Docket No. 50-336
B18255

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Reactor Operator Initial Examination
Examination Material

# JOB PERFORMANCE MEASURE APPROVAL SHEET

I. JPM Title: **Power Range Safety Channel and Delta T Power Channel Calibration**

ID Number: JPM-97 Revision: 5

II. Initiated:

D. A. Pantalone — Developer — 11-01-00 Date

III. Reviewed:

Steve Myers — Technical Reviewer — 11-03-00 Date

IV. Approved:

User Department Supervisor S.V. Baker — 11-3-00 Date

Mike Jensen — Nuclear Training Supervisor — 11-03-00 Date

## JOB PERFORMANCE MEASURE WORKSHEET

Facility: MP-2 Examinee: _____

JPM Number: JPM-97 Rev. 5

Task Title: **Power Range Safety Channel and Delta T Power Channel Calibration**

System: Reactor Protection

Time Critical Task: Yes ____ No x

Validated Time (minutes): 20

Task No.(s): NUTIMS #217-700-02-01

Applicable To: SRO X RO X PEO ____

K/A No.: 015-000-A1.01 K/A Rating: 3.5/3.8

K/A No.: Generic 2.2.12 K/A Rating: 3.0/3.4

Method of Testing:

Simulated Performance: X Actual Performance: ____

Location:

Classroom: ____ Simulator: X In-Plant: X

Task Standards: The examinee performs power range safety channel and delta T power channel calibration for RPS Channel "A" per SP 2601D.

Required Materials (procedures,equipment):
- Authorized surveillance OPS Form 2601D-1
- Calculator

General References: SP 2601D

*** * * * READ TO THE EXAMINEE * * * ***

*I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied. You may use any approved reference materials normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgments, and log entries as if the evolution was actually being performed.*

## JOB PERFORMANCE MEASURE WORKSHEET

JPM Number: JPM-97 Rev. 5

Initiating Cues: You are the PPO. An I&C tech has just completed the incore/excore detector calibration on Channel "A" RPS.

The US has directed you to perform surveillance SP 2601D on Channel "A" of the RPS.

Initial Conditions:

- The plant is at 100% power.
- All systems are in a normal lineup.
- SP 2601D-1 has been authorized for use.

Simulator Requirements:

- Initialize the simulator at a normal 100% power IC and stable.
- Record the present setpoint for Channel 'A' "NUCLEAR PWR CALIBRATE" pot.
- Disengage the locking device for Channel 'A' "NUCLEAR PWR CALIBRATE" pot, and turn it 0.2 in the counter-clockwise direction.
- Record the present setpoint for Channel 'A' "Tcold CALABRATE" pot
- Disengage the locking device for Channel 'A' "Tcold CALIBRATE" pot and rotate 0.12 in the clockwise direction.
- Select "Tcold CAL" position on channels B, C & D and ensure they are all within 0.1 of each other.
- Place the displays on MON 1, 2 & 3 to the 100% pwr displays.

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*** * * * NOTES TO EXAMINER * * * ***

1. Critical steps for this JPM are indicated with an "X". For the examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.

2. When examinee states what his/her simulated action/observation would be, read the appropriate "Cue".

3. If necessary, question examinee for details of simulated actions / observations (i.e. "What are you looking at?" or "What are you observing?").

4. Under **NO** circumstances must the examinee be allowed to manipulate any devices during the performance of this JPM (in-plant only).

## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

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**START TIME:** [redacted]

STEP **1** __ __ Performance Steps: Check Channel 'A' Digital Voltmeter.

GRADE __ __ Standards: Examinee performs the following
1. Place the "METER INPUT" Switch to "METER INPUT"
2. Press and Hold the "ZERO, +10V & -10V buttons.
3. Observe voltage indication (DVM).
4. Record Voltages on 2601D-1
5. Check the voltages within the acceptance criteria and initial.

Cue: [redacted]

Comments: Examinee may choose to check the voltages on all 4 channels at this time.

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STEP **2** X Performance Steps: Calculate % Calorimetric Power and compare it to RATED THERMAL POWER.

GRADE __ X Standards: Examinee performs the following
1. *Divide CV4CAL buy 2700 MWth.*
2. *Ensure no deviations in excess of 5% of RATED THERMAL POWER between calorimetric and each linear range power.*
3. *Initial 2601D-1*

Cue: [redacted]

Comments: The examinee may only compare the 'A' Channel.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

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STEP **3** x Performance Steps: Check, Calibrate and Record Tc.

GRADE __ x Standards: Examinee performs the following:

1. *Place the all the "METER INPUT' switches to 'Tcold'.*
2. *Record 'Tcold' indication from the DVD onto 2601D-1 .*
3. *Place 'METER INPUT' switch to 'Tcold cal'.*
4. *Compare Channel 'A' 'Tcold Cal' with the other maximum value obtained above.*
5. *Disengage the locking device and adjust Channel 'A' 'Tcold CALIBRATE' pot.*
6. *Obtain a 'Tcold Cal' indication on Channel 'A' DVM within 0.2$^0$ F of the maximum value.*
7. *Engage the pot.*
8. *If the 'Tcold cal' changed, disengage the pot, recalibrate and engage the pot.*
9. *Record 'As Left' pot settings on 2601D-1.*

Cue:

Comments: If Channel 'A' 'Tcold cal' is within .2°F of maximum value, there is no need to perform steps 5, 6, 7 & 8 above.

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STEP **4** _ Performance Steps: Record the as found 'NUCLEAR PWR CALIBRATE' and 'DELTA T PWR CALIBRATE' potentiometer settings.

GRADE __ _ Standards: Examinee performs the following:

1. *Record Channel 'A' 'NUCLEAR PWR' and 'DELTA T PWR' pot settings on 2601D-1*
2. *Notify the US to log into LCO .3.3.1.1.*
3. *Record date and time of LCO entry onto 2601D-1.*

Cue: As US, inform the examinee that the LCO has been logged.

Comments: The LCO is logged for the first channel only and logged out after the last channel is completed.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

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STEP **5** _ Performance Steps: Record Calorimetric Power in percent.

GRADE __ _ Standards: Examinee performs the following:
1. *Examinee obtains thermal MW from PPC.*
2. *Divides CV4CAL by 2700MWth.*
3. *Record on 2601D-1*

Cue: [redacted]

Comments: The Ops PPC designation form that is on the roll-around cart may be used by the examinee for converting from calorimetric to percent power.

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STEP **6** x Performance Steps: Bypass the following trip units:
- High Power Trip ('1')
- TMLP Trip ('7')
- Turbine Trip ('8')
- Local Power Density trip ('11')

GRADE __ x Standards: Examinee performs the following:
1. *Obtains the bypass keys for the above trip units.*
2. *Places keys in the appropriate slots for Channel 'A',.*
3. *Turns them to the right and observes the yellow bypass lights are lit for each.*

Cue: [redacted]

Comments:

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

STEP 7 _ Performance Steps: Record "% Nuclear Power DVM" on 2601D-1.

GRADE __ _ Standards: The examinee performs the following.
1. *Places the METER INPUT switch in the "NUCLEAR PWR" position.*
2. *Records the (as found) "% Nuclear Power DVM" on 2601D-1.*

Cue: [redacted]

Comments:

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STEP 8 x Performance Steps: Calibrate Channel 'A' 'NUCLEAR POWER' and Record.

GRADE __ x Standards: Examinee performs the following:
1. *Determine if the 'Percent Nuclear Power' DVM is within 0.1% of the plant calorimetric.*
2. *Disengage locking device on the 'NUCLEAR PWR CALIBRATE' pot.*
3. *Adjust 'NUCLEAR PWR CALIBRATE' pot to equal the "% Calorimetric Power" recorded on 2601D-1.*
4. *Engage the locking device on 'NUCLEAR PWR CALIBRATE' pot.*
5. *If DVM changed, recalibrate per steps 2, 3, & 4.*
6. *Record the (as left) 'NUCLEAR PWR CALIBRATE' pot setting on 2601D-1.*
7. *Record the (as left) 'NUCLEAR PWR' DVM reading on 2601D-1.*
8. *Check the DVM value is within 0.1% of the "%Calorimetric Power" recorded on 2601D-1.*

Cue: [redacted]

Comments: Steps 2, 3, 4, & 5 do not need to be performed if the DVM value is within 0.1% of the "%Calorimetric Power" recorded on 2601D-1.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

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STEP 9 __ Performance Steps: Record the following on 2601D-1
- Channel 'A' 'Delta-T PWR' (DVM)
- *'NUCLEAR PWR - DELTA-T PWR (%)*

GRADE __ __ Standards: The examinee will perform the following:
1. *Place the 'METER INPUT' switch to 'DELTA-T PWR'.*
2. *Record (as found) 'DELTA-T PWR' DVM and 'NUCLEAR PWR - DELTA-T PWR (%) on 2601D-1.*

Cue: [redacted]

Comments:

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STEP 10 x Performance Steps: Calibrate Channel 'A' 'Delta-T PWR.

GRADE __ x Standards: The examinee will perform the following.
1. *Disengage the locking device on 'DELTA-T PWR CALIBRATE' pot.*
2. *Adjust the 'DELTA-T PWR CALIBRATE' pot to obtain the 'DELTA-T PWR' (DVM), within 0.1% of 'Calorimetric Power %' as recorded on 2601D-1.*
3. *Ensure average deviation on 'NUCLEAR PWR - DELTA-T PWR (%)' is -0.5% to +0.5%.*
4. *Engage the locking device on the 'DELTA-T PWR CALIBRATE' pot.*
5. *If DVM indication changed, repeat steps 1, 2, 3 & 4 above.*
6. *Record the (as left) 'DELTA-T PWR CALIBRATIE' pot setting on 2601D-1.*

Cue: [redacted]

Comments: This step is not required if; the (as found) 'DELTA-T PWR' (DVM) recorded in step 9 is within 0.1% of the 'Calorimetric Power (%)' recorded on 2601D-1 and 'NUCLEAR PWR - DELTA-T PWR (%)' average indication is within *-0.5% to +0.5%.*

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-97 TITLE: Power Range Safety Channel and Delta-T Power Channel Calibration

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STEP 11 x Performance Steps: Restore the following to normal:
- High Power Trip
- TMLP Trip
- Turbine Trip
- Local Power Density Trip

GRADE __ x Standards: The examinee will perform the following:
1. *Turn the 'Bypass Keys' to the left, for the above trips.*
2. *Observe the yellow lights no longer lit.*

Cue: [redacted]

Comments: When Channel 'A' has been calibrated and the bypass keys are in normal, this JPM is complete.

**STOP TIME:** [redacted]

## VERIFICATION OF JPM COMPLETION

Job Performance Measure No. JPM- 97 Rev. 5

Date Performed: _____

Operator: _____

Evaluator(s): _____

For examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly. If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

Time Critical Task? Yes _____ No **X**

Validated Time (minutes): 20

Actual Time to Complete (minutes): _____

Result of JPM: _____ (Denote by an S for satisfactory or a U for unsatisfactory)

Areas for Improvement:

## EXAMINEE HANDOUT

JPM ID Number: 97

Initiating Cues:

You are the PPO. An I&C tech has just completed the incore/excore detector calibration on Channel 'A' RPS.

The US has directed you to perform surveillance SP 2601D on Channel 'A' of the RPS.

Initial Conditions:

- The plant is at 100% power.
- All systems are in a normal lineup.
- SP 2601D-1 has been authorized for use.

| Form Approval | |
|---|---|
| Approval Date: 6-8-99 | Effective Date: 6-11-99 |

# Form Cover Sheet

## Generic Information

| Form Title | Rev. No. |
|---|---|
| Power Range Safety Channel and Delta T Power Channel Calibration | 15 |

| Reference Procedure | Applicable Tech. Spec. | Frequency |
|---|---|---|
| SP 2601D | 4.3.1.1.1, Table 4.3–1, items 2a and 2b | At least once every 24 hours or as required |

**This form is being used for the following:**

- [x] Tech Spec Surveillance
- [ ] System Alignment
- [ ] Other: _____
- [ ] Maintenance Restoration (Retest)
- [ ] Non–Tech Spec Surveillance (PM)

## Specific Information

| SCHEDULE DATE | APPLICABLE MODE | TSAS 3.3.1.1 action 2 ENTERED AT (Date/Time) [◆ Ref. 6.5]: |
|---|---|---|
| N/A | See *NOTE* below | |
| TEST AUTHORIZED BY: Training – | DATE | |
| PREREQUISITES COMPLETED (INITIALS) | PRECAUTIONS NOTED (INITIALS) | |
| COMPLETED BY | DATE | TSAS 3.3.1.1 action 2 EXITED AT (Date/Time) [◆ Ref. 6.5]: |
| ACCEPTED BY | DATE | |
| APPROVED BY (DEPARTMENT HEAD OR DESIGNEE) | DATE | ACCEPTANCE CRITERIA SATISFIED ☐ YES ☐ NO |

SURVEILLANCE INFORMATION

*NOTE:* – Above 15% of RATED THERMAL POWER, "NUCLEAR PWR CALIBRATE" Pots must be adjusted to make nuclear power signals agree with the calorimeteric calculation and "ΔT PWR CALIBRATE" Pots must be adjusted to null Nuclear Power – ΔT Power DVMs.

During PHYSICS TESTS, daily calibrations of nuclear power and ΔT power may be suspended provided these calibrations are performed upon reaching each major power plateau and prior to proceeding to the next major test plateau.

COMMENTS

If performed for Maintenance Restoration, indicate Work Order #, etc.:

List any additional comments:

# Power Range Safety Channel and Delta T Power Channel Calibration

| Voltage and Power Deviation Checks | | | | | |
|---|---|---|---|---|---|
| Item | Acceptance Criteria | Channel | | | |
| | | "A" | "B" | "C" | "D" |
| "ZERO" | −0.003 to 0.003 volts | | | | |
| "+10V" | +9.997 to +10.003 volts | | | | |
| "−10V" | −9.997 to −10.003 volts | | | | |
| | **Initials** | | | | |
| *No* deviations in excess of 5% (in either direction) of RATED THERMAL POWER are observed between calorimetric and linear range NI indicated power **(Initials)** | | | | | |

| $T_C$ Check and Calibration | | | | |
|---|---|---|---|---|
| Item | Channel | | | |
| | "A" | "B" | "C" | "D" |
| "$T_{COLD}$" indication (DVM) | | | | |
| *As Left* "$T_{COLD}$ CALIBRATE" Pot setting | | | | |

| RPS Calibration | | | | |
|---|---|---|---|---|
| Item | Channel | | | |
| | "A" | "B" | "C" | "D" |
| *As Found* "NUCLEAR PWR CALIBRATE" Pot setting | | | | |
| *As Found* "ΔT PWR CALIBRATE" Pot setting | | | | |
| Calorimetric power (%) | | | | |
| *As Found* "Percent Nuclear Power" (DVM) | | | | |
| *As Left* "NUCLEAR PWR CALIBRATE" Pot setting | | | | |
| *As Left* "Percent Nuclear Power" (DVM) | | | | |
| **Acceptance Criteria:** *As Left* "Percent Nuclear Power" (DVM) indication is within ±0.1% of calorimetric power (%) **Initials** | | | | |
| *As Found* "ΔT PWR" (DVM) | | | | |
| "NUCLEAR PWR − ΔT PWR (%)" | | | | |
| *As Left* "ΔT PWR CALIBRATE" Pot setting | | | | |

N/A

| Power Range Control Channel Check and Calibration | | |
|---|---|---|
| Item | Channel "X" | Channel "Y" |
| "NUC PWR CAL POT" setting | N/A | |
| "POWER RANGE" indication (C−04) | | |

# JOB PERFORMANCE MEASURE APPROVAL SHEET

I. JPM Title: **Manual Isolation of Steam Generator Blowdown**

ID Number: JPM-T04 Revision: 0

II. Initiated:

Daniel A. Pantalone — 11-02-00
Developer — Date

III. Reviewed:

Steve Myers — 11-03-00
Technical Reviewer — Date

IV. Approved:

User Department Supervisor S.J. Baker — 11-3-00 Date

Mike Jensen — 11-03-00
Nuclear Training Supervisor — Date

## JOB PERFORMANCE MEASURE WORKSHEET

Facility: MP-2 Examinee: _____

JPM Number: JPM-T04 Rev. 0

Task Title: Manual Isolation of Steam Generator Blowdown

System: Steam Generator Blowdown

Time Critical Task: Yes ____ No X

Validated Time (minutes): 15

Task No.(s): NUTIMS #035-01-049 & 073-01-050

Applicable To: SRO X RO X PEO ____

K/A No.: Generic 2.3.11 K/A Rating: 2.7/3.2

Method of Testing:

Simulated Performance: X Actual Performance: ____

Location:

Classroom: ____ Simulator: X In-Plant: ____

Task Standards: At the completion of this JPM, the examinee will have manually isolated Steam Generator Blowdown.

Required Materials (procedures,equipment):
- ARP 2590E C-06/7
- ARP 2590H RC-14

General References:

**** READ TO THE EXAMINEE ****

*I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied. You may use any approved reference materials normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgments, and log entries as if the evolution was actually being performed.*

## JOB PERFORMANCE MEASURE WORKSHEET

JPM Number: JPM-T04 Rev. 0

Initiating Cues: You are the Secondary Plant Operator (SPO). As the SPO, respond to any plant conditions as you would in the plant.

I will act as your US.

Initial Conditions: The plant is at 100% power, NOT/NOP. No equipment is out of service.

Simulator Requirements:

Ensure that RM5099 (SJAE RM) has a setpoint cal sticker and that Recorder RJR-9373 has paper.

1. Place the simulator in any 100% power IC.
2. On RC-14, place the SJAE Radmonitor (RM4262) in "TEST".
3. When the lights on the RM go on, place the switch back to "OP"
4. On C-05 override open MS 220A&B by taking their hand-switches to close then back to open.
5. RMR-01 (Defeat) Defeat RM4262
6. Override Annunciator (C-06 DB24) to (OFF)
7. (IO – OFF) RIT4262 lights (DS-1, DS-2 & DS-3)
8. Check that all lights are off on RM4262 on RC-14.
9. Clear all Annunciators and any PPC alarms.
10. Place Mon. 1, 2 & 3 to their appropriate displays for 100% power.

After the examinee has reported that she has taken the watch, insert the following.

11. SG-01A (100%) S/G Tube Leak.

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*** * * * NOTES TO EXAMINER * * * ***

1. Critical steps for this JPM are indicated with an "X". For the examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When examinee states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question examinee for details of simulated actions / observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the examinee be allowed to manipulate any devices during the performance of this JPM (in-plant only).

## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-T04 TITLE: Manual Isolation of Steam Generator Blowdown

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**START TIME:** [redacted]

STEP **1** __ Performance Steps: Examinee observes changes in plant status and reports same to the US.

GRADE ____ __ Standards: Examinee performs the following.

1. *Informs the US of a "Process Rad Monitor HiHI/Fail" annunciator on C-07.*
2. *Informs the US of a "SJAE RAD MONITOR" alarm on MON 2.*
3. *Refers to the ARP for the C-07 DA-24 Annunciator.*

Cue: [redacted]

Comments: The examinee may suggest that the Blowdown Valves MS-220A & B be closed as a precautionary measure prior to carrying out the steps in the ARP.

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STEP **2** X Performance Steps: Determine which Radmonitor is in alarm.

GRADE ____ X Standards: The examinee performs the following.

1. *Verifies that RM 5099 (SJAE RM) is in alarm.*
2. *Refers to ARP 2590H for guidance.*
3. *Place RM5099 in alarm defeat.*

Cue: [redacted]

Comments: The examinee can verify RM 5099 by going to RM-14 and observing that the alarm light on RM 5099 is lit, or by accessing the PPC and verifying that RM 5099 is in alarm.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-T04 TITLE: Manual Isolation of Steam Generator Blowdown

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STEP **3** __ Performance Steps: Observe and Compare radmonitor indication with the "SETPOINT" sticker on RM5099.

GRADE ____ __ Standards: The examinee will perform the following:
1. *Check RM5099 reading on RC14.*
2. *Compare the reading with the calibration sticker.*
3. *Checks RJR-9373 for SJAE Radmonitor trend.*

Cue: [redacted]

Comments:

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STEP **4** X Performance Steps: Set S/G Blowdown flow to 0.0 in the PPC.

GRADE ____ X Standards: The examinee will perform the following.
1. *Display the appropriate screen on the PPC*
2. *Reset blowdown flow to 0.0gpm. for both steam generators.*

Cue: [redacted]

Comments: Various PPC displays can be used to perform this step. As long as flow is set to 0.0 gpm, the task is accomplished.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-T04 TITLE: Manual Isolation of Steam Generator Blowdown

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STEP **5** X Performance Steps: Ensure all automatic functions have taken place.

GRADE ___ X Standards: The examinee performs the following:

1. *Places the switch for MS220A to close.*
2. *Places the switch for MS220B to close.*
3. *Observes that both valves have a Green Closed Light*
4. *Reports to the US that Blowdown has been isolated.*

Cue:

Comments: **After this step is completed, the JPM is considered complete.**

**STOP TIME:**

## VERIFICATION OF JPM COMPLETION

Job Performance Measure No. JPM- Rev.

Date Performed: _____

Operator: _____

Evaluator(s): _____

For examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly. If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

Time Critical Task? Yes _____ No **X**

Validated Time (minutes): _____

Actual Time to Complete (minutes): _____

Result of JPM: _____ (Denote by an S for satisfactory or a U for unsatisfactory)

Areas for Improvement:

## EXAMINEE HANDOUT

JPM ID Number: T04

Initiating Cues: You are the Secondary Plant Operator (SPO). As the SPO, respond to any plant conditions as you would in the plant.

I will act as your US.

Initial Conditions: The plant is at 100% power, NOT/NOP. No equipment is out of service.

# JOB PERFORMANCE MEASURE APPROVAL SHEET

I. JPM Title: **Trend Critical Data**

ID Number: JPM-T02 Revision: 0

II. Initiated:

Daniel A. Pantalone — Developer — 10/30/00 Date

III. Reviewed:

Steve Myers — Technical Reviewer — 11/03/00 Date

IV. Approved:

User Department Supervisor — 11-3-00 Date

S. J. Baker

Mike Jensen — Nuclear Training Supervisor — 11/03/00 Date

## JOB PERFORMANCE MEASURE WORKSHEET

Facility: MP-2 Examinee: _____

JPM Number: JPM-T02 Rev. 0

Task Title: Trend Critical Data

System: N/A

Time Critical Task: Yes X No _____

Validated Time (minutes): 15

Task No.(s): NUTIMS #083-01-050 Trend Parameters using the MMI.
NUTIMS# 083-01-052 Print information using the MMI.

Applicable To: SRO _____ RO X PEO _____

K/A No.: Generic K/A 2.1.19 K/A Rating: 3.0

Method of Testing:

Simulated Performance: X Actual Performance: _____

Location:

Classroom: _____ Simulator: X In-Plant: X

Task Standards: At the completion of this JPM, the examinee will have completed a trend of the following data points: RXLVL-A, CALSAT-A & TCETHI-A

Required Materials (procedures,equipment):
- Plant Process Computer Terminal

General References: Skill of the trade.

*** * * * READ TO THE EXAMINEE * * * ***

*I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied. You may use any approved reference materials normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgments, and log entries as if the evolution was actually being performed.*

## JOB PERFORMANCE MEASURE WORKSHEET

JPM Number: JPM-T02 Rev. 0

Initiating Cues:

- As the spare RO, the US has directed you to create a 3 trend graph of Reactor Vessel Level, Saturation Temperature and CET Temperature (CET high)' using the "Train A" parameters from the "ICC SUMMARY" display. Trend these points over the course of the LOCA.

Initial Conditions:

- The plant has experienced a LOCA and was manually tripped.
- EOP 2525 has been completed and EOP 2532 is in progress.

Simulator Requirements:

1. IC-24 or equivalent; 100% PWR, NOT/NOP
2. RC-03A (100%) Cold Leg Loop 1A
3. Place the sim. in RUN
4. Complete 2525.
5. Trip all RCPs
6. Change MON-1, 2 & 3 to "FTP Display Set"
   - display the "Unit 2 PPC Top Menu"
   - click on the "SPDS" button
   - click on the "FPT Display Set" button.
7. Allow the simulator to run for 10min. then FREEZE.

The examinee may now enter the simulator.

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*** * * * NOTES TO EXAMINER * * * ***

1. Critical steps for this JPM are indicated with an "X". For the examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.

2. When examinee states what his/her simulated action/observation would be, read the appropriate "Cue".

3. If necessary, question examinee for details of simulated actions / observations (i.e. "What are you looking at?" or "What are you observing?").

4. Under **NO** circumstances must the examinee be allowed to manipulate any devices during the performance of this JPM (in-plant only).

**START TIME:** [redacted]

STEP **1** X Performance Steps: Determine the "PPC Point" for the three data points to be trended: Rx Vessel Level, Saturation Temperature and CET Temperature (CET high).

GRADE __ X Standards: *The examinee determines that the "PPC Points" for the requested data is as follows.*
- *Rx Vessel Level = RXLVL-A*
- *Saturation Temperature = CALSAT-A*
- *CET Temperature (CET high) = TCETHI-A*

Cue: None

Comments: *Examinee can determine these points in various ways.*
1. *Directly from the "ICC SUMMARY" Display.*
   a. *Access the "ICC SUMMARY" display.*
   b. *Place the cursor over each of the above data points.*
   c. *Record the "PPC Point" as displayed at the bottom of the "ICC SUMMARY" display or on the "ANALOG POINT DISPLAY".*
2. *Searching via the ""Data Point Selection" display.*
   a. *Open the "Data Point Selection" display.*
   b. *Place the noun name into the "Point Search Text" box.*
   c. *Click on "Find or Find Next" until the point is found.*

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

STEP **2** X Performance Steps: Display the "ONE THREE-VARIABLE TREND".

GRADE __ X Standards: The examinee performs the following:
- *Display the "Unit 2 PPC Top Menu".*
- *Click the cursor on ""TREND 3" at the bottom of the display.*

Cue: None

Comments: It is not critical that the "TREND 3" be selected. Any trend display that will accommodate at least 3 data points will be permissible.

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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM- TITLE:

STEP **3** X Performance Steps: Insert the three "PPC Data Points" into the Trend Screen.

1. Click the curser in the "Point Selection Field" at the bottom left of the TREND display
2. For the three "Data Points" do the following.
   a) Insert the three "Data Points" into the "Point Search Text" field.
   b) Click on "Find" or "Find Next".
   c) Click on "Add"
3. Click on "OK".

GRADE __ X Standards:

1. *A three point trend is apparent on the monitor, and*
2. *The three "Point Selection Fields" on the bottom left of the "TREND" screen contain the following "Data Points"*

- *RXLVL-A*
- *CALSAT-A*
- *TCETHI-A*

Cue:

Comments: The "Data Points" can be in any order. If the examinee selects "Data Points" other than those specified, these "Data Points" must display comparable data.

Comments: **After this step is completed, the JPM is considered complete.**

**STOP TIME:**

## VERIFICATION OF JPM COMPLETION

Job Performance Measure No. JPM- Rev.

Date Performed: _____

Operator: _____

Evaluator(s): _____

| |
|---|
| For examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly. If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade. |

Time Critical Task? Yes _____ No **X**

Validated Time (minutes): 15

Actual Time to Complete (minutes): _____

Result of JPM: _____ (Denote by an S for satisfactory or a U for unsatisfactory)

Areas for Improvement:

## EXAMINEE HANDOUT

JPM ID Number: T02

Initiating Cues:

- As the spare RO, the US has directed you to create a 3 trend graph of Reactor Vessel Level, Saturation Temperature and CET Temperature (CET high)' using the "Train A" parameters from the "ICC SUMMARY" display. Trend these points over the course of the LOCA.

Initial Conditions:

- The plant has experienced a LOCA and was manually tripped.
- EOP 2525 has been completed and EOP 2532 is in progress.

# JOB PERFORMANCE MEASURE APPROVAL SHEET

I. JPM Title: **Calculate Boration/Dilution Volume**

ID Number: JPM-T01 Revision: 0

II. Initiated:

Daniel A. Pantalone — Developer — 11/02/00 Date

III. Reviewed:

Steve Myers — Technical Reviewer — 11/03/00 Date

IV. Approved:

User Department Supervisor S.J. Baker — 11-3-00 Date

Mike Jensen — Nuclear Training Supervisor — 11/03/00 Date

## JOB PERFORMANCE MEASURE WORKSHEET

Facility: MP-2 Examinee: _____

JPM Number: JPM-T01 Rev. 0

Task Title: **Calculate Boration/Dilution Volume**

System: N/A

Time Critical Task: Yes ____ No **X**

Validated Time (minutes): 20

Task No.(s): NUTIMS #121-01-145

Applicable To: SRO **X** RO **X** PEO ____

K/A No.: Generic 2.1.25 K/A Rating: 2.8/3.1
192002 K1.13 3.5/3.7

Method of Testing:

Simulated Performance: ____ Actual Performance: **X**

Location:

Classroom: **X** Simulator: **X** In-Plant: **X**

Task Standards: At the completion of this JPM, examinee has determined the required shutdown boron concentration within +50/-15 ppm and the amount of Boric Acid that must be added to meet that concentration.

Required Materials (procedures,equipment):
- OP 2208 (and all associated OPS Forms)
- Calculator

General References: OP 2208, Section 4.3 (Rev. 12, Ch. 3)
OP 2208, Attachment 4

**** READ TO THE EXAMINEE ****

*I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied. You may use any approved reference materials normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgments, and log entries as if the evolution was actually being performed.*

## JOB PERFORMANCE MEASURE WORKSHEET

JPM Number: JPM-A08 Rev. 0

Initiating Cues:

Shutdown Margin for the present condition is me using Xenon. The Unit Supervisor has directed you to do the following:

1. Determine Boron Concentration for adequate SDM 80 hours after the trip.
2. Determine the volume of PMW or Boric Acid that must be added to meet that SDM, in accordance with OP 2208.

Initial Conditions:

- The plant has tripped from 100% steady-state equilibrium power. It is expected to startup in approximately 4 days.
- The trip was uncomplicated and normal temperature and pressure are being maintained until startup.
- Chemistry Department has sampled the RCS and determined the boron concentration to be 1176 ppm.
- Reactor Engineering has indicated core average burnup is 2000 MWD/MTU.
- The PPC is not available.

Simulator Requirements: If this JPM is being performed on the Simulator do the following:

1. Place the Simulator in a post trip condition at 532 $^{0}$F
2. Blank or obstruct all PPC screens as if it were out of service.

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*** * * * NOTES TO EXAMINER * * * ***

1. Critical steps for this JPM are indicated with an "X". For the examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.

2. When examinee states what his/her simulated action/observation would be, read the appropriate "Cue".

3. If necessary, question examinee for details of simulated actions / observations (i.e. "What are you looking at?" or "What are you observing?").

4. As necessary use Data Sheet to verify parameters used.

## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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**START TIME:** [redacted]

STEP **1** _ Performance Steps: 1. OBTAIN present burnup from one of the following and RECORD:
- "CVBURNUP" (PPC)
- Reactor Engineering

2. RECORD RCS temperature ($T_{AVG}$).

GRADE ____ _ Standards: *Examinee obtains a copy of OPS Form 2208-13, "SDM Determination in MODES 3, 4, and 5" and records burnup and $T_{avg}$.*

Cue:

Comments: Burnup was provided and $T_{avg}$ used should be 532 °F.

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STEP **2** X Performance Steps: Refer To OPS Form 2208-12 and DETERMINE required shutdown boron concentration for existing core burnup and $T_{AVG}$ and RECORD.
- If any untrippable CEA(s) *not* fully inserted, ADD 350 ppm for *each* CEA *not* fully inserted, to the required shutdown boron concentration.

GRADE ____ X Standards: *Examinee uses burnup and $T_{avg}$ and determines required boron on OPS Form 2208-12 and records on OPS Form 2208-13. Since trip was uncomplicated, examinee determines it is <u>not</u> necessary to add 350 ppm.* ***Tolerance is +50/-15 ppm.***

Cue:

Comments: As necessary Refer to Data Sheet for value.
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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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STEP **3** _ Performance Steps: RECORD present RCS boron concentration, date, and time and SIGN "Determined By" section.

GRADE ___ _ Standards: *Examinee records present RCS boron concentration, date, and time on OPS Form 2208-13 and signs form.*

Cue:

Comments:

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STEP **4** X Performance Steps: If xenon worth modification is applicable (i.e., post trip or shutdown), PERFORM the following once every hour for a maximum of 24 hours:

a) RECORD date and time
b) Refer To OPS Form 2208-5 and DETERMINE Inverse Boron Worth at present burnup.
c) RECORD Inverse Boron Worth in column "A."

GRADE ___ X Standards: *Examinee identifies that xenon worth modification is applicable and uses burnup to determine inverse boron worth on OPS Form 2208-5 and records in column "A" on OPS Form 2208-13 (also date and time).*
***Tolerance is ± 0.2 ppm/%ΔK/K.***

Cue:

Comments: If the examinee decides that the Xenon worth after 80 hours is negligible, steps 4, 5, 6 &7 are not required.
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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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STEP **5** X Performance Steps: NOTE: When determining the smallest xenon reactivity worth expected to occur at any time during the next 1 hour periods, the following should be considered:

- If xenon is building in, the value at the beginning of the hour should be used.
- If xenon is decaying, the value at the end of the hour should be used.

1. Refer To one of the following and DETERMINE the *smallest* xenon reactivity worth expected within the hour being evaluated:
   - "Xenon-Samarium Post Trip Report" (printed automatically on special typer following trips)
   - OPS Form 2208-4
   - "XENON-SAMARIUM DEMAND" PPC program
   - Reactor Engineering
2. RECORD xenon reactivity worth in column "B."

GRADE ____ X Standards: *Examinee reads note and determines that xenon is decaying. Using OPS Form 2208-4, examinee determines the xenon reactivity worth value at the end of the 80 hours and records in column "B" on OPS Form 2208-13.* ***Tolerance is ± 0.1%ΔK/K.***

Cue: If asked which source to use, suggest OPS Form 2208-4.

Comments: Xenon value will be from the 100% power column of 2208-004. Time after Shutdown = 80 hours.

The examinee may elect to enter 0 %Δρ instead of .051%Δρ.
As necessary Refer to Data Sheet for value.

## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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STEP **6** _ Performance Steps: CALCULATE Boron Equivalent of Xenon Reactivity Worth as follows and RECORD in column "C":
*Boron Equivalent of Xenon Reactivity Worth = (Inverse Boron Worth) x (Xenon Reactivity Worth)*

GRADE ___ _ Standards: *Examinee multiplies column "A" (Inverse Boron Worth) times column "B" (Xenon Reactivity Worth) and records Boron Equivalent of Xenon in column "C" on OPS Form 2208-13.*

Cue:

Comments: As necessary Refer to Data Sheet for value.

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STEP **7** X Performance Steps: CALCULATE Xenon Corrected Required Shutdown Boron Concentration as follows:

1. RECORD the *lowest expected* RCS $T_{AVG}$ in the next hour.
2. Refer To OPS Form 2208-12 and DETERMINE required shutdown boron concentration.
3. RECORD required shutdown boron concentration in column "D."
4. CALCULATE and RECORD in column "E":
   - *Xenon Corrected Required Shutdown Boron Concentration = Required Shutdown Boron Concentration - Boron Equivalent of Xenon Reactivity Worth*
5. SIGN "Calculated By" column.

GRADE ___ X Standards: *Examinee records data ($T_{avg}$ as 532°F), subtracts Boron Equivalent of Xenon Reactivity Worth determined in step 6 from the Required Shutdown Boron Concentration determined in step 2 and signs OPS Form 2208-13.* ***Tolerance is +50/-15 ppm.***

Cue:

Comments: As necessary Refer to Data Sheet for value.
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## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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STEP **8** x Performance Steps: The examinee determines that the present boron concentration of 1176 ppm is 133 ppm short of the concentration needed 80 hours post trip..

GRADE ___ x Standards: *Examinee states that we must raise Boron Concentration by about 133 ppm.*

Cue: Acknowledge report.

Comments: ***Tolerance is +50/-15 ppm.***

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STEP **9** _ Performance Steps: Examinee locates the "Boration and Dilution" formulas.

GRADE ___ _ Standards: *Examinee references 2208 Attachment 4, "Manual Calculations With PPC Not Available".*

Cue:

Comments: The examinee can use any equivalent reference that supplies a formula for Boration or Dilution.

STEP **10** x Performance Steps: The examinee uses the "Boration" formula to calculate the volume of boric acid that needs to be added.

GRADE ___ x Standards: The examinee will manually calculate the following:
1. *62,490 x Ln [1176 - 5943) / 1309 - 5943)]*
2. *1768 gal of boric acid*

Cue:

Comments: Any number between 2446 gal to 1566 gal is acceptable. This deviation is based on +50/-15 ppm from the previous step.

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Comments: **WHEN THE EXAMINEE HAS COMPLETED THE CALCULATIONS, THIS JPM IS COMPLETE.**

## PERFORMANCE INFORMATION

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

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**STOP TIME:** _____

JPM ID NUMBER: JPM-A08 TITLE: Determine Shutdown Margin

**DATA SHEET**

The values for this data sheet must be determined and verified using the current OPS Forms in OP 2208. The data on this sheet may be updated as necessary if the data in OP 2208 changes.

RCS Boron Concentration: 1176 ppm

| PERFORMANCE STEP | VALUE | FORM AND REV. # |
|---|---|---|
| Step 2: Required Shutdown Boron Concentration | 1309 ppm | OPS Form 2208-12 (Rev. 19) |
| Step 4: Inverse Boron Worth | 123.9 ppm/% $\Delta K/K$ | OPS Form 2208-5 (Rev.17) |
| Step 5: Xenon Reactivity Worth | .051 to 0.0 % $\Delta K/K$ | OPS Form 2208-4 (Rev. 37) |
| Step 6: Boron Equivalent of Xenon | Value in step 4 times value in step 5 = 5.32 to 0.0 ppm | N/A |
| Step 7: Required Shutdown Boron Concentration | Value in step 2 minus value in step 6 = 1303.7 to 1309 ppm | N/A |

Values Determined by: Daniel A. Pantalone Values Verified by: Rich Cox

Date 11/02/2000 Date 11-03-2000

## VERIFICATION OF JPM COMPLETION

Job Performance Measure No. JPM-A08 Rev. 0

Date Performed: _____

Operator: _____

Evaluator(s): _____

For examinee to achieve a satisfactory grade, **ALL** critical steps must be completed correctly. If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

Time Critical Task? Yes _____ No **X**

Validated Time (minutes): 20

Actual Time to Complete (minutes): _____

Result of JPM: _____ (Denote by an S for satisfactory or a U for unsatisfactory)

Areas for Improvement:

## EXAMINEE HANDOUT

JPM ID Number: A08

Initiating Cues:

The Unit Supervisor has directed you to do the following:

1. Determine Boron Concentration for adequate SDM 80 hours after the trip.
2. Determine the volume of PMW or Boric Acid that must be added to meet the that SDM, in accordance with OP 2208.

Initial Conditions:

- The plant has tripped from 100% steady-state equilibrium power. It is expected to startup in approximately 4 days.
- The trip was uncomplicated and normal temperature and pressure are being maintained until startup.
- Chemistry Department has sampled the RCS and determined the boron concentration to be 1176 ppm.
- Reactor Engineering has indicated core average burnup is 2000 MWD/MTU.
- The PPC is not available.

Form Approved by Director – Millstone Unit 2 | 10/21/96 Effective Date | 2-96-246 PORC Mtg. No.

# SDM Determination in MODES 3, 4, and 5

| Burnup MWD/MTU | Required Shutdown Boron Concentration (OPS Form 2208-12) ppm | Date |
|---|---|---|
| $T_{AVG}$ °F | Present RCS Boron Concentration ppm | Time |
| Determined By: | | |

**Xenon Worth Modification of Required Shutdown Boron Concentration:**

A – Inverse Boron Worth (OPS Form 2208-5)
B – Xenon Reactivity Worth (OPS Form 2208-4)
C – Boron Equivalent of Xenon Reactivity Worth
D – Required Shutdown Boron Concentration (OPS Form 2208-12)
E – *Xenon Corrected* Required Shutdown Boron Concentration

| Date/Time | A (ppm/%Δρ) | | B (%Δρ) | | C (ppm) | RCS $T_{AVG}$ (°F) | D (ppm) | | C (ppm) | | E (ppm) | Calculated By |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |
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| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |
| | | X | | = | | | | – | | = | | |

*Completed form should be attached to applicable Control Room Daily Surveillance.*

*NOTE:* If any untrippable CEA(s) *not* fully inserted, for each CEA *not* fully inserted 350 ppm must be added, to the required shutdown boron concentration.

# Attachment 4
# Manual Calculations With PPC Not Available

(Sheet 1 of 1)

**Blended Makeup Flowrate Determination Formula:**

PMW flowrate = *"K" x (boric acid flowrate)*

Where, *"K"* = $\frac{\text{(ppm boron in BAST) − (ppm boron in makeup)}}{\text{ppm boron in makeup}}$

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**Boration and Dilution Formulas:**

**NOTE**

The boration and dilution formulas used in this worksheet assume the RCS is at 532°F, 2,250 psia, and pressurizer level is at 40%.

| | |
|---|---|
| BAST Boron Concentration ($C_{BAST}$) ppm | Initial RCS Boron Concentration ($C_I$) ppm |
| RCS $T_{AVG}$ °F | Desired Final RCS Boron Concentration ($C_F$) ppm |

**Boration Formula ($C_F > C_I$):**

$$Volume\ of\ boric\ acid\ (gal) = 62,490 \times Ln\left[\frac{(C_I - C_{BAST})}{(C_F - C_{BAST})}\right]$$

**Dilution Formula ($C_F < C_I$):**

$$Volume\ of\ PMW\ (gal) = 61,480 \times Ln\ \frac{(C_I)}{(C_F)}$$

| Natural Logarithmic Values for Selected Points | | |
|---|---|---|
| Ln 1.0 = 0.000 | Ln 1.5 = 0.405 | Ln 2.0 = 0.693 |
| Ln 1.1 = 0.095 | Ln 1.6 = 0.470 | Ln 2.1 = 0.742 |
| Ln 1.2 = 0.182 | Ln 1.7 = 0.531 | Ln 2.2 = 0.788 |
| Ln 1.3 = 0.262 | Ln 1.8 = 0.588 | Ln 2.3 = 0.833 |
| Ln 1.4 = 0.336 | Ln 1.9 = 0.642 | Ln 2.4 = 0.875 |

RO EXAM
Administrative Topic A.4

Administrative Topics Outline Statement: Evaluates the applicant's knowledge of the emergency plan for the facility, including, as appropriate, the responsibility of the RO or SRO to decide whether the plan should be executed and the duties assigned under the plan.

**QUESTION:**

What is the lowest NRC Classification that requires full activation of the Site Emergency Response Organization?

**Answer:**

Alert

The examinee's response may also include, the State of Connecticut's Posture Code.

Charlie 1

Reference: SERO Overview CBT

K/A Generic 2.4.29 2.6/4.0

# RO EXAM
## Administrative Topic A.4

Administrative Topics Outline Statement: Evaluates the applicant's knowledge of the emergency plan for the facility, including, as appropriate, the responsibility of the RO or SRO to decide whether the plan should be executed and the duties assigned under the plan.

**QUESTION:**

You are and extra operator on shift. You have been sent to Bldg. 475 to discuss outage planning with the Maintenance Supervisor when the SERO is activated.

Who becomes your immediate supervisor while the SERO is activated?

**Answer:**

DSEO or MCRO or SM

The examinee's response may include any one or all of the above.

Reference: EPAP 1.15 Rev 6 Pg.36

K/A Generic 2.4.29 2.6/4.0

Facility: Millstone Unit 2 Date of Examination: 11-13-2000

Examination Level (circle one): RO / ~~SRO~~ Operating Test Number: 1

| Administrative Topic/Subject Description | | Describe method of evaluation:<br>1. ONE Administrative JPM, OR<br>2. TWO Administrative Questions |
|---|---|---|
| A.1 | 2.1.25 | JPM - Calculate how much Boric Acid must be added to the core to satisfy SDM, 80 hours after a plant trip. The Plant Process Computer is not available. |
| | | |
| | 2.1.19 | JPM - The plant has experienced a LOCA. Use the Plant Process Computer to graph Rx Vessel Level, Saturation Margin (CET Max) and CET High over the time of the event. |
| A.2 | 2.2.12 | JPM - I&C has completed calibrating the X-Core Detectors on Channel "A". You have been directed to perform the Pwr Range & Delta T Power Calibration surveillance (SP-2601D) on the "A" Channel of RPS. |
| | | |
| A.3 | 2.3.11 | JPM - While performing the duties of the BOP operator the Blowdown Radmonitor alarms. The BOP operator must monitor plant parameters and determine that Blowdown should have isolated but didn't. The BOP operator must then take action to isolate Blowdown. |

| | | |
|---|---|---|
| A.4 | 2.4.29 | What is the lowest Emergency Plan classification that requires activating the SERO? |
| | 2.4.29 | You have been temporarily assigned to work for the Maintenance Supervisor to assist in outage planning. You are in the Bldg. 475 when the SERO is activated.<br>Who becomes your immediate supervisor while the SERO is activated? |