSIVs occurs or the plant depressurizes. By taking the EPR to "OFF", a loss of power signal is generated and the valves are driven closed. This allows the MPR to take control on increasing pressure. No backup system is available with the MPR in service and the EPR out of service. After restoring power, the EPR requires several minutes to warm up and balance electrical signals before it can be used for pressure control.

[3] Response to a failed-open Bypass Valve depends on plant power. At lower power levels (less than approximately 30%), Bypass Valve capacity exceeds steam production capacity. Opening of Bypass Valves beyond steam generation will result in decreasing Reactor pressure and low pressure MSIV closure or system depressurization. If Bypass Valves cannot be closed to prevent this, the unit must be Scrammed. At higher power levels, the control valves will close to compensate for the steam flow through the Bypass Valves and system pressure will remain constant. Attempts to correct the problem may be pursued with the unit on-line. If unsuccessful, the unit must be Scrammed. Power reduction to just above the power level equal to steam flow through the Bypass Valve minimizes the power level prior to the Scram. Reduction below that level will result in loss of pressure control. After the unit is shut down, the cooldown rate must be monitored. If the Bypass Valves are open beyond the steam production by decay heat, allowing excessive cooldown rates, the unit should be isolated from the condenser. Pressure control is then accomplished with HPCI or RCIC.

[4] Attempting to close the Bypass Valves using the Bypass Valve Opening Jack control switch with the unit online may cause Turbine Control Valves to open, resulting in a loss of Reactor pressure control.

[5] To assist with diagnostics of MHC failures, a simplified MHC logic diagram is provided in Attachment 1.