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

Facility: Harris Nuclear Plant Task No.: 001004H101

Task Title: Perform A Manual Shutdown Margin Calculation JPM No.: 2014 NRC Exam Admin JPM RO A1-2

K/A Reference: G 2.1.25 RO 3.9 SRO 4.2 **Alternate Path - NO**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	The plant has been operating at 92% power for 2 weeks. OST-1005, Control Rod and Rod Position Indicator Exercise Quarterly Interval Modes 1 – 3, was just performed and one rod in Control Bank 'B' was determined to be immovable/stuck. • Core burnup is 350 EFPD • RCS boron concentration is 600 ppm • POWERTRAX is **NOT** available

Initiating Cue:	The CRS has entered Tech Spec 3.1.1.1 and has directed you to complete OST-1036, Shutdown Margin Calculation Modes 1-5, Section 7.3, Manual SDM Calculation (Modes 1 and 2) for current plant conditions. **NOTE: For this JPM notify evaluator when independent verification is required to be performed.**

Task Standard:	OST-1036, Attachment 3, Manual SDM Calculation (Modes 1 and 2), completed with SDM of 2872 ± 100 pcm **(tolerance based on total of curves used and their division readability)**
Required Materials:	Calculator, ruler
General References:	OST-1036, Shutdown Margin Calculation Modes 1-5 (Rev. 48) Curve Book (Cycle 19)
Handouts:	OST-1036, Shutdown Margin Calculation Modes 1-5 (Rev. 48), pg 19, 24 and 25
Time Critical Task:	No
Validation Time:	20 minutes

Critical Step Justification	
Step 4	Must determine correct rod insertion limit based on curve value. The number of rod steps will be an input to the calculation.
Step 7	Must determine correct power defect based on curve value. The power defect will provide one of the inputs to the calculation.
Step 8	Must determine the correct rod worth based on curve value. The rod worth will provide one of the inputs to the calculation.
Step 10	The total shutdown margin was the task that the CRS directed applicant to perform.

START TIME: _____

OST-1036

Performance Step: 1 OBTAIN PROCEDURE

Standard: Reviews Procedure

Evaluator Cue:	**Provide OST-1036 Section 7.3 and Attachment 3.**

Comment:

Evaluator Note:	**NOTE: The curve numbers provided in this JPM are numbers from the 2014 NRC Exam Frozen Procedures Curve Book folder.**

OST-1036 Section 7.3.1

Performance Step: 2 Enter the absolute value for each parameter on Attachment 3.

Standard: Reviews Attachment 3 and determines value for each parameter.

Comment:

OST-1036 Attachment 3 Step 1

Performance Step: 3 Enters Reactor Power Level

Standard: Refers to given conditions and enters 92%

Comment:

OST-1036 Attachment 3 Step 2

✓ **Performance Step: 4** Determine Rod Insertion Limit for power level

Standard: Refers to Curve F-19-1 and determines TS limit for RIL to be 170 steps (165 – 175 steps, tolerance based on curve division readability)

Comment:

OST-1036 Attachment 3 Step 3

Performance Step: 5 Enters core Burn Up

Standard: Refers to given conditions and enters 350 EFPD

Comment:

OST-1036 Attachment 3 Step 4

Performance Step: 6 Enters RCS Boron Concentration

Standard: Refers to initial conditions and enters 600 ppm

Comment:

Evaluator Note:	**ATT 3, STEP 5 NOT PERFORMED SINCE VALUE IS INCLUDED AS PART OF ATTACHMENT.**

OST-1036 Attachment 3 Step 6

✓ **Performance Step: 7** Determines Power Defect for current power level

Standard: Refers to Curve C-19-3 and determines power defect to be 2520 ± 50 pcm
(tolerance based on curve division readability)

Comment:

OST-1036 Attachment 3 Step 7

✓ **Performance Step: 8** Determines Rod Worth for RIL position determined above

Standard: Refers to Curve A-19-11 and determines rod worth to be 425 ± 50 pcm
(tolerance based on rod position tolerance from performance step 4 curve division readability)

Comment:

OST-1036 Attachment 3 Step 8

Performance Step: 9 Enters worth of any additional immovable or untrippable rods

Standard: Refers to given conditions and enters 1294 pcm

Comment:

OST-1036 Attachment 3 Step 9

✓ **Performance Step: 10** Determines Total Shutdown Margin

Standard: Determines Total Shutdown Margin to be **2872 ± 75** pcm (tolerance based on total of all curves used and their division readability)

Comment:

OST-1036 Section 7.3.2

Performance Step: 11 Perform the calculation listed on Attachment 3 Item 9 for the required SDM boron concentration for the projected conditions.

Standard: Refers to Attachment 3 Item 9 to document SDM

Comment:

OST-1036 Section 7.3.3

Performance Step: 12 Perform an independent verification of Attachment 3..

Standard: Contacts evaluator to perform Independent Verification per initial conditions

Comment:

Evaluator Cue:	**When independent verification of OST-1036, Attachment 3, Manual SDM Calculation is requested.** **END OF JPM**

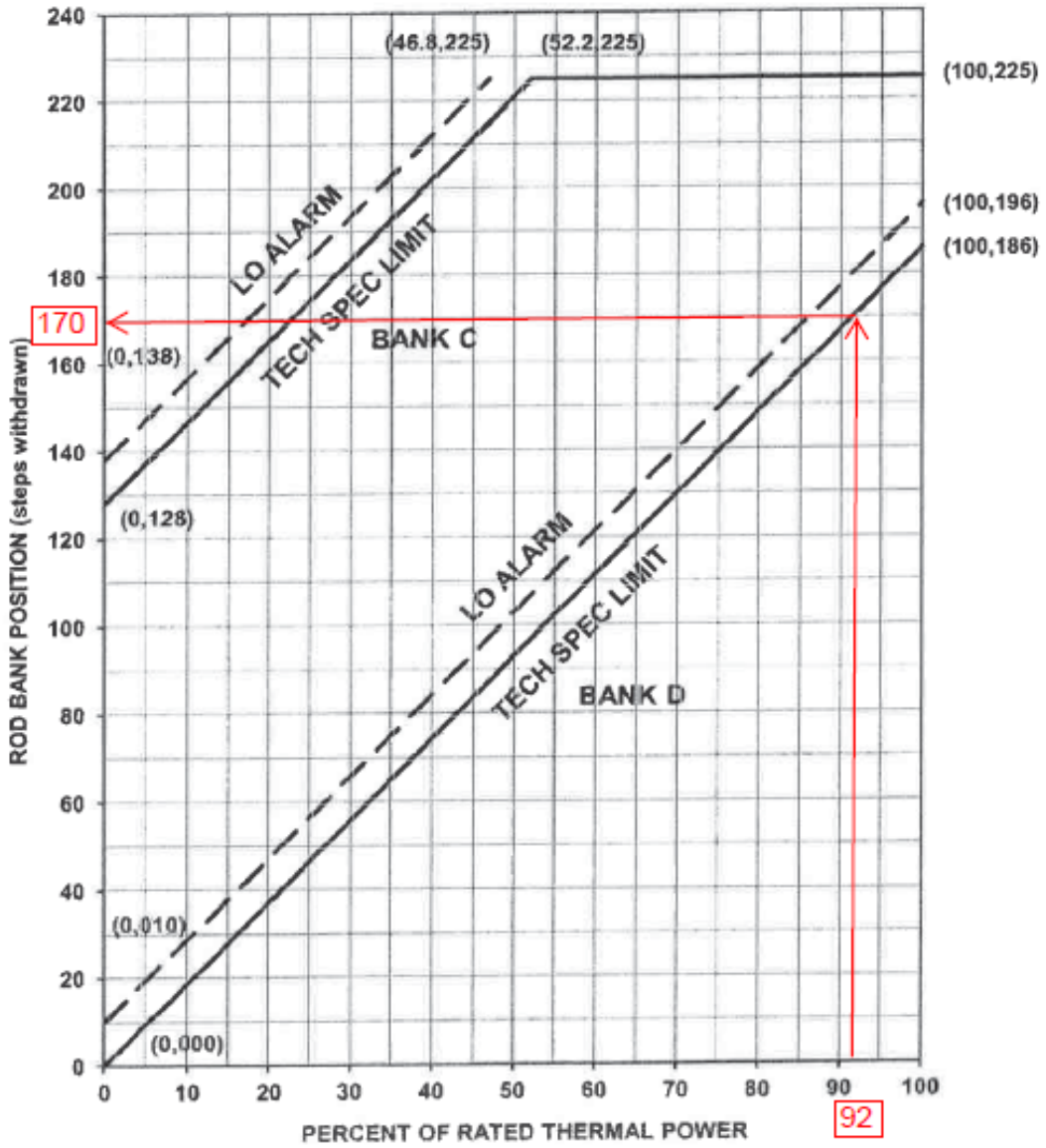
STOP TIME: _____

KEY

HNP Cycle 19
Curvebook
Operator Curves

HNP-F/NFSA-0230
Attachment 2, Rev 0
Page 25 of 25

HARRIS UNIT 1 CYCLE 19
ROD INSERTION LIMITS



CURVE NO.	F-19-1	REV NO.	0
ORIGINATOR		DATE	11-9-13
SUPERVISOR	NRAIT WHITE	DATE	11-9-13
SHIFT MANAGER	Mike Spellman	DATE	11/11/13

Burnie Brinn

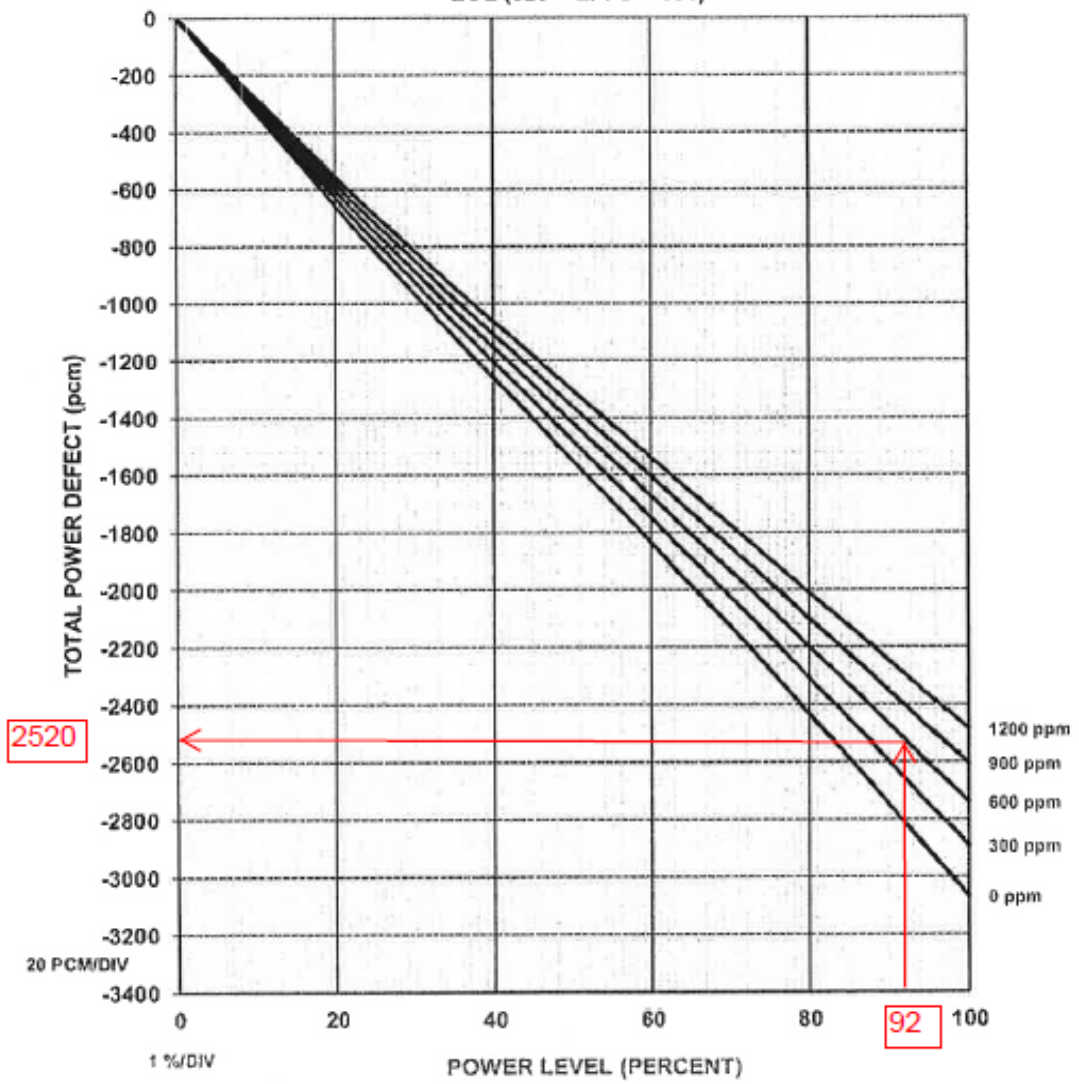
KEY

HNP Cycle 19
Curvebook
Operator Curves

HNP-F/NFSA-0230
Attachment 2, Rev 0
Page 24 of 25

HARRIS UNIT 1 CYCLE 19
POWER DEFECT vs. POWER LEVEL
for VARIOUS BORON CONCENTRATIONS

EOL (328 < EFPD ≤ 501)



CURVE NO.	C-19-3	REV NO.	0
ORIGINATOR	[signature]	DATE	11-9-13
SUPERVISOR	[signature] Noalt Waste	DATE	11-9-13
SHIFT MANAGER	[signature] Mike Sullivan	DATE	11/9/13

Bernie Brinn

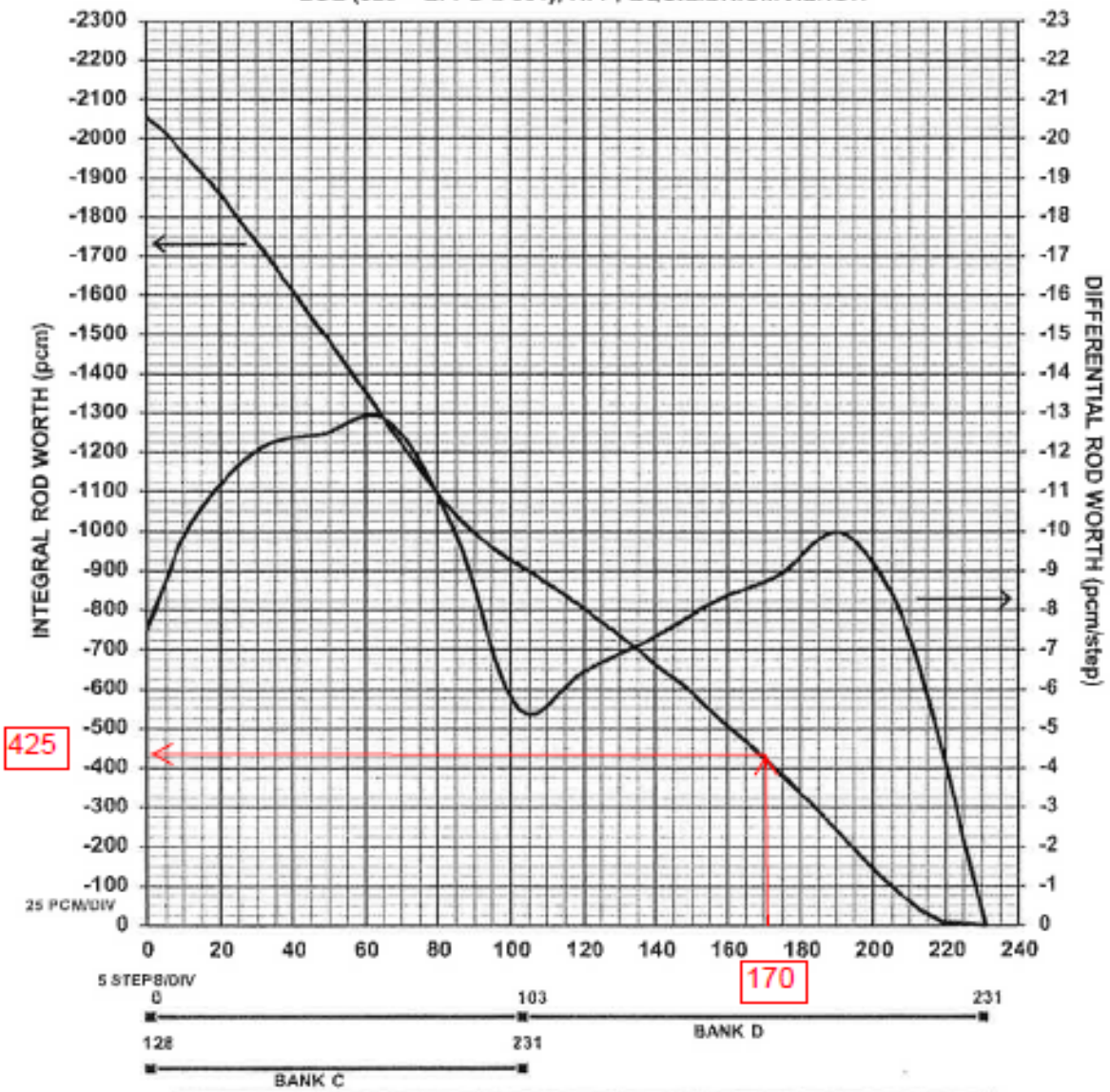
KEY

HNP Cycle 19
Curvebook
Operator Curves

HNP-F/NFSA-0230
Attachment 2, Rev 0
Page 6 of 25

HARRIS UNIT 1 CYCLE 19
DIFFERENTIAL AND INTEGRAL
ROD WORTH CONTROL BANKS D and C
MOVING WITH 103 STEP OVERLAP

EOL (328 < EFPD ≤ 501), HFP, EQUILIBRIUM XENON



CURVE NO.	A-19-11	REV NO.	0
ORIGINATOR		DATE	11-9-13
SUPERVISOR	Norm White	DATE	11-9-13
SHIFT MANAGER	Mike Spellman	DATE	11/21/13

Bunnie Brinn

EXAMINER CALCULATION KEY

(SHADED AREA BELOW INDICATES DATA ALREADY PROVIDED)

Manual SDM Calculation (Modes 1 and 2)

1. Reactor power level. **92** %

2. Rod insertion limit for the above power level

170 (165-175) steps on bank **D**

3. Burn up (POWERTRAX/MCR Status Board). **350** EFPD

4. Present RCS Boron Concentration **600** ppm

NOTE: Use absolute values of numbers obtained from curves.

5. Total worth of all control and shutdown banks, minus the worth of the most reactive rod for Fuel Cycle 19.

7111 pcm
(a)

6. Cycle 19 Power defect for the power level recorded in Step 1. (Refer to Curves C-X-1 to C-X-3).

Curve used **C-19-3** **2520 ± 50** pcm
(b)

NOTE: HFP curves are used for power levels of 10% or greater.

7. Inserted control rod worth at the rod insertion limit recorded in Step 2. (Refer to Curves A-X-6 to A-X-11)

Curve used **A-19-11** **425 ± 50** pcm
(c)

8. Worth of any additional immovable or untrippable rods (for each stuck rod, use the most reactive single rod worth (1294 pcm) or obtain individual withdrawn rod worth from the Reactor Engineer).

1294 pcm
(d)

9. Determine the Total Shutdown Margin using the following formula:

Total SDM C_B = **7111** - **2520 ± 50** - **425 ± 50** - **1294**
(e) (a) (b) (c) (d)

2872 ± 100 pcm
(e)

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam Admin JPM RO A1-2
Perform A Manual Shutdown Margin Calculation
OST-1036

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

Name: _____

Date: _____

Initial Conditions:	The plant has been operating at 92% power for 2 weeks. OST-1005, Control Rod and Rod Position Indicator Exercise Quarterly Interval Modes 1 – 3, was just performed and one rod in Control Bank 'B' was determined to be immovable/stuck. • Core burnup is 350 EFPD • RCS boron concentration is 600 ppm • POWERTRAX is **NOT** available

Initiating Cue:	The CRS has entered Tech Spec 3.1.1.1 and has directed you to complete OST-1036, Shutdown Margin Calculation Modes 1-5, Section 7.3, Manual SDM Calculation (Modes 1 and 2) for current plant conditions. **NOTE: For this JPM notify evaluator when independent verification is required to be performed.**

7.3. Manual SDM Calculation (Modes 1 and 2)

1. **ENTER** the absolute value for each parameter on Attachment 3. _____
2. **PERFORM** the calculation listed on Attachment 3 Item 9 for the required SDM boron concentration for the projected conditions. _____
3. **PERFORM** an independent verification of Attachment 3. _____
4. **VERIFY** that total SDM recorded on Attachment 3 is 1770 pcm or greater. _____

Attachment 3 - Manual SDM Calculation (Modes 1 and 2)
Sheet 1 of 2

1. RECORD Reactor power level. _____ % _____

2. RECORD Rod insertion limit for the above power level

   _____ steps on bank _____ _____

3. RECORD Burn up (POWERTRAX/MCR Status Board). _____ EFPD _____

4. RECORD Present RCS Boron Concentration. _____ ppm _____

NOTE: Use absolute values of numbers obtained from curves.

5. OBSERVE that the total worth of all control and shutdown banks, minus the worth of the most reactive rod for Fuel Cycle 19 is:

   7111 pcm
   (a) _____

6. DETERMINE Cycle 19 Power defect for the power level recorded in Step 1, from Curves C-X-1 through C-X-3.

   Curve Used _____

   Power defect = _____ pcm _____
   (b)

NOTE: HFP curves are used for power levels of 10% or greater.

7. DETERMINE inserted control rod worth at the rod insertion limit recorded in Step 2, using Curves A-X-6 to A-X-11.

   Curve Used _____

   Inserted Rod Worth = _____ pcm
   (c) _____

Attachment 3 - Manual SDM Calculation (Modes 1 and 2)
Sheet 2 of 2

8. **IF** any rod is known to be stuck or untrippable **AND** is **NOT** completely inserted in the core, **THEN PERFORM** the following:

   a. **IF** more than 5 rods are stuck, **THEN**:

      (1) **STOP** the calculation. _____

      (2) **NOTIFY** Reactor Engineering. _____

> **NOTE:** The most reactive single rod worth is 1294 pcm.
>
> For multiple stuck OR immovable rods, each additional rod is assigned a value of 1779 pcm as determined by AREVA calculations and added conservatism. (The value of 1294 pcm is used for a single stuck rod. For each additional stuck rod up to five total, a value of 1779 pcm is used.)
>
> Example: 1 stuck rod = 1294, 3 stuck rods = 1294 + 1779 + 1779

   b. **DETERMINE** the worth of any known stuck or untrippable rods from Table:

# Stuck Rods	1	2	3	4	5
Reactivity	1294	1779	1779	1779	1779

_____ + _____ + _____ + _____ + _____ = _____ (d) _____

_____
Verify

9. **DETERMINE** the Total Shutdown Margin, C_s, using the following formula:

7111 (a) - _____ (b) - _____ (c) - _____ (d) = _____ Total SDM C_s _____

Facility:	Harris Nuclear Plant	Task No.:	015004H201
Task Title:	Perform the Quadrant Power Tilt Ratio Surveillance	JPM No.:	2014 NRC Exam Admin JPM RO A2
K/A Reference:	G2.2.12 RO 3.7 SRO 4.1	**Alternate Path - NO**	

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, 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 90% power when a rod in Control Bank 'A' (P-10) dropped. • The crew is performing AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. • There are NO deficiency tags on PR NIs. • ERFIS points ANM9112U and ANM9113L have a BAD quality code. HNP IT has been notified and they are evaluating the ERFIS points.

Initiating Cue:	The CRS has directed you to perform a manual QPTR IAW OST-1039, CALCULATION OF QPTR. The Power Range NI indications are provided. **NOTE: Show values of your work. For this JPM notify evaluator when independent verification is required to be performed.**

Task Standard: Calculations within required band.

Required Materials: Calculator

General References: OST-1039, CALCULATION OF QPTR, Revision 16

Handouts:
- OST-1039
- Power Range NI – Current and Voltage Set point Table

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 10	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.
Step 11	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.
Step 12	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.

Start Time: _____.

Performance Step: 1 Obtain procedure.

Standard: Reviews procedure.

Evaluator Cue:	**Provide OST-1039.**

Evaluator Note:	**A KEY is provided for your use on JPM prior to candidate pages.**

Comment:

Evaluator Note:	**NOTE: The NI curve numbers provided in this JPM are numbers from the 2014 NRC Exam Frozen Procedures Curve Book folder.**

OST-1039 Section 3.0 Note prior to step 1

Performance Step: 2 NOTE: Precaution and Limitation 4.0.1 has guidance if performing this OST with one Power Range Channel inoperable.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 3.0

Performance Step: 3 Completes Prerequisites section:

- Verify instrumentation needed for the performance of this test is free of deficiencies that affect instrument indication.
- Verify the most recent Curve F-X-8 is used in the performance of this procedure. (Reference 2.1.1 and 2.1.2)
- OBTAIN CRS permission to perform this OST.

Standard:

- Logs F-19-8 revision number : 5
- Initials/signs all blocks

Comment:

OST-1039 Section 7.0

Performance Step: 4

- IF Quadrant Power Tilt Ratio Calculation Computer Program is used, THEN PERFORM the following:
  - MARK Step 7.0.2 N/A.
  - MARK Section 7.2 N/A.
  - PERFORM Section 7.1.
- IF manual calculation of the Quadrant Power Tilt Ratio is used, THEN PERFORM the following:
  - MARK Section 7.1 N/A.
  - PERFORM Section 7.2.

Standard:

- Marks Section 7.1 N/A
- Proceeds to Section 7.2

Comment:

OST-1039 Section 7.2 Note prior to step 1

Performance Step: 5 **NOTE: The detector current meters on each power range channel drawer are designated as left-upper, right-lower.**

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 7.2, Step 1

Performance Step: 6 Prior to reading the value of detector current, VERIFY the meter range/rate switch is in the 400 μA/SLOW position.

Standard: Prior to reading the value of detector current, VERIFIES the Meter Range/Rate switch is in the 400 μA/SLOW position.

Evaluator Note:	This information is on the JPM Cue Sheet

Comment:

OST-1039 Section 7.2, Step 2

Performance Step: 7 RECORD on Attachment 2, in column A, the upper and lower detector currents from all operable power range channels as read on the Nuclear Instrumentation Cabinet.

Standard: Transposes readings from PRNIs Readings Table onto Attachment 2.

Comment:

OST-1039 Section 7.2, Step 3

Performance Step: 8 RECORD on Attachment 2, in column B, the 100% power normalized current for each channel from Curve F-X-8.

Standard: Transposes TOP and BOTTOM 100% current values from the Curve F-19-8.

Comment:

OST-1039 Section 7.2, Note prior to Step 4

Performance Step: 9 NOTE: When recording all fractions and ratios, record to four decimal places, dropping the fifth and subsequent decimal places.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 7.2, Step 4

√ **Performance Step: 10** Divide values in Column A by the respective normalized current in Column B and record the result in Column C as the Normalized Fraction.

Standard: Divides each Upper and Lower reading by the respective 100% normalized current value and records in Column C.

Comment:

OST-1039 Section 7.2, Step 5

√ **Performance Step: 11**

CALCULATE the average value for the upper and the lower Normalized Fractions as follows:

- ADD the Normalized Fraction in each section of column C, recording the sum in the space provided.
- DIVIDE the sum obtained in Step 7.2.5.a by the number of operable NI channels, recording the result in column D of Attachment 2.

Standard:

Adds all Normalized Fractions for the same plane and records the sum in the space provided.

Divides by the sum by four and records result in Column D.

Comment:

OST-1039 Section 7.2, Step 6

√ **Performance Step: 12**

Using the formula and values from Attachment 2, CALCULATE the Upper and Lower Ratios.

Standard:

- Divides the Maximum Normalized Fraction by the Average Normalized Fraction on each plane.
- Determines the UPPER ratio is ≥ 1.02
- QPTR value as 1.0763 to 1.0773 (N43 UPPER) Identifies Upper as outside the band

Evaluator Note:	**The applicant may inform the CRS as soon as any calculation is > 1.02. If so, acknowledge and evaluation on this JPM is complete.**

Comment:

Acceptable band is +/- .0005.
UPPER calculated band is 1.0763 to 1.0773
LOWER calculated band is 1.0682 to 1.0692

OST-1039 Section 7.2, Step 7

Performance Step: 13 PERFORM independent verification of all calculations made on Attachment 2.

Standard: Requests Independent Verifier.

Evaluator Cue:	**Independent verifications complete, I agree with your calculations.** **Evaluation on this JPM is complete.**

Comment:

STOP Time: _____.

KEY

Determines QPTR = **1.0768** Acceptable band is +/- .0005 (1.0763 to 1.0773)

	A	B	C	D
UPPER DETECTOR	UPPER DETECTOR CURRENT	UPPER 100% POWER NORMALIZED CURRENT	UPPER NORMALIZED FRACTION (NOTE 1)	AVERAGE UPPER NORMALIZED FRACTION
N-41	145.6	161.4	0.9021	0.9055
N-42	162.5	181.6	0.8948	
N-43	199.8	204.9	0.9751	
N-44	138.4	162.8	0.8501	
		SUM	3.5360	

$$\text{Upper Ratio} = \frac{\text{Maximum Upper Normalized Fraction}}{\text{Average Upper Normalized Fraction}} = \frac{0.9751}{0.9055} = 1.0768^{*}$$

* Standard for this calculation is 1.0763 to 1.0773

	A	B	C	D
LOWER DETECTOR	LOWER DETECTOR CURRENT	LOWER 100% POWER NORMALIZED CURRENT	LOWER NORMALIZED FRACTION (NOTE 1)	AVERAGE LOWER NORMALIZED FRACTION
N-41	159.6	179.3	0.8901	0.8845
N-42	172.1	204.1	0.8432	
N-43	209.3	221.4	0.9453	
N-44	165.2	192.2	0.8595	
		SUM	3.5381	

$$\text{Lower Ratio} = \frac{\text{Maximum Lower Normalized Fraction}}{\text{Average Lower Normalized Fraction}} = \frac{0.9453}{0.8845} = 1.0687^{**}$$

** Standard for this calculation is 1.0682 to 1.0692

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam Admin JPM RO A2
Perform a Quadrant Power Tilt Ratio Surveillance
OST-1039

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

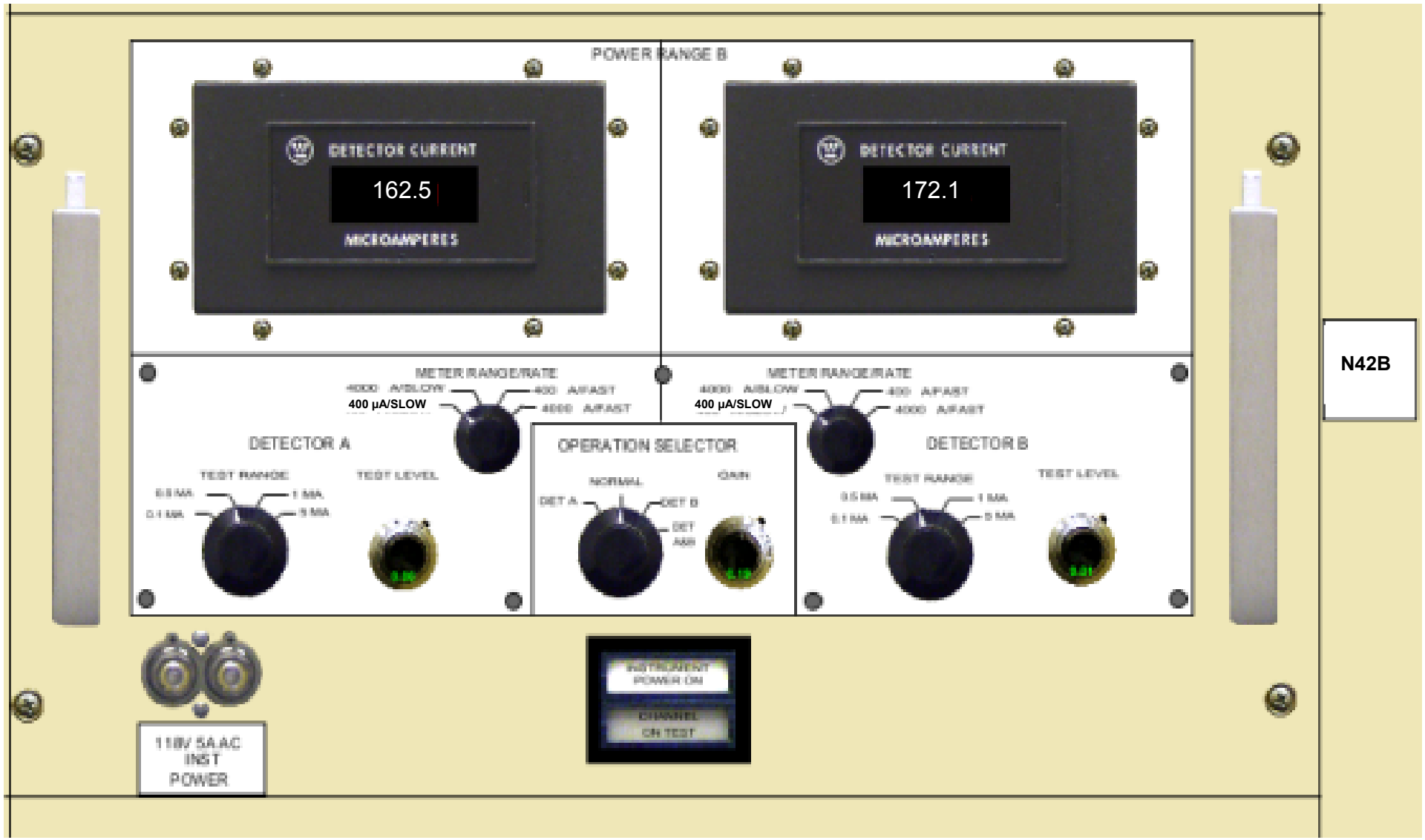
Name: _____

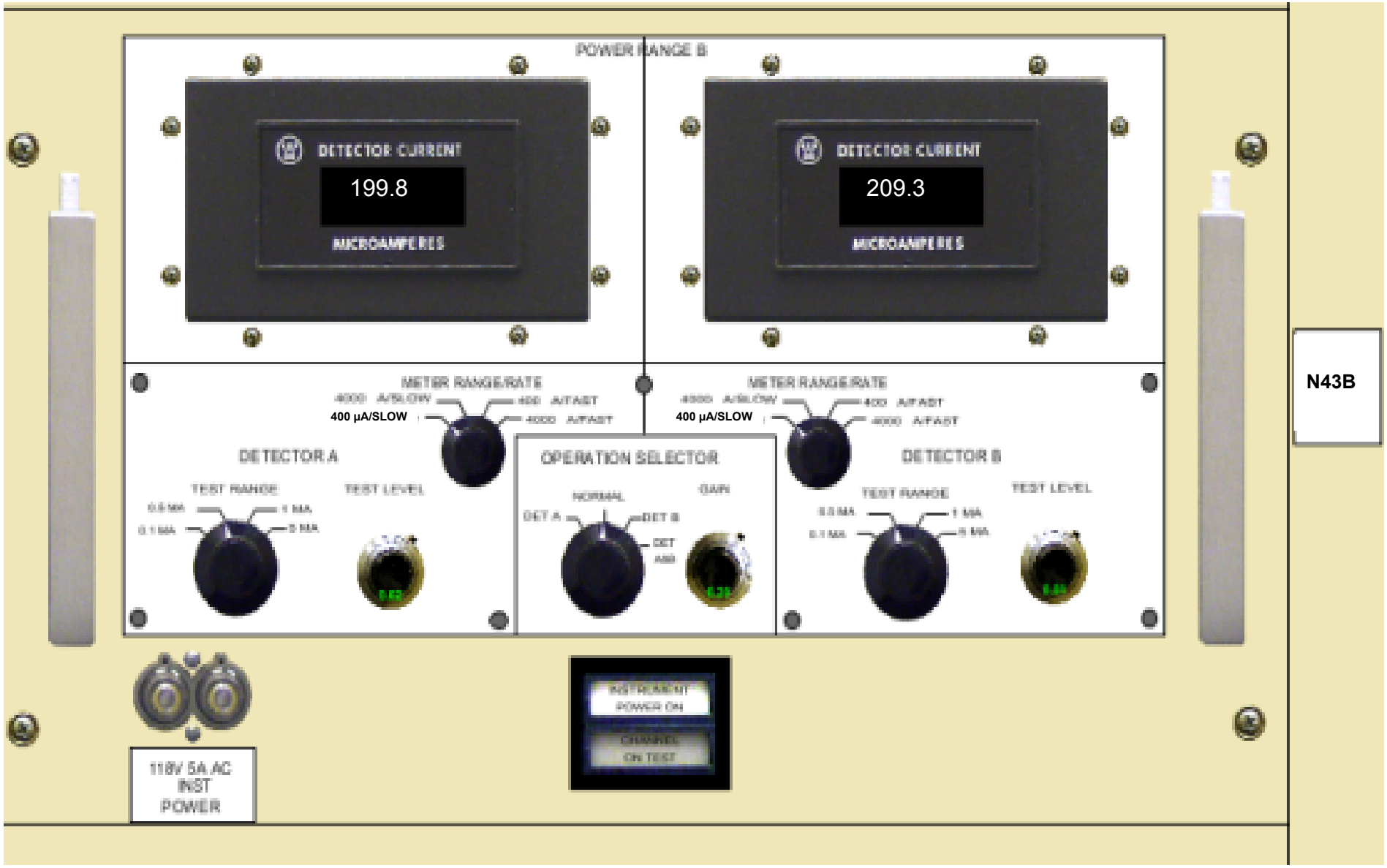
Date: _____

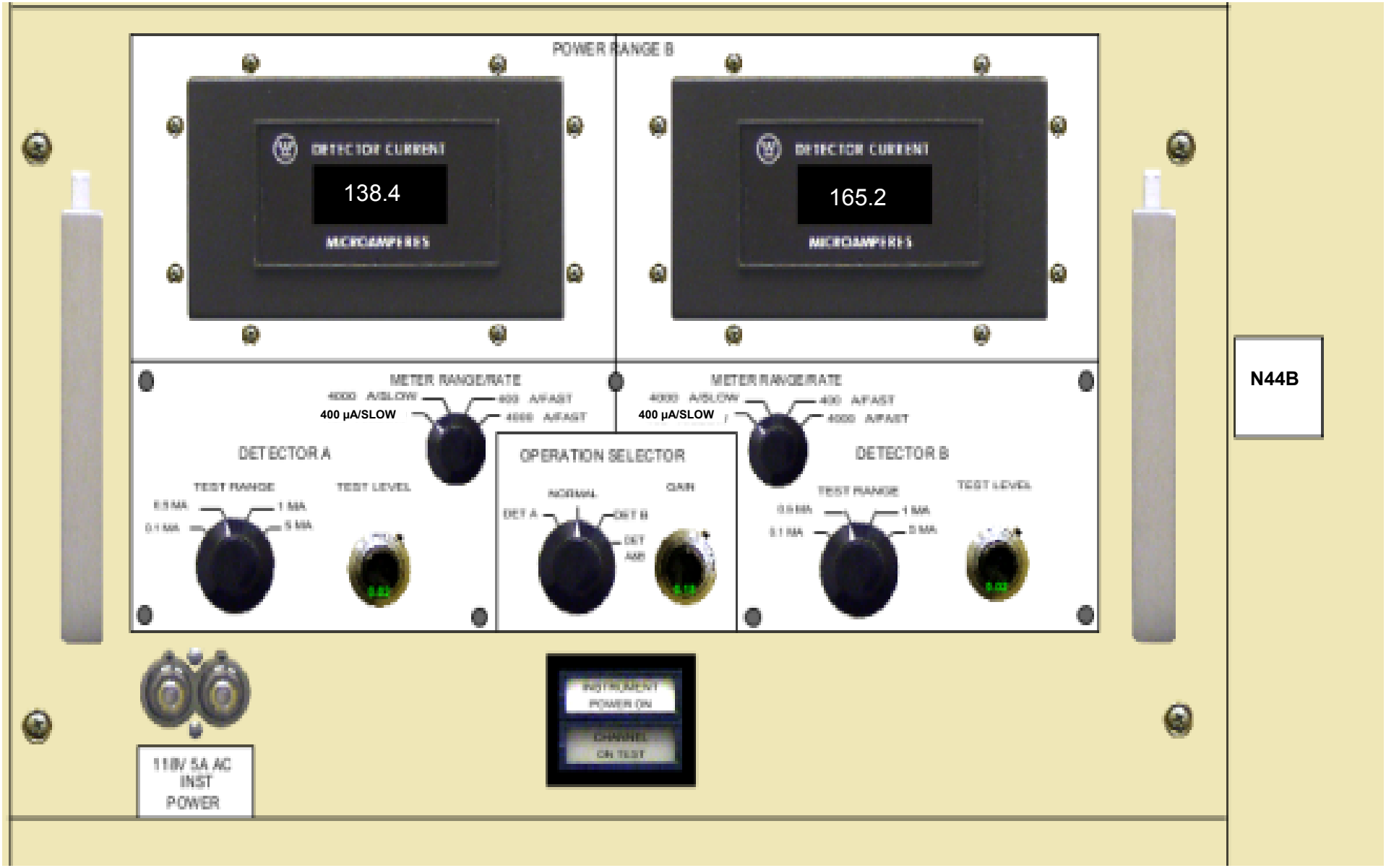
Initial Conditions:	• The plant is operating at 90% power when a rod in Control Bank 'A' (P-10) dropped. • The crew is performing AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. • There are NO deficiency tags on PR NIs. • ERFIS points ANM9112U and ANM9113L have a BAD quality code. HNP IT has been notified and they are evaluating the ERFIS points.

Initiating Cue:	The CRS has directed you to perform a manual QPTR IAW OST-1039, CALCULATION OF QPTR. The Power Range NI indications are provided. **NOTE: Show values of your work. For this JPM notify evaluator when independent verification is required to be performed.**


POWER RANGE B
DETECTOR CURRENT
145.6
MICROAMPERES
DETECTOR CURRENT
159.6
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
GAIN
DET A
DET B
DETECTOR B
TEST RANGE
TEST LEVEL
N41B
118V 5A AC
INST
POWER


POWER RANGE B
DETECTOR CURRENT
162.5
MICROAMPERES
DETECTOR CURRENT
172.1
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
OPERATION SELECTOR
DETECTOR B
TEST RANGE
TEST LEVEL
NORMAL
GAIN
DET A
DET B
TEST RANGE
TEST LEVEL
N42B
118V 5A AC
INST
POWER
INSTRUMENT
POWER ON
CHANNEL
ON TEST


POWER RANGE B
DETECTOR CURRENT
199.8
MICROAMPERES
DETECTOR CURRENT
209.3
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
GAIN
DET A
DET B
DETECTOR B
TEST RANGE
TEST LEVEL
N43B
118V 5A AC
INST
POWER


POWER RANGE B
DETECTOR CURRENT
138.4
MICROAMPERES
DETECTOR CURRENT
165.2
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
DET A
DET B
GAIN
METER RANGE/RATE
400 µA/SLOW
DETECTOR B
TEST RANGE
TEST LEVEL
N44B
118V 5A AC
INST
POWER
INSTRUMENT
POWER ON
CHANNEL
ON TEST

Facility:	Harris Nuclear Plant	Task No.:	119015H301
Task Title:	Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)	JPM No.:	2014 NRC Exam Admin JPM RO SRO A1-1
K/A Reference:	004 A4.03 RO 2.7 SRO 3.2	**Alternate Path - NO**	

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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

Initial Conditions:	The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling.

Initiating Cue:	The CRS has assigned you to complete Attachment 2, Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet and Attachment 3, 1/M Data Plot to predict when reactor will become critical.

Task Standard: Determines the predicted criticality will occur below the 500 pcm ECC rod height of 36 steps on CBD.

Required Materials: Calculator

General References: GP-004, Rev 58

Handouts: JPM Cue Sheets Pages 8 and 9, GP-004 Attachment 3 pg 32

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 3	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 4	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 5	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 6	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts
Step 7	Critical to correctly calculate inverse count ratio in order to predict the estimated critical rod position following the doubling of source range counts
Step 8	Critical to correctly plot the inverse count ratio and controlling rod position in order to predict the estimated critical rod position following the doubling of source range counts

Start Time: _____.

Performance Step: 1 OBTAIN PROCEDURE (GP-002 Attachment 2 and 3 will be provided to allow candidates to write on)

Standard: Obtains GP-004 and refers to Attachment 2 and 3.

Comment:

Performance Step: 2 Complete Attachment 3 Startup Information

Standard: Transfers the following information from Attachment 2 to Attachment 3:

- Date
- Startup Number
- Rod Insertion Limit
- 500 pcm below ECC
- 500 pcm above ECC
- Control Operator

Evaluator Note:	**The above information has been provided to the candidate as part of the JPM Cue sheet for Attachment 2. The transfer of this information from Attachment 2 to Attachment 3 may be performed at any time before the completion of the JPM**

Comment:

✓ **Performance Step: 3** Calculation of 1/M data point at 0515

Standard: Divides initial source range count rate by source range count reading for 0515

- 150 cps / 305 cps = 0.49

Comment:

✓ **Performance Step: 4** Plot 1/M data point to determine predicted Criticality position at 0515

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is 216 steps on Control Bank D. (208 – 224 steps, tolerance based on curve division readability)

Comment:

✓ **Performance Step: 5** Calculation of 1/M data point at 0530

Standard: Divides initial source range count rate by source range count reading for 0530

- 150 cps / 625 cps = 0.24

Comment:

✓ **Performance Step: 6** Plot 1/M data point to determine predicted Criticality position at 0530

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is 96 steps on Control Bank D. (88 – 104 steps, tolerance based on curve division readability)

Comment:

✓ **Performance Step: 7** Calculation of 1/M data point at 0545

Standard: Divides initial source range count rate by source range count reading for 0545

- 150 cps / 1275 cps = 0.12

Comment:

✓ **Performance Step: 8** Plot 1/M data point to determine predicted Criticality position at 0545

Standard: Manually plots 1/M data point on Attachment 3 using data from Attachment 2 and interpolates data to determine predicted critical position is 24 steps on Control Bank D. (16 – 32 steps, tolerance based on curve division readability)

Determines the predicted criticality position is below the 500 pcm ECC value of 36 steps on Control Bank D

Comment:

Performance Step: 9 Documents Attachment 3 results of predicted rod height for criticality

Standard: Documents the predicted rod height is 24 steps on Control Bank D

Comment:

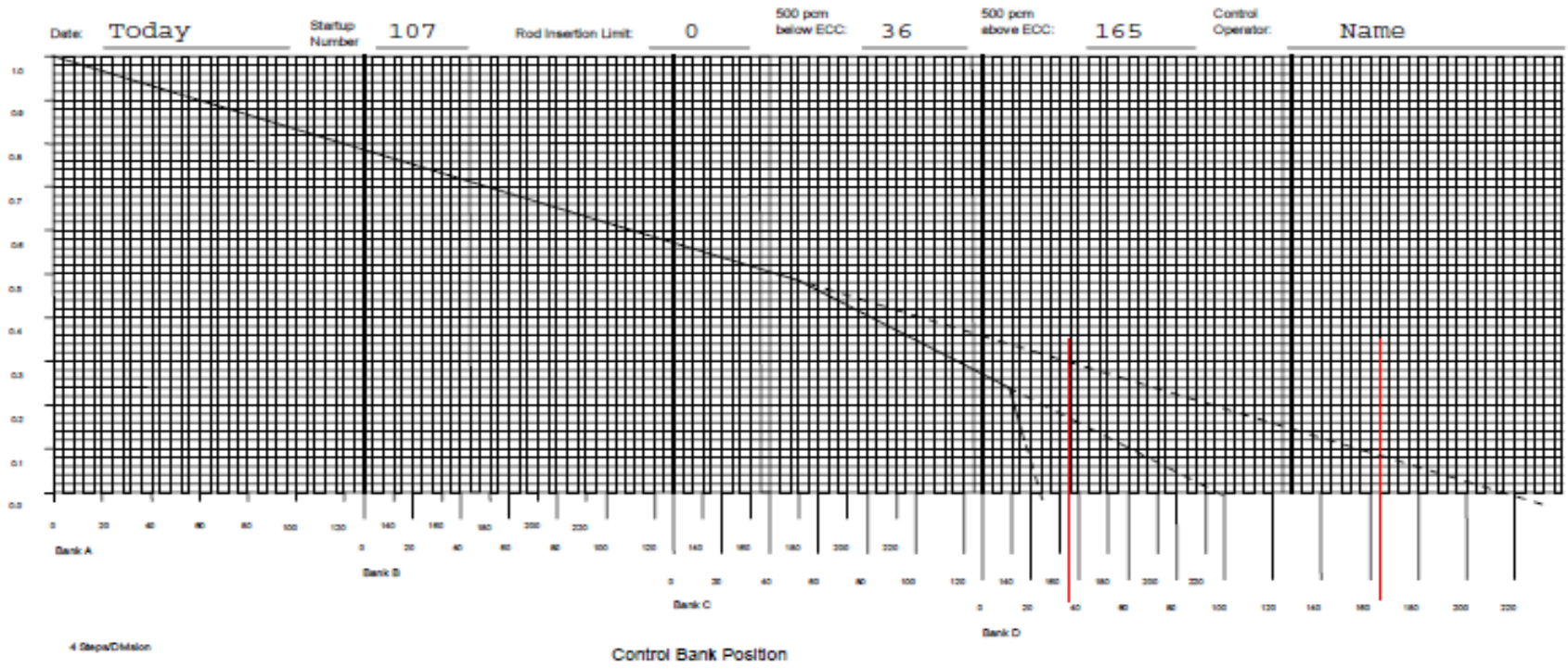
Evaluator Note:	**Candidate determines the predicted rod height is below the 500 pcm ECC.** **END OF JPM**

Comment:

Stop Time: _____

KEY

Attachment 3 - 1 / M Data Plot
Sheet 1 of 1



VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC JPM Common RO SRO A1-1
Perform RCS Average Temperature Data Sheet and Determine Inverse Count Rate Ratio (1/M)
GP-004

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

Name: _____

Date: _____

Initial Conditions:	The unit is in Mode 2, with a plant startup in progress per GP-004, REACTOR STARTUP (MODE 3 TO MODE 2). The OATC has just completed the 3rd doubling.

Initiating Cue:	The CRS has assigned you to complete Attachment 2, Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet and Attachment 3, 1/M Data Plot to predict when reactor will become critical.

Predicted Rod Height for Reactor Criticality _____

Attachment 2 - Inverse Count Rate Ratio (1/M) and RCS Average Temperature Data Sheet

Sheet 2 of 2

Date: Today
500 pcm below ECC: D 36
500 pcm above ECC: D 165
Rod Insertion Limit: 0

Startup Number: 107
Steps on Bank: D
Steps on Bank: D
Steps on Bank: D

Data Point	Time	RCS Lowest T_{avg}	SR N-___ cps	1/M C_o / C_i	IR N-___ amps	1/M C_o / C_i	Control Bank Position (Steps-Bank)	Predicted Criticality (Steps-Banks)	Calculations Verified
0	0500	557	150	N/A	$1.3x10^{-11}$	N/A	CB A-D 0		
1	0515	557	305		$1.5x10^{-11}$	0.86	CB C 52		
2	0530	557	625		$1.7x10^{-11}$	0.76	CB D 11		
3	0545	557	1275		$2.2x10^{-11}$	0.59	CB D 17		

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

Facility: Harris Nuclear Plant Task No.: 34502H601

Task Title: Determine TEDE While Working in a High Airborne Area JPM No.: 2014 NRC Exam Admin JPM RO SRO A3

K/A Reference: G2.3.4 RO 3.2 SRO 3.7 **Alternate Path - NO**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, 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 shut down for refueling • The RAB AO is being directed to enter an area to inspect several malfunctioning valves. • While doing contract work the operator received a combined 1,325 mRem TEDE this calendar year. • In the same calendar year, the operator has received another 495 mRem TEDE at the Harris plant. • The estimated dose rate in the work area is 465 mRem/hr. • An airborne contamination concern exists. • It is estimated that it will take 25 minutes to complete the inspection if the operator uses a respirator. • If the operator does **NOT** wear a respirator, the inspection will take 12 minutes, but Radiation Protection projects that the internal exposure will be 10 DAC-hrs.

Initiating Cue:	1.a. Calculate the resultant total effective dose equivalent for with a respirator for this job and the accumulated dose for the year. 1.b. Calculate the resultant total effective dose equivalent for without a respirator for this job and the accumulated dose for the year. 2. Using the lowest dose determined in number 1, determine if the individual can perform the task without exceeding Duke Energy's Annual Administrative Dose Limit. **Show your calculations on the next page**

Task Standard: Determination made that **NOT** wearing a respirator will result in a lower TEDE and that the individual can perform the task without exceeding Duke Energy's Annual Administrative Dose Limit.

Required Materials: Laptop with General Reference PD-RP-ALL-0001, Radiation Worker Responsibilities, Rev 3 or hard copy

General References: PD-RP-ALL-0001, Radiation Worker Responsibilities, Rev 3

Handouts: JPM Cue Sheet Pages 9 and 10

Time Critical Task: No

Validation Time: 15 minutes

Critical Step Justification	
Step 2	Determining external exposure while wearing a respirator is required to complete the calculations and answer.
Step 4	Determining internal exposure while NOT wearing a respirator is required to complete the calculations and answer.
Step 5	Determining external exposure while NOT wearing a respirator is required to complete the calculations and answer.
Step 8	Determining individual's total exposure for the year if the work is allowed without a respirator is required to complete the calculations and answer.
Step 9	Determining individual's total exposure for the year if the work is allowed with a respirator is required to complete the calculations and answer.
Step 10	Determining if the individual can perform the work without exceeding Duke Energy's Annual Administrative Dose Limit of 2000 mRem is required to complete the calculations and answer.

Start Time: _____.

NOTE: Steps in this JPM may be performed in any order.

	Performance Step: 1	Determines internal exposure while wearing a respirator
	Standard:	Determines internal exposure to be ZERO while wearing a respirator
	Comment:	
✓	**Performance Step: 2**	Determines external exposure while wearing a respirator
	Standard:	Determines external exposure to be 193.8 mRem TEDE while wearing a respirator (465 mRem / hr x 25 min = 193.8 mRem) **(NOTE: Could round to 194)**
	Comment:	
	Performance Step: 3	Determines TOTAL exposure while wearing a respirator
	Standard:	Determines total exposure to be 193.8 mRem while wearing a respirator (0 mRem internal + 193.8 mRem external = 193.8 mRem total) **(NOTE: Could round to 194)**
	Comment:	

✓ **Performance Step: 4** Determines internal exposure while NOT wearing a respirator

Standard: Determines internal exposure to be 25 mRem while not wearing a respirator
(2.5 mRem / hr x 10 DAC-hr = 25 mRem)
(NO tolerance)

Comment:

✓ **Performance Step: 5** Determines external exposure while NOT wearing a respirator

Standard: Determines external exposure to be 93.0 mRem TEDE while not wearing a respirator
(465 mRem / hr x 12 min = 93 mRem)
(NO tolerance)

Comment:

Performance Step: 6 Determines TOTAL exposure while NOT wearing a respirator

Standard: Determines total exposure to be 118 mRem while not wearing a respirator
(25 mRem internal + 93 mRem external = 118 mRem total)
(NO tolerance)

Comment:

Performance Step: 7 Determines individual's total exposure for the year

Standard: Determines individual's total exposure for the year to be 1820 mRem
(1325 mRem + 495 mRem = 1820 mRem)

Comment:

✓ **Performance Step: 8** Determines individual's total exposure for the year if the work is allowed without a respirator

Standard: Determines individual's total exposure for the year if the work is performed without a respirator to be 1938 mRem
(1820 mRem + 118 mRem = 1938 mRem)

(NO tolerance)

Comment:

✓ **Performance Step: 9** Determines individual's total exposure for the year if the work is allowed with a respirator

Standard: Determines individual's total exposure for the year if the work is performed with a respirator to be 2013.8 mRem
(1820 mRem + 193.8 mRem = 2013.8 mRem)

Note: If calculated wearing a respirator the total exposure for the year will be 2013.8 mRem and work cannot be performed without an extension. The directions were to use the lowest dose and this represents UNSAT performance.

(NOTE: Could have rounded 193.8 to 194 and answer would be 2014 mRem)

Comment:

✓ **Performance Step: 10** Determines if the individual can perform the work without exceeding Duke Energy's Annual Administrative Dose Limit of 2000 mRem without an administrative dose limit extension

Standard: Determines the individual **CAN** perform the work without wearing a respirator will NOT exceed Duke Energy's Annual Administrative Dose Limit of 2000 mRem
(1820 mRem + 118mRem = 1938 mRem)

Comment:

Evaluator Cue:	**When all calculations have been completed and the determination that work can proceed, this JPM is complete.**

Stop Time: _____

KEY

1.a Calculation for resultant total effective dose equivalent with a respirator.

Determines internal exposure to be ZERO while wearing a respirator

Determines external exposure to be 193.8 mRem TEDE while wearing a respirator
(465 mRem / hr x 25 min = 193.8 mRem)
(NOTE: Could round to 194)

Determines TOTAL exposure while wearing a respirator
(0 mRem internal + 193.8 mRem external = 193.8 mRem total)
(NOTE: Could round to 194)

Determines individual's total exposure for the year to be 1820 mRem
(1325 mRem + 495 mRem = 1820 mRem)

Determines individual's total exposure for the year if the work is allowed to be 2013.8 mRem
(1820 mRem + 193.8 = **2013.8 mRem**)
(NOTE: **Could round to 2014 mRem**)

Note: If calculated wearing a respirator the total exposure for the year will be **2013.8 mRem** and work **CANNOT** be performed without an extension. The directions were to use the lowest dose and this represents UNSAT performance.

1.b Calculation for resultant total effective dose equivalent without a respirator.

Determines internal exposure to be 25 mRem while **not** wearing a respirator
(2.5 mRem / hr x 10 DAC-hr = 25 mRem)
(NO tolerance)

Determines external exposure to be 118 mRem TEDE while not wearing a respirator
(495 mRem / hr x 12 min = 93 mRem)

Determines total exposure to be 118 mRem while not wearing a respirator
(25 mRem internal + 93 mRem external = 118 mRem total)

Determines individual's total exposure for the year if the work is allowed to be **1938 mRem**
(1820 mRem + 118 = 1938 mRem)

The individual **CAN** perform the task without exceeding Duke Energy's Annual Admin Dose Limit if the task is performed **WITHOUT** a respirator.

KEY

2. Using the lowest dose determined from the above calculations (1a or 1b):

CAN the individual perform the task without exceeding Duke Energy's Annual Administrative Dose Limit?

YES (without a respirator total dose would be 1,938 mRem which is < 2,000 mRem)

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam JPM RO SRO A3
Determine TEDE While Working in a High Airborne Area
PD-RP-ALL-0001

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 shut down for refueling • The RAB AO is being directed to enter an area to inspect several malfunctioning valves. • While doing contract work the operator received a combined 1,325 mRem TEDE this calendar year. • In the same calendar year, the operator has received another 495 mRem TEDE at the Harris plant. • The estimated dose rate in the work area is 465 mRem/hr. • An airborne contamination concern exists. • It is estimated that it will take 25 minutes to complete the inspection if the operator uses a respirator. • If the operator does **NOT** wear a respirator, the inspection will take 12 minutes, but Radiation Protection projects that the internal exposure will be 10 DAC-hrs.

Initiating Cue:	1.a. Calculate the resultant total effective dose equivalent for with a respirator for this job and the accumulated dose for the year. 1.b. Calculate the resultant total effective dose equivalent for without a respirator for this job and the accumulated dose for the year. 2. Using the lowest dose determined in number 1, determine if the individual can perform the task without exceeding Duke Energy's Annual Administrative Dose Limit. ***Show your calculations on the next page**

JPM CUE SHEET

Name: _____

Date: _____

1.a Calculation for resultant total effective dose equivalent with a respirator.

1.b Calculation for resultant total effective dose equivalent without a respirator.

2. Using the lowest dose determined from the above calculations (1a or 1b):

CAN the individual perform the task without exceeding Duke Energy's Annual Administrative Dose Limit?

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

Facility: Harris Nuclear Plant Task No.: 344047H402

Task Title: Complete GP-002, Attachment 5 - Minimum Equipment List (MEL) for Entry into Mode 4 JPM No.: 2014 NRC Exam Admin JPM SRO A1-2

K/A Reference: G2.1.43 4.1 / 4.3 **Alternate Path: NO**

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	The unit is in Mode 5, making preparation to enter Mode 4 in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 To Mode 3. The current conditions for the plant are as listed on the data sheet.

Initiating Cue:	The previous shift has completed a partial review of GP-002, Attachment 5 – MEL for Entry into Mode 4. The CRS has assigned you to review the remaining items to be completed on GP-002, Attachment 5 for any discrepancies AND identify any mode limiting items required by Technical Specifications.

Task Standard: All conditions not meeting Mode 4 requirement identified.

Required Materials: Technical Specifications

General References: GP-002, rev 61

Handouts: JPM Cue Sheets Pages 7, Plant Conditions sheet matching the JPM content.
Partially completed GP-002, Attachment 5 matching the Plant Conditions handout.

Time Critical Task: No

Validation Time: 25 minutes

Critical Step Justification	
Step 2	Critical to comply with Technical Specification requirements to ensure proper safety system alignment is configured as designed per the accident analysis.
Step 3	Critical to comply with Technical Specification requirements to ensure proper safety system alignment is configured as designed per the accident analysis.
Step 4	Critical to comply with Technical Specification requirements to ensure proper safety system alignment is configured as designed per the accident analysis.

Start Time: _____.

Performance Step: 1 Obtain procedure and determine existing plant conditions.

Standard: Reviews Attachment 5 and Plant Conditions.

Evaluator Cue:	**Provide handout (Plant Conditions Sheet and partially completed GP-002, Attachment 5).**

Evaluator Note:	**All conditions except the following meet the MEL requirements.**

Comment:

√ **Performance Step: 2** Compare Plant Conditions to Attachment 5 requirements.

Standard: Boric Acid Tank and Associated Temperatures:

- Identify that Boric Acid Tank needs to be filled to ≥ 74%.

Comment:

√ **Performance Step: 3** Compare Plant Conditions to Attachment 5 requirements.

Standard: Reactor Coolant Loops/RHR Loops:

- Identify the need to either restore RHR Loop “B” or increase at least one S/G NR level to >30%.

Comment:

√ **Performance Step: 4** Compare Plant Conditions to Attachment 5 requirements.

Standard: Safety Related Electrical Buses:

- Identify need to restore S1 Inverter and supply 1DP-1A-SI through the inverter, connected to DC Bus DP-1A-SA.

Comment:

Performance Step: 5 Provide Attachment 5 to the CRS.

Standard: Provides Attachment 5 to the CRS and may make a verbal report.

Evaluator Cue:	**Acknowledge any verbal communication.**

Comment:

Evaluator Cue:	**After Attachment 5 and/or the optional report has been provided to the CRS: Evaluation on this JPM is complete.**

STOP TIME: _____

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam Admin JPM SRO A1-2

Complete GP-002, Attachment 5 - Minimum Equipment List (MEL) for Entry into Mode 4

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 unit is in Mode 5, making preparation to enter Mode 4 in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 To Mode 3. The current conditions for the plant are as listed on the data sheet.

Initiating Cue:	The previous shift has completed a partial review of GP-002, Attachment 5 – MEL for Entry into Mode 4. The CRS has assigned you to review the remaining items to be completed on GP-002, Attachment 5 for any discrepancies AND identify any mode limiting items required by Technical Specifications.

2014 NRC JPM SRO A1-2 PLANT CONDITIONS

- The Reactor Trip Breakers are OPEN.
- DRPI indicates all rods inserted.
- All ventilation systems are in normal alignment with nothing tagged.
- RCS Temperature is 195 ˚F with a bubble in the PRZ.
- LTOP is in service.
- All PRZ Code Safety Valves are operable.
- Chemistry has reported RCS Specific Activity, O, Cl, and Fl are within TS limits.
- RHR Train “A” is providing cooling.
- RHR Pump “B” is isolated and tagged due to mechanical seal leakage.
- All RCP’s are stopped.
- CSIP “B” was stopped due to an oil leak 75 minutes ago and was declared inoperable, cleared and tagged 20 minutes later.
- Operators removed the tags and started CSIP “A” 30 minutes ago.
- Operable indicators indicate the following levels:
  - BAT – 20%
  - RWST – 93%
- The BAT is at 93 ˚F and 7450 ppm Boron.
- Both BAT Pumps are operable.
- The RWST is at 73 ˚F and 2525 ppm.
- Both Emergency Diesel Generators are operable.
- Instrument Bus SI is powered from 1DP-S1, Alternate Supply from PP-1A211-SA, while a breaker is replaced in the inverter.
- Two physically independent off-site power circuits are available.
- All other AC buses are in normal alignment.
- All DC buses are energized.
- Operable indicators indicate SG NR Levels as:
  - SG “A” – 28%
  - SG “B” – 26%
  - SG “C” – 26%
- SG WR Level indicators are inoperable.
- All MSIVs and SG PORV’s are closed.
- CREVS and Train “A” and “B” are operable.
- FHB Emergency Exhaust Train “A” and Train “B” are operable.
- Engineering reported that all snubbers required for Mode 4 and 5 are operable.

Facility:	Harris Nuclear Plant	Task No.:	015004H201
Task Title:	Perform the Quadrant Power Tilt Ratio Surveillance	JPM No.:	2014 NRC Exam Admin JPM SRO A2
K/A Reference:	G2.2.12 RO 3.7 SRO 4.1	**Alternate Path - NO**	

Examinee: _____ NRC Examiner: _____

Facility Evaluator: _____ Date: _____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, 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 90% power when a rod in Control Bank 'A' (P-10) dropped. • The crew is performing AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. • There are NO deficiency tags on PR NIs. • ERFIS points ANM9112U and ANM9113L have a BAD quality code. HNP IT has been notified and they are evaluating the ERFIS points.

Initiating Cue:	The CRS has directed you to perform a manual QPTR IAW OST-1039, CALCULATION OF QPTR, AND evaluate the actions, if any, of the applicable Technical Specification. The Power Range NIS indications are provided. **NOTE: Show values of your work. For this JPM notify evaluator when independent verification is required to be performed.**

Task Standard: Calculations within required band.
Correct Tech Spec actions are identified.

Required Materials: Calculator

General References: OST-1039, CALCULATION OF QPTR, Revision 16
Technical Specifications

Handouts:
- OST-1039
- Power Range NI – Current and Voltage Set point Table
- Technical Specifications

Time Critical Task: No

Validation Time: 25 minutes

Critical Step Justification	
Step 10	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.
Step 11	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.
Step 12	Must accurately determine the correct calculation based on collecting and inputting either provided data or visual inspection data. The calculation will yield an unsatisfactory QPTR.
Step 14	Must accurately identify associated Technical Specifications with a QPTR that has exceeded the limits specified in HNP Technical Specifications.

Start Time: _____.

Performance Step: 1 Obtain procedure.

Standard: Reviews procedure.

Evaluator Cue:	**Provide OST-1039.**

Evaluator Note: **A KEY is provided for your use on JPM prior to candidate pages.**

Comment:

Evaluator Note:	**NOTE: The NI curve numbers provided in this JPM are numbers from the 2014 NRC Exam Frozen Procedures Curve Book folder.**

OST-1039 Section 3.0 Note prior to step 1

Performance Step: 2 NOTE: Precaution and Limitation 4.0.1 has guidance if performing this OST with one Power Range Channel inoperable.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 3.0

Performance Step: 3 Completes Prerequisites section:

- Verify instrumentation needed for the performance of this test is free of deficiencies that affect instrument indication.
- Verify the most recent Curve F-X-8 is used in the performance of this procedure. (Reference 2.1.1 and 2.1.2)
- OBTAIN CRS permission to perform this OST.

Standard:

- Logs F-19-8 revision number : 5
- Initials/signs all blocks

Comment:

OST-1039 Section 7.0

Performance Step: 4

- IF Quadrant Power Tilt Ratio Calculation Computer Program is used, THEN PERFORM the following:
  - MARK Step 7.0.2 N/A.
  - MARK Section 7.2 N/A.
  - PERFORM Section 7.1.
- IF manual calculation of the Quadrant Power Tilt Ratio is used, THEN PERFORM the following:
  - MARK Section 7.1 N/A.
  - PERFORM Section 7.2.

Standard:

- Marks Section 7.1 N/A
- Proceeds to Section 7.2

Comment:

OST-1039 Section 7.2 Note prior to step 1

Performance Step: 5 NOTE: The detector current meters on each power range channel drawer are designated as left-upper, right-lower.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 7.2, Step 1

Performance Step: 6 Prior to reading the value of detector current, VERIFY the meter range/rate switch is in the 400 μA/SLOW position.

Standard: Prior to reading the value of detector current, VERIFIES the Meter Range/Rate switch is in the 400 μA/SLOW position.

Evaluator Note:	This information is on the JPM Cue Sheet

Comment:

OST-1039 Section 7.2, Step 2

Performance Step: 7 RECORD on Attachment 2, in column A, the upper and lower detector currents from all operable power range channels as read on the Nuclear Instrumentation Cabinet.

Standard: Transposes readings from PRNIs Readings Table onto Attachment 2.

Comment:

OST-1039 Section 7.2, Step 3

Performance Step: 8 RECORD on Attachment 2, in column B, the 100% power normalized current for each channel from Curve F-X-8.

Standard: Transposes TOP and BOTTOM 100% current values from the Curve F-19-8.

Comment:

OST-1039 Section 7.2, Note prior to Step 4

Performance Step: 9 NOTE: When recording all fractions and ratios, record to four decimal places, dropping the fifth and subsequent decimal places.

Standard: Operator reads and placekeeps any note or caution (initials, checks or circle/slash at each bulleted item to indicate read and understood)

Comment:

OST-1039 Section 7.2, Step 4

√ **Performance Step: 10** Divide values in Column A by the respective normalized current in Column B and record the result in Column C as the Normalized Fraction.

Standard: Divides each Upper and Lower reading by the respective 100% normalized current value and records in Column C.

Comment:

OST-1039 Section 7.2, Step 5

√ **Performance Step: 11** CALCULATE the average value for the upper and the lower Normalized Fractions as follows:

- ADD the Normalized Fraction in each section of column C, recording the sum in the space provided.
- DIVIDE the sum obtained in Step 7.2.5.a by the number of operable NI channels, recording the result in column D of Attachment 2.

Standard: Adds all Normalized Fractions for the same plane and records the sum in the space provided.

Divides by the sum by four and records result in Column D.

Comment:

OST-1039 Section 7.2, Step 6

√ **Performance Step: 12** Using the formula and values from Attachment 2, CALCULATE the Upper and Lower Ratios.

Standard:

- Divides the Maximum Normalized Fraction by the Average Normalized Fraction on each plane.
- Determines the UPPER ratio is ≥ 1.02
- QPTR value as 1.0763 to 1.0773 (N43 UPPER) Identifies Upper as outside the band

Evaluator Note:	**The applicant may inform the CRS as soon as any calculation is > 1.02. If so, acknowledge and direct applicant to Identify the T.S. LCO affected, if any?**

Comment: Acceptable band is +/- .0005.
UPPER calculated band is 1.0763 to 1.0773
LOWER calculated band is 1.0682 to 1.0692

OST-1039 Section 7.2, Step 7

Performance Step: 13 PERFORM independent verification of all calculations made on Attachment 2.

Standard: Requests Independent Verifier.

Evaluator Cue:	**Independent verifications complete, I agree with your calculations. Identify the T.S. LCO affected, if any?**

Comment:

√ **Performance Step: 14** Identify the Technical Specification LCOs that would be in effect.

Standard: Identifies that Technical Specification 3.2.4, Quadrant Power Tilt Ratio has been exceeded

- Identifies the following ACTION statements to be implemented and the required time limitation (see page 12)
  - 3.2.4.a.1 1 hour

a. With the QUADRANT POWER TILT RATIO determined to exceed 1.02 but less than or equal to 1.09:

1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until either:

a) The QUADRANT POWER TILT RATIO is reduced to within its limit, or

b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.

  - 3.2.4.a.2 2 hours, reduce thermal power to ≤ 76.96%
    - (7.68% x 3% = 23.04% 100% - 24% = 76.96%)

2. Within 2 hours either:

a) Reduce the QUADRANT POWER TILT RATIO to within its limit, or

b) Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1 and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours.

  - 3.2.4.a.3 24 hours

3. Verify that the QUADRANT POWER TILT RATIO is within its limit within 2 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours; and

Evaluator Note:	**Technical Specification 3.2.4.a.4 is not required to be identified since no direction is provided in the cue for raising thermal power.**

Comment:

Terminating Cue:	**After identification of the Tech Spec LCOs affected: Evaluation on this JPM is complete.**

STOP Time: _____.

KEY

Determines QPTR = **1.0768** Acceptable band is +/- .0005 (1.0763 to 1.0773)

	A	B	C	D
UPPER DETECTOR	UPPER DETECTOR CURRENT	UPPER 100% POWER NORMALIZED CURRENT	UPPER NORMALIZED FRACTION (NOTE 1)	AVERAGE UPPER NORMALIZED FRACTION
N-41	145.6	161.4	0.9021	0.9055
N-42	162.5	181.6	0.8948	
N-43	199.8	204.9	0.9751	
N-44	138.4	162.8	0.8501	
		SUM	3.5360	

$$\text{Upper Ratio} = \frac{\text{Maximum Upper Normalized Fraction}}{\text{Average Upper Normalized Fraction}} = \frac{0.9751}{0.9055} = 1.0768^{*}$$

* Standard for this calculation is 1.0763 to 1.0773

	A	B	C	D
LOWER DETECTOR	LOWER DETECTOR CURRENT	LOWER 100% POWER NORMALIZED CURRENT	LOWER NORMALIZED FRACTION (NOTE 1)	AVERAGE LOWER NORMALIZED FRACTION
N-41	159.6	179.3	0.8901	0.8845
N-42	172.1	204.1	0.8432	
N-43	209.3	221.4	0.9453	
N-44	165.2	192.2	0.8595	
		SUM	3.5381	

$$\text{Lower Ratio} = \frac{\text{Maximum Lower Normalized Fraction}}{\text{Average Lower Normalized Fraction}} = \frac{0.9453}{0.8845} = 1.0687^{**}$$

** Standard for this calculation is 1.0682 to 1.0692

KEY

POWER DISTRIBUTION LIMITS

3/4.2.4 QUADRANT POWER TILT RATIO

LIMITING CONDITION FOR OPERATION

3.2.4 The QUADRANT POWER TILT RATIO shall not exceed 1.02.

APPLICABILITY: MODE 1, above 50% of RATED THERMAL POWER*.

ACTION:

a. With the QUADRANT POWER TILT RATIO determined to exceed 1.02 but less than or equal to 1.09:

1. Calculate the QUADRANT POWER TILT RATIO at least once per hour until either:

a) The QUADRANT POWER TILT RATIO is reduced to within its limit, or

b) THERMAL POWER is reduced to less than 50% of RATED THERMAL POWER.

2. Within 2 hours either:

a) Reduce the QUADRANT POWER TILT RATIO to within its limit, or

b) Reduce THERMAL POWER at least 3% from RATED THERMAL POWER for each 1% of indicated QUADRANT POWER TILT RATIO in excess of 1 and similarly reduce the Power Range Neutron Flux-High Trip Setpoints within the next 4 hours.

3. Verify that the QUADRANT POWER TILT RATIO is within its limit within 24 hours after exceeding the limit or reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within the next 2 hours and reduce the Power Range Neutron Flux-High Trip Setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours; and

4. Identify and correct the cause of the out-of-limit condition prior to increasing THERMAL POWER; subsequent POWER OPERATION above 50% of RATED THERMAL POWER may proceed provided that the QUADRANT POWER TILT RATIO is verified within its limit at least once per hour for 12 hours or until verified acceptable at 95% or greater RATED THERMAL POWER.

*See Special Test Exceptions Specification 3.10.2.

SHEARON HARRIS - UNIT 1 3/4 2-11

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam Admin JPM SRO A2
Perform a Quadrant Power Tilt Ratio Surveillance
OST-1039

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

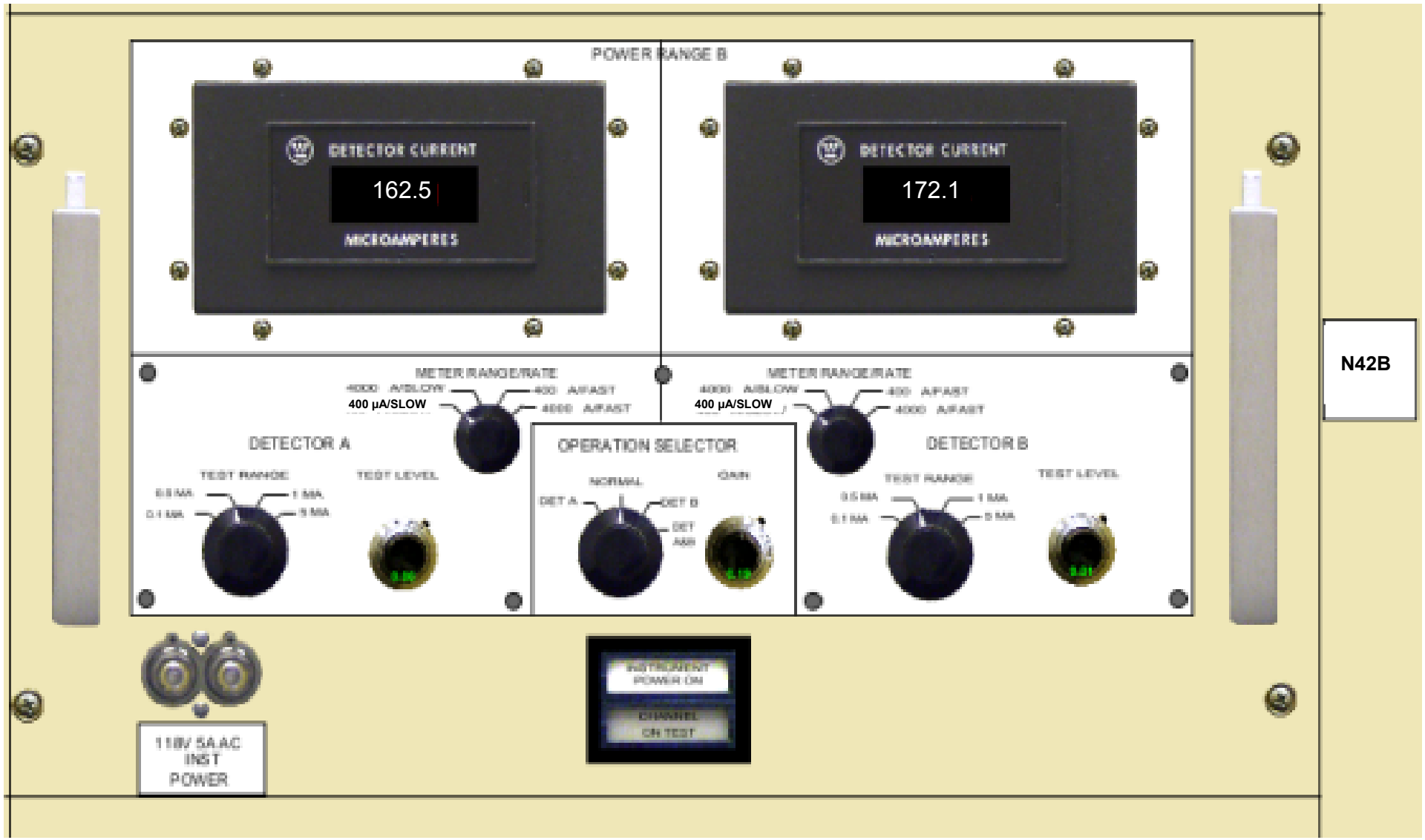
Name: _____

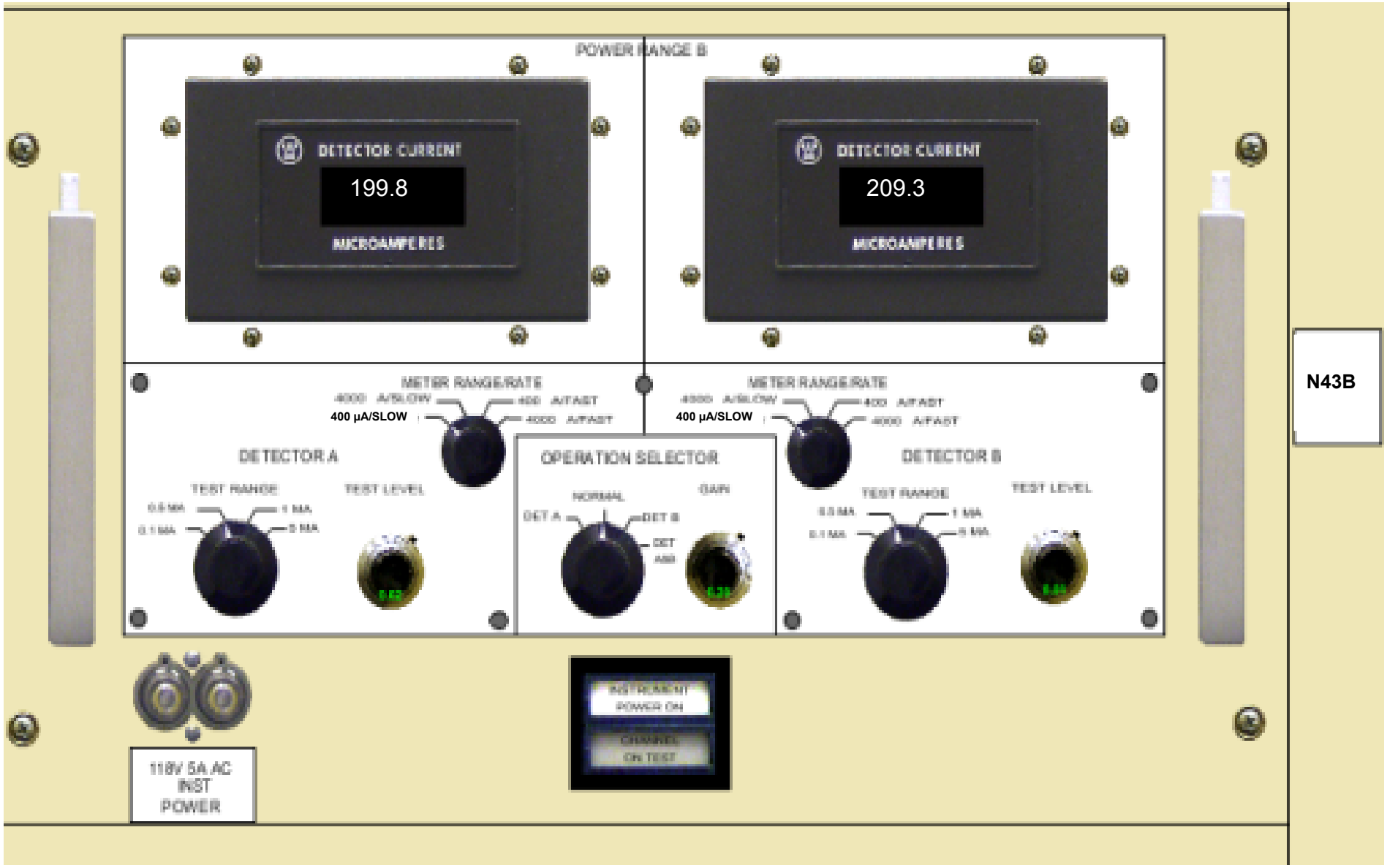
Date: _____

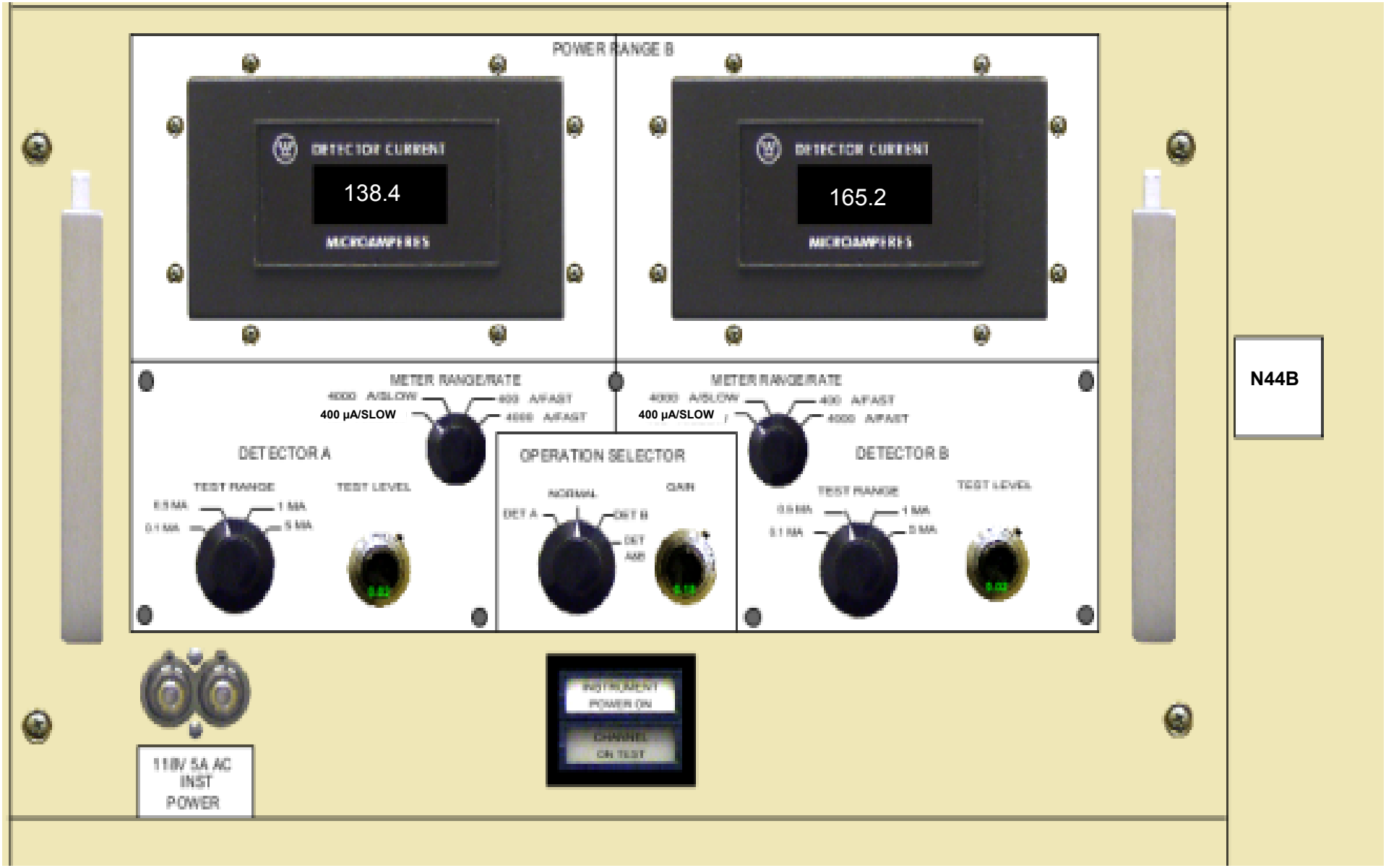
Initial Conditions:	• The plant is operating at 90% power when a rod in Control Bank 'A' (P-10) dropped. • The crew is performing AOP-001, MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM. • There are NO deficiency tags on PR NIs. • ERFIS points ANM9112U and ANM9113L have a BAD quality code. HNP IT has been notified and they are evaluating the ERFIS points.

Initiating Cue:	The CRS has directed you to perform a <u>manual</u> QPTR IAW OST-1039, CALCULATION OF QPTR, AND evaluate the actions, if any, of the applicable Technical Specification. The Power Range NIS indications are provided. **NOTE: Show values of your work. For this JPM notify evaluator when independent verification is required to be performed.**


POWER RANGE B
DETECTOR CURRENT
145.6
MICROAMPERES
DETECTOR CURRENT
159.6
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
GAIN
DET A
DET B
DETECTOR B
TEST RANGE
TEST LEVEL
N41B
118V 5A AC
INST
POWER


POWER RANGE B
DETECTOR CURRENT
162.5
MICROAMPERES
DETECTOR CURRENT
172.1
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
GAIN
METER RANGE/RATE
400 µA/SLOW
DETECTOR B
TEST RANGE
TEST LEVEL
N42B
118V 5A AC
INST
POWER
INSTRUMENT
POWER ON
CHANNEL
ON TEST


POWER RANGE B
DETECTOR CURRENT
199.8
MICROAMPERES
DETECTOR CURRENT
209.3
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
GAIN
DET A
DET B
DETECTOR B
TEST RANGE
TEST LEVEL
N43B
118V 5A AC
INST
POWER


POWER RANGE B
DETECTOR CURRENT
138.4
MICROAMPERES
DETECTOR CURRENT
165.2
MICROAMPERES
METER RANGE/RATE
400 µA/SLOW
DETECTOR A
TEST RANGE
TEST LEVEL
OPERATION SELECTOR
NORMAL
DET A
DET B
DET
AMP
GAIN
METER RANGE/RATE
400 µA/SLOW
DETECTOR B
TEST RANGE
TEST LEVEL
N44B
118V 5A AC
INST
POWER
INSTRUMENT
POWER ON
CHANNEL
ON TEST

`Facility:	Harris Nuclear Plant	Task No.:	345001H602
Task Title:	Classify an EAL	JPM No.:	2014 NRC Exam Admin JPM SRO A4
K/A Reference:	G2.4.41 RO 2.9 SRO 4.6	**Alternate Path - NO**	
Examinee:	_____	NRC Examiner:	_____
Facility Evaluator:	_____	Date:	_____

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

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

Initial Conditions:	**This is a TIME CRITICAL JPM.**
	
	Given the following plant conditions:
	• The unit is operating at 100% power
	• The 'A' CNMT Spray Pump is under clearance
	• AOP-025, Loss of One Emergency AC Bus (6.9KV) Or One Emergency DC Bus (125V) is in progress:
	  • Breaker 125 is tripped open
	  • The 'B' EDG is failed to start
	
	The following occurs:
	• 15 minutes ago, the crew entered AOP-016, Excessive Primary Plant Leakage and based on plant conditions, the Reactor was tripped and Safety Injection was actuated
	  • The crew implemented EOP-E-0, Reactor Trip or Safety Injection
	  • RCPs were secured based on RCP Trip foldout criteria
	• 12 minutes ago the 'A' CSIP tripped on overcurrent
	• 10 minutes ago the following conditions existed
	  • CNMT Pressure was 12 psig
	  • Core Exit TCs were 628°F
	  • RCS Pressure was 1200 psig
	  • RVLIS Full Range Level was 33%
	  • Wind speed was 10 mph and wind direction was 185 degrees

Initiating Cue:	The time is now 0554 Evaluate the EAL Matrix and determine the highest classification required for these plant conditions. **NOTE: Do not use SEC judgment.** **NOTE: Write out EAL classification in blank provided then raise your hand and return your page to the Evaluator.**

Task Standard: Classify the highest EAL as an Site Area Emergency FS1.1.

Required Materials: None

General References: PEP-110 EAL Matrix
PEP-110
EP-EAL (allowed reference)

Handouts:
- Attached Initial Conditions
- PEP-110
- PEP-110 EAL Matrix
- EP-EAL

Time Critical Task: YES – 15 minutes for classification.

Validation Time: 15 minutes for classification

CRITICAL STEP JUSTIFICATION	
Step 2	Classification of the event is critical for determining State and County notifications, public information notices, site information notices, and event reportability to the Nuclear Regulatory Commission.

Evaluator Cue:	**Start Time for this portion of JPM begins when the individual has been briefed.**

START TIME: _____

Performance Step: 1 OBTAINS EP-EAL and EAL Matrix.

Standard : Obtains EP-EAL and EAL Matrix

Comments:

✓ **Performance Step: 2** Identify EAL Classification for events in progress.

Standard : The correct EAL is: **Site Area Emergency FS1.1**

Loss or potential loss of **any** two barriers (Table F-1)):

- Fuel barrier is determined to be a POTENTIAL LOSS based on CSFST Core Cooling ORANGE
- RCS barrier is determined to be LOSS based on RCS leak rate > ECCS capability due to the loss of subcooling
- CNMT barrier is determined to be POTENTIAL LOSS based CNMT Pressure > 10 psig with less than one full train of depressurization equipment. Neither CNMT Pump is available.

Comments:

Evaluator Cue:	**Event classification sheet provided to evaluator.**

STOP TIME: _____

Examiners Cue:	**After the candidate returns this JPM classification record the stop time and then announce.** **END of JPM.**

Emergency Action Levels

Attachment 1 – Emergency Action Level Technical Bases

Category: Fission Product Barrier Degradation

Subcategory: N/A

Initiating Condition: Loss or potential loss of **any** two barriers

EAL:

FS1.1 Site Area Emergency

Loss or potential loss of **any** two barriers (Table F-1)

Mode Applicability:

1 - Power Operation, 2 - Startup, 3 - Hot Standby, 4 - Hot Shutdown

Basis:

Generic

None

Plant-Specific

Fuel Clad, RCS and Containment comprise the fission product barriers. Table F-1 (Attachment 2) lists the fission product barrier thresholds, bases and references.

At the Site Area Emergency classification level, each barrier is weighted equally. A Site Area Emergency is therefore appropriate for any combination of the following conditions:

- One barrier loss and a second barrier loss (i.e., loss - loss)
- One barrier loss and a second barrier potential loss (i.e., loss - potential loss)
- One barrier potential loss and a second barrier potential loss (i.e., potential loss - potential loss)

At the Site Area Emergency classification level, the ability to dynamically assess the proximity of present conditions with respect to the threshold for a General Emergency is important. For example, the existence of Fuel Clad and RCS Barrier loss thresholds in addition to offsite dose assessments would require continual assessments of radioactive inventory and Containment integrity in anticipation of reaching a General Emergency classification. Alternatively, if both Fuel Clad and RCS potential loss thresholds existed, the SEC would have greater assurance that escalation to a General Emergency is less imminent.

Emergency Action Levels

Attachment 1 – Emergency Action Level Technical Bases

HNP Basis Reference(s):

None

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Fuel Clad

Category: A. Critical Safety Function Status

Degradation Threat: Potential Loss

Threshold:

1. CSFST Core Cooling-ORANGE entry conditions met

   OR

   CSFST Heat Sink-RED entry conditions met due to actual loss of secondary heat sink and heat sink is required

Basis:

Generic

Core Cooling - ORANGE indicates subcooling has been lost and that some clad damage may occur.

Heat Sink - RED when heat sink is required indicates the ultimate heat sink function is under extreme challenge.

Plant-Specific

The three Critical Safety Function Status Tree (CSFST) Core Cooling-ORANGE path entry conditions are (ref. 1):

- Core Exit TCs less than 1200°F, and RCS subcooling less than 10°F[40°F] – C, 20°F[50°F] – M, no RCPs running, Core Exit TCs greater than 730°F, and RVLIS Full Range greater than 39%
- Core Exit TCs less than 1200°F, and RCS subcooling less than 10°F[40°F] – C, 20°F[50°F] – M, no RCPs running, Core Exit TCs less than 730°F, and RVLIS Full Range less than 39%
- Core Exit TCs less than 1200°F, RCS subcooling less than 10°F[40°F] – C, 20°F[50°F] – M, at least one RCP running, and RVLIS Dynamic Head Range:
  - < 60% - 3 RCPs
  - < 33% - 2 RCPs
  - < 25% - 1 RCP

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

The Critical Safety Function Status Tree (CSFST) Heat Sink-RED path entry conditions are Narrow Range Level in all SGs less than 25% [40%] and total feed flow to SGs less than 210 KPPH (ref. 2):

The RCS subcooling values designated "C" (for computer) are normally used when the subcooling monitor (ERFIS) is available. The values designated "M" (for manual) are used only when the subcooling monitor is not available (ref. 3).

The CSFSTs can be monitored using the SPDS display on the Plant Computer (ref. 4).

Adverse Containment parameters (enclosed in brackets) determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the Adverse Containment values should be used in the EOPs:

- Containment pressure is greater than the High-1 setpoint (3.0 psig)
- Containment radiation level has exceeded 10^3 R/hr, or
- Integrated containment radiation exposure has exceeded 10^4 R

If containment pressure subsequently decreases below 3.0 psig, normal values can be used. If radiation levels subsequently decrease below 10^3R/hr, however, use of adverse values must be continued until the plant operations staff has determined the integrated dose has not exceeded 10^4 R (ref. 5).

EOP-FRP-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK, specifically states that functional response procedure actions should not be performed if total feed flow capability of 210 KPPH is available and total feed flow has been reduced due to operator action as directed by the EOPs. The following EOPs direct feed flow to be reduced below 210 KPPH (ref. 6):

- EOP-ECA-2.1 UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS
- EOP-FR-S.1 RESPONSE TO NUCLEAR POWER GENERATION/ATWS
- EOP-FR-P.1 RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK
- EOP-FR-P.2 RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK
- EOP-FR-Z.1 RESPONSE TO HIGH CONTAINMENT PRESSURE

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

HNP Basis Reference(s):

1. EOP-CSFST Core Cooling CSF-2
2. EOP-CSFST Heat Sink CSF-3
3. EOP-User's Guide
4. OP-163 ERFIS
5. EOP User's Guide, Section 5.2.6

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Reactor Coolant System

Category: D. Inventory

Degradation Threat: Loss

Threshold:

2. RCS leak rate > available ECCS makeup capacity as indicated by a loss of RCS subcooling (< 10°F[40°F] – C, < 20°F[50°F] – M)

Basis:

Generic

This threshold addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Plant-Specific

Critical Safety Function Status Trees (CSFST), Core Cooling, indicates that if subcooling margin based on core exit TCs is less than 10°F[40°F] – C, 20°F[50°F] – M, a loss of RCS subcooling has occurred (ref. 1). AOP-016, Excessive Primary Coolant Leakage, provides appropriate actions to prevent and mitigate the consequences of RCS leakage (ref. 2).

The RCS subcooling values designated "C" (for computer) are normally used when the subcooling monitor (ERFIS) is available. The values designated "M" (for manual) are used only when the subcooling monitor is not available (ref. 3).

The CSFSTs can be monitored using the SPDS display on the Plant Computer (ref. 4).

Adverse Containment parameters (enclosed in brackets) determine when a harsh environment begins to affect instrumentation located inside Containment. The following indications identify that the Adverse Containment values should be used in the EOPs:

- Containment pressure is greater than the High-1 setpoint (3.0 psig)
- Containment radiation level has exceeded 10^3 R/hr, or
- Integrated containment radiation exposure has exceeded 10^4 R

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

If containment pressure subsequently decreases below 3.0 psig, normal values can be used. If radiation levels subsequently decrease below 10^3R/hr, however, use of adverse values must be continued until the plant operations staff has determined the integrated dose has not exceeded 10^4 R (ref. 5).

HNP Basis Reference(s):

1. EOP-CSFST Core Cooling CSF-2
2. AOP-016 Excessive Primary Coolant Leakage
3. EOP-User's Guide
4. OP-163 ERFIS
5. EOP User's Guide, Section 5.2.6

Emergency Action Levels

Attachment 2 – Fission Product Barrier Loss/Potential Loss Matrix and Bases

Barrier: Containment

Category: D. Inventory

Degradation Threat: Potential Loss

Threshold:

7. Containment pressure > 10 psig

   AND

   Less than one full train of depressurization equipment operating (one CNMT spray pump and two CNMT fan coolers)

Basis:

Generic

This threshold represents a potential loss of containment in that the containment heat removal/depressurization system (e.g., containment sprays, CNMT fan coolers, etc.) are either lost or performing in a degraded manner, as indicated by containment pressure greater than the setpoint at which the equipment was supposed to have actuated.

Plant-Specific

The Containment pressure setpoint (10 psig) is the pressure at which the Containment Spray System should actuate (ref. 1, 2). Limiting LOCA analyses assume one Containment Spray pump and two CNMT fan coolers operate (ref. 3).

HNP Basis Reference(s):

1. EOP-CSFST CSF-5
2. OP-112 Containment Spray System
3. FSAR 6.2.1.1.3.2

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2014 NRC Exam Admin JPM SRO A4
Classify an Event
PEP-110 and EP-EAL

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT _____ UNSAT _____

Examiner's Signature: _____ Date: _____

JPM CUE SHEET

Initial Conditions:	**This is a TIME CRITICAL JPM.**
	
	Given the following plant conditions:
	• The unit is operating at 100% power
	• The 'A' CNMT Spray Pump is under clearance
	• AOP-025, Loss of One Emergency AC Bus (6.9KV) Or One Emergency DC Bus (125V) is in progress:
	  • Breaker 125 is tripped open
	  • The 'B' EDG is failed to start
	
	The following occurs:
	• 15 minutes ago, the crew entered AOP-016, Excessive Primary Plant Leakage and based on plant conditions, the Reactor was tripped and Safety Injection was actuated
	  • The crew implemented EOP-E-0, Reactor Trip or Safety Injection
	  • RCPs were secured based on RCP Trip foldout criteria
	• 12 minutes ago the 'A' CSIP tripped on overcurrent
	• 10 minutes ago the following conditions existed
	  • CNMT Pressure was 12 psig
	  • Core Exit TCs were 628°F
	  • RCS Pressure was 1200 psig
	  • RVLIS Full Range Level was 33%
	  • Wind speed was 10 mph and wind direction was 185 degrees

Initiating Cue:	Evaluate the EAL Matrix and determine the highest classification required for these plant conditions. **NOTE: Do not use SEC judgment.** **NOTE: Write out EAL classification in blank provided then raise your hand and return your page to the Evaluator.**

Name: _____

Date: _____

Start Time: _____

EAL Classification Time: _____

EAL: _____