Facility: **BVPS Unit 2** Task No.: 1300-023-03-023

Task Title: Approve a Tagging Request JPM No.: 2005 NRC SRO Admin No. 3

K/A Reference: 2.2.13 (3.8)

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 or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	The plant is operating at 100% power with all systems in their normal operating alignment. A tagout section has been prepared to isolate and drain [2QSS*P22A], Refueling Water Cooling Pump for maintenance.
Task Standard:	Review a clearance tagout section and identify errors.
Required Materials:	None
General References:	NOP-OP-1001, Clearance/Tagging Program, Rev. 4
Handouts:	Tagging Section with errors 2OM-13.3.B.1, Valve List - 2QQS, Rev. 9 2OM-13.3.C, Power Supply And Control Switch List, Issue 4, Rev. 7 OP Manual Fig. No. 13-2, Quench Spray System, Rev. 13 NOP-OP-1001, Clearance/Tagging Program, Rev. 4
Initiating Cue:	The Shift Manager directs you to conduct a review of the attached tagout section that is ready for approval for completeness and accuracy. Report your results when finished.
Time Critical Task:	Yes
Validation Time:	12 minutes

(Denote Critical Steps with a check mark)

START TIME: _____

NOTE:	This task is normally performed using the eSOMS clearance computer and signed electronically. If necessary, for the purpose of this JPM, inform the Candidate to review a hardcopy of the tagout for approval in place of performing an electronic review.

√ **Performance Step: 1** Review the tagout section for accuracy and completeness.

Standard: Candidate verifies tagout section is appropriate for the task.

Standard: Candidate identifies and reports the following tagout errors:

- Breaker MCC-2-17-6C is tagged in the On position. The correct position is Off.
- Valve 2QSS-21 is not a correct discharge isolation point (2QSS*P22B vs. P22A). The correct valve is 2QS-20.
- Valve 2QSS-239 is tagged in the Shut position. The correct position is Open.

CUE: **If the Candidate asks for direction following identification of the first error, direct the Candidate to review the remainder of the tagout section.**

Comment:

Terminating Cue:	When the Candidate reports the results of the review, the evaluation for this JPM is complete.

STOP TIME: _____

Tagout: 2BVP-04-1

Clearance: 2W10-13 -QSS-004

FOR TRAINING USE ONLY

02/28/05 10:00

Component to be Worked:

QSS-P22A

(RWST) REFUELING WATER COOLING PUMP P22A

2-SFGB-718 -NORTH -AT RWST COOLERS

Description /Reason

200015610 DISASSEMBLE & REPAIR
200063975 LUBE MOTOR BEARINGS
200091064 CHANGE RESERVOIR OIL & SAMPLE

Placement Notes

MECH./ ELECT. MAINT. CLEARANCE

Cautions

Completion Instructions /Feedback

CHECK OIL LEVEL

Clearance Attributes:

Attribute Description	Attribute Value
Equipment Required For Mode Change	No
Restored/Removed Prior to Mode	NOT APPLICABLE
ESF Clearance Required	No
Schedule	2W10
Clearance Type	Danger
Time to Post (In Minutes)	
ne to Remove (In Minutes)	

Work Documents List:

Number / Equipment ID	Description
200015610 - - - - - - - - - - - - - - - **PRT/AWD** - - - - - - - - - - - - - - - **2QSS-P22A**	03-007888-000 12 WEEK SCHEDULE - REPLACE MECHANICAL SEAL BORIC ACID WAS CLEANED PER WORK ORDER #02-023791-000. LEAKAGE WAS FROM THE MECHANICAL SEAL AND NEEDS REPLACED. (See 02-09422 CA 4)
200063975 - - - - - - - - - - - - - - - **PRT/AWD** - - - - - - - - - - - - - - - **2QSS-P22A-MOTOR**	LUBE MOTOR BEARINGS REFUELING WATER COO LUBE MOTOR BEARINGS REFUELING WATER COOLING PUMP MOTOR LUBE MOTOR BEARINGS REFUELING WATER COOLING PUMP MOTOR
200091064 - - - - - - - - - - - - - - - **PRT/AWD** - - - - - - - - - - - - - - - **2QSS-P22A**	CHANGE RESERVOIR OIL AND OBTAIN OIL SAMPLE FOR ANALYSIS REFUELING WATER COOLING PUMPS CHANGE RESERVOIR OIL AND OBTAIN OIL SAMPLE FOR ANALYSIS REFUELING WATER COOLING PUMPS

Clearance Verification:

Status	Description	Name	Verification Date
Prepared	Prepared By	R.O. #1	*Today*
Reviewed	Reviewed By	R.O. #2	*Today*
Second Reviewed	Second Reviewed By		
proved	Approved By		
ssued for Work	Issued for Work By		
Restoration Review	Restoration Review By		

Tagout: 2BVP-04-1

Clearance: 2W10-13 -QSS-004 *02/28/05 10:00*

Status	Description	Name	Verification Date
Removal Authorized	Removal Authorized By		
Clearance Closed	Clearance Closed By		

Ground Disc List:

Tag Serial No.	Tag Type	Equipment * Equipment Description * Equipment Location		Pla Seq	Placement Configuration * Notes	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time		Rest Seq	Restoration Configuration * Notes	As Left Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time
0	Caution	A6-1F * REFUELING WATER COOLING PUMP MOTOR THERMAL OVERLOAD * 2-CNTB-735-CONTROL ROOM -		1	TAG POSTED				7	TAG REMOVED	TAG REMOVED		
0	Caution	S1149 * KNIFE SWITCH FOR A6-1F (2QSS-P22A) * 2-CNTB-707 - -BAY 14		2	OPEN				6	CLOSED	CLOSED		
0	Caution	2QSS-P22A-CS * 2QSS-P22A CONTROL SWITCH * 2-CNTB-735 -CONTROL ROOM -CONTROL ROOM-BB-C		3	STOP				5	STOP	STOP		
0	Danger	MCC-2-17-6C * MOTOR STARTER FOR REFUEL WATER COOLING PUMP 2QSS-P22A * 2-MSCV-755--CV & RC AREA		4	ON				4	ON	ON		
0	Danger	2QSS-21 * REFUELING WTR COOLING PUMP P22B DISCH ISOL * 2-SFGB-718 - -NORTH BY PUMP		5	SHUT * 13-2/E4				3	OPEN * 13-2/E4	OPEN		
0	Danger	2QSS-16 * REFUELING WATER COOLING PUMP P22A SUCTION * 2-SFGB-718 - -722 NORTH BY PUMP		6	SHUT * 13-2/E3				2	OPEN * 13-2/E3	OPEN		
0	Danger	2QSS-239 * REFUELING WATER COOLING PMP P22A DISCH DRAIN * 2-SFGB-718 - -NORTH BY PUMP		7	SHUT * 13-2/E4				1	SHUT * 13-2/E4	SHUT		

Tag Serial No.	Tag Type	Equipment * Equipment Description * Equipment Location		Pla Seq	Placement Configuration * Notes	Place. 1st Verif Date/Time	Place. 2nd Verif Date/Time		Rest Seq	Restoration Configuration * Notes	As Left Configuration	Rest. 1st Verif Date/Time	Rest. 2nd Verif Date/Time
0	Danger	2QSS-234 * REFUELING WTR COOLING PUMP P22A SUCTION TCN * 2-SFGB-718 - -NORTH BY PUMP		7	OPEN				1	SHUT	SHUT		

Component	Print Number
2QSS-21	13-2 F4
2QSS-16	13-2 E3
2QSS-239	13-2 E4
2QSS-234	13-2 E4

Component	Annotations
MCC-2-17-6C	OPENING MCC-2-17-6C BRINGS IN ANN. A6-1F

Facility:	**BVPS Unit 2**	Task No.:	1320-008-03-023
Task Title:	Determine Action Required For Failed AC Sources Surveillance	JPM No.:	2005 NRC SRO Admin No. 1
K/A Reference:	2.1.12 (4.0)		

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 or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	The plant is operating at 100% power with all systems in their normal operating alignment. The 2-1 EDG was declared inoperable and removed from service 30 minutes ago due to a ruptured engine cylinder. The PO has completed 2OST-36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification.
Task Standard:	Procedure errors are identified and Technical Specification action requirements are determined for a failed surveillance test.
Required Materials:	None
General References:	2OST-36.7, Offsite To Onsite Power Distribution System Breaker Alignment Verification, Rev. 8 BVPS Unit 2 Technical Specifications LCO 3.8.1.1
Handouts:	2OST-36.7, Offsite To Onsite Power Distribution System Breaker Alignment Verification, Rev. 8 (marked up copy) BVPS Unit 2 Technical Specifications LCO 3.8.1.1
Initiating Cue:	The Shift Manager directs you to review the completed 2OST-36.7, Offsite To Onsite Power Distribution System Breaker Alignment Verification for completeness. Report your results when finished.
Time Critical Task:	No
Validation Time:	14 minutes

(Denote Critical Steps with a check mark)

START TIME: _____

√ **Performance Step: 1** Review procedure for completeness.

Standard: Candidate determines that signoffs are missing for the following steps:

- VI.D.1 (Operator performing test has reviewed procedure)
- VII.A.1.b (Class 1E power through the USST's or SSST's)

Comment:

√ **Performance Step: 2** Review Data Sheet 1 for completeness.

Standard: Candidate determines that the neon light for 4KV breaker ACB 342B is marked as OFF.

NOTE: This is the required lineup for live bus transfer that would be indicated if the neon light was ON.

Comment:

√ **Performance Step: 3** Determine Technical Specification Action Statement requirements.

Standard: Candidate determines that OST does not satisfy the Acceptance Criteria.

Standard: Candidate identifies applicability of T.S. Action Statement 3.8.1.1.c with one offsite circuit and one diesel generator inoperable.

NOTE: Provide the Candidate with a copy of the T.S. handout.

NOTE: Refer to attached Technical Specification LCO 3.8.1.1 Action c for applicable requirements for an inoperable offsite circuit and diesel generator.

Comment:

Terminating Cue:	When the Candidate identifies the Technical Specification action statement requirement, the evaluation for this JPM is complete.

STOP TIME: _____

Beaver Valley Power Station

Unit 2

2OST-36.7

Offsite to Onsite Power Distribution System Breaker Alignment Verification

Revision 8

Prepared by **W. K. Giffrow**	Date **2/7/02**	Pages Issued **1 through 14**	
Reviewed by **R. C. Plummer**	Date **2/15/02**	Validated by **N/A**	Date
OSC Meeting No. **OSC Not Required**	Date	**DRR-02-00634**	

Table Of Contents

Frequency: W	Surveillance Requirements: 4.8.1.1.1.a & 4.8.1.2
Required for Mode(s): 1, 2, 3, 4, 5, 6, #, @ Performed in Mode(s): ALL	Date / Time Completed: Today / Now Total Manhours: 0.5

TEST RESULTS: (Completed by Performer)

(√ or N/A)

☐ _____ Test Completed SATISFACTORY

☐ _____ Problems Encountered
(See Problem Sheet)

☐ __√__ Unscheduled/partial OST (explain)

2-1 EDG inoperable

_____

_____
Reviewer Signature/Date

STA Review _____/_____

NSS Approval _____/_____

PERFORMED BY:

Name (Print)	Initial
Plant Operator	*PO*

COMMENTS: (Include Date and Initials)

☐ Comments continued on Problem Sheet

\# During movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies.

@ Within one hour PRIOR to a preplanned removal of a diesel generator from service **OR** within one hour AFTER an unplanned removal of a diesel generator from service (Diesel Inoperable). (T.S. 3.8.1.1)(IX.C.2)

OST PROBLEM SHEET

See Page and Step No. for problem description. See below for corrective action.

PAGE NO.	STEP NO.	DESCRIBE CORRECTIVE ACTION	INITIALS	DATE

I. PURPOSE

This procedure demonstrates the operability of the two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system.

II. DISCUSSION

The operator will perform this OST by filling out the attached Data Sheet 1 or Data Sheet 2.

III. ACCEPTANCE CRITERIA

Note:	Satisfactory completion means that the required circuits are operable as determined by correct breaker lineup and indicated power availability.

A. Satisfactory completion of Data Sheet 1 for normal offsite alignment (Modes 1-6, or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies).

B. Satisfactory completion of Data Sheet 2 while in Backfeed.

IV. EQUIPMENT AND MATERIAL

NONE

V. PRECAUTIONS AND LIMITATIONS

A. Circuit breakers should **NOT** be operated for the purpose of aligning to the conditions specified on Data Sheet 1 or 2, unless NSS/ANSS has been notified **AND** approval to operate breaker has been given.

VI. INITIAL CONDITIONS

A. **Plant Status Changes**

This procedure does not affect plant status.

B. **NSS/ANSS Sign-on**

1. NSS/ANSS verifies the following:

   - Performance of this procedure is authorized.

DATE: **Today**	TIME: **Now**	CURRENT PLANT MODE: **1**
NSS/ANSS COMMENTS: ***None***		

NSS / ANSS Signature ***SM***

C. **Reactor Operator Sign-on**

1. Reactor Operator perform the following:

   - Acknowledge procedure performance.

Reactor Operator Signature ***PO***

D. **Procedure Performer Initial Conditions**

1. The operator performing this test has reviewed this procedure.

_____/_____
Initial / Date

VII. INSTRUCTIONS

A. Test Preparation

1. Completion of Data Sheet 1, **NOT** on Backfeed. (Otherwise N/A)

   a. The plant is in operational Mode 1, 2, 3, 4, 5, 6 or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies.

   PO / Today
   Initial / Date

   b. The onsite Class 1E distribution system is being powered through the Unit Station Service Transformers **OR** the System Station Service Transformers.

   _____/_____
   Initial / Date

2. Completion of Data Sheet 2, on Backfeed. (Otherwise N/A)

   a. The plant is in operational Mode 5, 6 or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies.

   N/A / Today
   Initial / Date

   b. The onsite Class 1E distribution system is being powered through the Unit Station Service Transformers, Backfeed through the Main Transformer.

   N/A / Today
   Initial / Date

3. Review OST schedule and determine if this is the scheduled weekly performance of this OST.

PO / Today
Initial / Date

a. For scheduled weekly performance, Blackout Breakers ACB 2A2 and ACB 2D12 are to be checked locally. (Otherwise N/A)

N/A / Today
Initial / Date

OR

b. If this is not the scheduled weekly performance, verification of Blackout Breakers ACB 2A2 and ACB 2D12 position may be performed via review of Padlock Manipulation Log. (Otherwise N/A)

PO / Today
Initial / Date

B. **Performance of the OST**

Note:	Either Step VII.B.1 **OR** Step VII.B.2 should be completed **AND** the other step should be N/A. Only the data sheet required for the current mode of operation should be filled out and completed. The unused data sheet is to be left blank.

1. When in Modes 1 through 6 or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies. (**NOT** on Backfeed) complete Data Sheet 1. (Otherwise N/A)

a. Data Sheet 1 completed satisfactorily.

PO / Today
Initial / Date

b. If Data Sheet 1 cannot be completed satisfactorily notify NSS **AND** refer to Technical Specifications 3.8.1.1 or 3.8.1.2 as applicable.

PO / Today
Initial / Date

c. If this procedure is being performed prior to taking a Diesel Generator out of service, Notify the NSS/ANSS to refer to Licensing Requirements 2.5, 2.6, 2.1, and 2.2. (Otherwise Mark N/A)

PO / Today
Initial / Date

2. When in Modes 5, 6 or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies, **AND** station power is obtained by backfeeding, complete Data Sheet 2. (Otherwise N/A)

a. Data Sheet 2 completed satisfactorily.

N/A / Today
Initial / Date

b. If Data Sheet 2 cannot be completed satisfactorily notify NSS **AND** refer to Technical Specifications.

N/A / Today
Initial / Date

C. **Test Completion**

1. Consult the acceptance criteria for acceptable performance.

PO / Today
Initial / Date

2. Inform the NSS/ANSS of the completion of this test.

PO / Today
Initial / Date

3. Complete the front cover sheet.

PO / Today
Initial / Date

VIII. DATA SHEETS, TABLES, FIGURES, AND ATTACHMENTS

A. **Data Sheets**

1. Without Backfeed
2. When Backfeeding through Main Transformer

B. **Tables**

NONE

C. **Figures**

NONE

D. **Attachments**

NONE

DATA SHEET 1

WITHOUT BACKFEED

(For Modes 1 through 6, or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies, see Note 1)

ITEM	REQUIRED POSITION OR READING	(O or S / INITIAL) OR (READING / INITIAL)
138KV BUS 2-Train A		
138KV OCB 85	CLOSED (RED LIGHT ON)	S / PO
MTR OPER DISC SW 89-2A	CLOSED (RED LIGHT ON)	S / PO
2A SSST Volt. Sel.		
A Bus FDR. (Phase Y)		
Pos A-B	125V (Note 2)	125 / PO
Pos B-C	125V (Note 2)	125 / PO
Pos C-A	125V (Note 2)	126 / PO
4KV Bus 2A ACB 342A	OPEN (DIM WHITE LIGHT ON)	O / PO
	(NEON LAMP ON) (Note 3)	ON / PO
	OR	
	CLOSED (TWO RED LIGHTS ON)	/
	(NEON LAMP OFF)	/
4KV Bus 2A ACB 2A2[C.1]	Locked in the DISC (disconnect) position (Note 4)	DISC / PO
4KV Bus 2A ACB 2A10	CLOSED (RED LIGHT ON)	S / PO
4KV Bus 2AE ACB 2E7	CLOSED (RED LIGHT ON)	S / PO
138KV BUS 1-Train B		
138KV OCB 94	CLOSED (RED LIGHT ON)	S / PO
2B SSST Volt. Sel.		
D Bus FDR. (Phase Y)		
Pos A-B	125V (Note 2)	125 / PO
Pos B-C	125V (Note 2)	126 / PO
Pos C-A	125V (Note 2)	125 / PO
4KV Bus 2D ACB 342B	OPEN (DIM WHITE LIGHT ON)	O / PO
	(NEON LAMP ON) (Note 3)	OFF / PO
	OR	
	CLOSED (TWO RED LIGHTS ON)	/
	(NEON LAMP OFF)	/
4KV Bus 2D ACB 2D12[C.1]	Locked in the DISC (disconnect) position (Note 4)	DISC / PO
4KV Bus 2D ACB 2D10	CLOSED (RED LIGHT ON)	S / PO
4KV Bus 2DF ACB 2F7	CLOSED (RED LIGHT ON)	S / PO

Notes:

1. It is intended that both circuits be verified as indicated, although during Mode 5, 6 or during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies, only one of the two circuits is required by Tech Specs to be demonstrated operable.

2. All voltage readings are nominal and the meters are not required to be calibrated. Readings are made on the 4KV Common Voltmeter (VB-C)

3. Illuminated neon lamp signifies that ACB is setup for Automatic Bus Transfer (During Mode 1 operation only).

4. Verify locally each scheduled weekly performance. For additional performances, verification may be via review of Padlock Manipulation Log.

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and

b. Two separate and independent diesel generators each with:

1. Separate day tank containing a minimum of 350 usable gallons of fuel,

2. A separate fuel storage system containing a minimum of 53,225 usable gallons of fuel,

3. A separate fuel transfer pump,

4. Lubricating oil storage containing a minimum total volume of 504 gallons of lubricating oil, and

5. Capability to transfer lubricating oil from storage to the diesel generator unit.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- - - - - - - - - - - - - - - - GENERAL NOTE - - - - - - - - - - - - - -

Specification 3.0.4.b is not applicable to diesel generators.

- -

a. With one offsite circuit inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

b. With one diesel generator[1] inoperable, demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1.a within 1 hour and at least once per 8 hours thereafter; and if the diesel

(1) Fuel oil contained in the storage tanks not meeting the properties in accordance with 4.8.1.1.2.d.2 or 4.8.1.1.2.e shall be brought within the specified limits within 7 days.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

generator became inoperable due to any cause other than an independently testable component, testing or preplanned preventative maintenance, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.5 within 24 hours[2] unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated. Restore the diesel generator to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With one offsite circuit and one diesel generator[1] inoperable, demonstrate the OPERABILITY of the remaining A.C. sources by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter; and if the diesel generator became inoperable due to any cause other than an independently testable component, testing or preplanned preventative maintenance, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Surveillance Requirement 4.8.1.1.2.a.5 within 8 hours[2] unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Action Statement a or b, as appropriate with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source. A successful test of diesel OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.5 performed under this Action Statement for an OPERABLE diesel or a restored to OPERABLE diesel satisfies the diesel generator test requirement of Action Statement b.

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(1) Fuel oil contained in the storage tanks not meeting the properties in accordance with 4.8.1.1.2.d.2 or 4.8.1.1.2.e shall be brought within the specified limits within 7 days.

(2) This action is required to be completed regardless of when the inoperable diesel generator is restored to OPERABILITY.

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

d. With two of the required offsite A.C. circuits inoperable, restore one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Following restoration of one offsite source, follow Action Statement a with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable offsite A.C. circuit.

e. With two of the required diesel generators[1] inoperable, demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1.a within one hour and at least once per 8 hours thereafter; restore one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. Following restoration of one diesel generator unit, follow Action Statement b with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable diesel generator. A successful test of diesel OPERABILITY per Surveillance Requirement 4.8.1.1.2.a.5 performed under this Action Statement for a restored to OPERABLE diesel satisfies the diesel generator test requirement of Action Statement b.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be:

a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignment, indicated power availability, and

b. Demonstrated OPERABLE at least once per 18 months by transferring (manually and automatically) unit power supply from the unit circuit to the system circuit.

(1) Fuel oil contained in the storage tanks not meeting the properties in accordance with 4.8.1.1.2.d.2 or 4.8.1.1.2.e shall be brought within the specified limits within 7 days.

Facility:	**BVPS Unit 2**	Task No.:	0011-003-01-013
Task Title:	Review an Estimated Critical Position Calculation	JPM No.:	2005 NRC SRO Admin No. 2
K/A Reference:	2.1.23 (4.0)		

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 or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:

- A plant startup is being performed 5 days after a reactor trip from 100% power.
- Core burnup is 10,000 MWD/MTU.
- RCS boron concentration is 1000 ppm.
- The plant computer is **NOT** available.

Task Standard: ECP errors correctly identified and the boron concentration for startup value is calculated within the specified tolerance.

Required Materials: Calculator; ECP Answer Sheet

General References: 2OM-50.4.F, Performing An Estimated Critical Position Calculation, Rev. 4
BV-2 Curve Book

Handouts: 2OM-50.4.F, (with completed DATA SHEET 1)
BV-2 Cycle 11 Curves

Initiating Cue: The Shift Manager directs you to perform a review of a completed ECP calculation in accordance with 2OM-50.4.F, Performing An Estimated Critical Position Calculation. Report your results when finished.

Time Critical Task: No

Validation Time: 20 minutes

(Denote Critical Steps with a check mark)

START TIME: _____

√	**Performance Step: 1** (Data Sheet 1)	Review the ECP calculation.
	Standard:	Candidate correctly identifies the following errors and determines the boron concentration required for startup.
	(Step IV.I.1.b)	'Performed By' signature is missing.
	(Part B.2)	CB-24A is incorrectly circled. Correct figure is CB-24B.
	(Part B.2)	Control Rod reactivity values are incorrect in Columns II and III. The correct number is 725.
	(Part B.5)	Reactivity Change value is incorrect. The correct number is 3707.
	(Part C.I, Line 1)	Reactivity Change value is incorrect (carryover from previous step).
	(Part C.III, Line 1)	Boron Change value is incorrect. The correct number is 501.
	(Part C.V, Line 1)	Boron Conc. for Startup value is incorrect. The correct number is 1501.
	(Part C.III, Line 2)	Boron Change value is incorrect. The correct number is 526.
	(Part C.V, Line 2)	Boron Conc. For Startup value is incorrect. The correct number is 1526. (Accept value between **1476 – 1576**).

Comment:

Terminating Cue:	When the Candidate completes the review of the calculation and reports the results, the evaluation for this JPM is complete.

STOP TIME: _____

JPM No.: 2005 NRC SRO No. 2

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

_____

_____

Response: _____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS:

- A plant startup is being performed 5 days after a reactor trip from 100% power.
- Core burnup is 10,000 MWD/MTU.
- RCS boron concentration is 1000 ppm.
- The plant computer is **NOT** available.

INITIATING CUE:

The Shift Manager directs you to perform a review of a completed ECP calculation in accordance with 2OM-50.4.F, Performing An Estimated Critical Position Calculation. Report your results when finished.

ANSWER SHEET

DATA SHEET 1

FORM ECP-1

A. Critical Data

(I) PRIOR TO SHUTDOWN	(II) EXPECTED AT CRITICALITY
Date 5 days ago Time 0000	Date Today Time 0000
Boron Conc. 1000 ppm Power 100 %	
Xenon 100 % (Use Fig CB-12 or N/A)	Xenon 0 % (Use Fig CB-23 or N/A)
Samarium 100 % (Use Fig CB-22 or N/A)	Samarium 134 % (Use Fig CB-22 or N/A)
Control Rod Position A 226 C 226 B 226 D 226	Control Rod Position A 226 C 226 B 226 D 130

B. Reactivity Balance – (Record **absolute values** in Columns I and II)

Reactivity Defects	(I) Prior to Shutdown	(II) Expected at Criticality	(III) (II – I) Difference
1. Power (Fig CB-21) (OR Consult RX ENGR)	2040 pcm	0 (zero) pcm	(-) - 2040 pcm
2. Control Rods (Circle Fig. used) (Fig. CB-24A, 24B, 24C OR Consult RX ENGR)	0 pcm	(725) 600 pcm	(725) (±) + 600 pcm
3. Xenon (Fig. CB-23)	2606 pcm	0 pcm	(±) - 2606 pcm
4. Samarium (Fig. CB-22)	628 pcm	842 pcm	(±) + 214 pcm
5. Reactivity Change (Sum of 1-4) =			(±) - 3832 pcm - 3707

ANSWER SHEET

DATA SHEET 1 (continued)

FORM ECP-1

C. Critical Boron Concentration

	(I)	(II)	(III)	(IV)	(V)
	Reactivity Change (B.5)	Differential Boron Worth (Fig. CB-20)	Boron Change (I) ÷ (II)	Boron Conc. at Shutdown	Boron Conc. for Startup (III) + (IV)
1.	(±) **- 3832** pcm	(-) **- 7.4** pcm/ppm	**(501)** (±) **+518** ppm	**1000** ppm	**(1501)** **1518** ppm
2.	**(- 3707)**	(-) **- 7.05** pcm/ppm	(±) **+544** ppm	**1000** ppm	**1544** ppm
			(526)		**(1526)**

D. Estimated Rod Position Correction

(I)	(II)	(III)	(IV)
Boron Sample	Boron Conc. For Startup C.1.h	Boron Deviation (I) - (II)	Differential Boron Worth (Fig. CB-20)
ppm	ppm	(±) ppm	(–) pcm/ppm

(V)	(VI)	(VII)	(VIII)
Rod Worth Correction (III) × (IV)	Rod Worth Expected At Criticality (B.2)	Corrected Rod Worth Expected At Criticality (V) + (VI)	Corr Critical Rod Pos. (Circle Figure used) (Fig CB-24A, 24B, 24C OR Consult RX ENGR)
(±) pcm	pcm	(–) pcm	Steps

A9 330B

Beaver Valley Power Station

Unit 2

2OM-50.4.F

Performing An Estimated Critical Position Calculation

Revision 4

Prepared by	Date	Pages Issued	
J. P. Keegan	**09/23/02**	**1 through 27**	
Reviewed by	Date	Validated by	Date
J. E. Burnecke	**09/24/02**	**N/A**	
PORC Meeting No.	Date		
OSC Not Required		**PAF-02-03855**	

I. PURPOSE

The purpose of this procedure is to provide instruction in completing an Estimated Critical Position (ECP) calculation prior to placing the reactor in a critical condition. This procedure includes instructions for completing the ECP Form, instructions for performing a 1/M plot, and the 1/M plot figure. All other curves referenced by this procedure are found in the Operators controlled copy of the Unit 2 Curve Book and the Core Operating Limits Report in the Unit 2 Licensing Requirements Manual (LRM).

II. PRECAUTIONS AND LIMITATIONS

A. If the count rate on either source range channel rises by a factor of two or more during any step involving a boron concentration change, the operation shall be stopped immediately and remain suspended until a satisfactory evaluation of the situation has been made.

B. The approach to criticality must be plotted by an inverse count rate versus control rod position (1/M Plot) for every startup.[I.1]

C. If on the approach to criticality, it is apparent that the reactor will go critical below the Rod Insertion Limit, notify the SM/US to ensure appropriate actions taken in accordance with 2OM-50.4.D, "Reactor Startup From Mode 3 To Mode 2".

D. If the reactor is critical below the Rod Insertion Limit, notify the SM/US to ensure appropriate action taken in accordance with 2OM-50.4.D, "Reactor Startup From Mode 3 To Mode 2".

E. If during withdrawal of Banks C or D, it appears that the reactor will go critical at a rod height of less than 500 pcm **OR** Bank D is at maximum rod height for criticality, notify the SM/US to ensure appropriate action taken in accordance with 2OM-50.4.D, "Reactor Startup From Mode 3 To Mode 2".

F. A 1/M plot shall be performed on every reactor startup by a reactor engineer or another qualified individual. The approval for each rod withdrawal shall originate with the individual responsible for the 1/M plot and be communicated to, and approved by the SRO. Only the SRO may direct rod movement.[I.15]

G. Estimated Critical Position calculations shall be independently verified prior to initiation.[I.15]

III. INITIAL CONDITIONS

A. The SM has requested this procedure be performed.

IV. INSTRUCTIONS

Note:
- Steps A through G explain how to complete Data Sheet 1(2), Form ECP-1 (Xenon-Free ECP Calculation) Parts A through G.
- Data Sheet 2, "Xenon-Free ECP Calculation", may be used in lieu of Data Sheet 1 for a Xenon-free startup if data from a recent Xenon-free startup is available as a reference point. Contact Reactor Engineering for applicability determination.
- The ECP data taken for this procedure is dependent upon RCS Tavg between 546°F and 548°F at startup.

A. **Critical Data**

1. Fill in the information on Data Sheet 1(2), Part A, Column I (Critical Data, Prior to Shutdown) from the following sources:

   a. Boron Concentration, Last boron sample during steady state operation from the NOMS log. (Boron Concentration from last Xenon-Free startup for Data Sheet 2.)

   b. Date and Time of the boron sample used for Step IV.A.1.a.

   c. Power-Reactor power at the time of the boron sample. This value can be obtained from cycle power history located in the Reactor Engineering Data Book. (Data Sheet 1)

   d. Burnup-Cycle burnup from the last Xenon-Free startup. This value can be obtained from cycle power history located in the Reactor Engineering Data Book or contact Reactor Engineering. (Data Sheet 2)

   e. Xenon-Percent equilibrium xenon at the time of the boron sample. Estimate this value using BV-2 Curve Book, Figure CB-12, "Integral Worth of Xenon vs. Time After Startup". If Reactor Engineering is requested to determine the value of Xenon, N/A the appropriate space on Part A, Column I. (Data Sheet 1)

   f. Samarium-Percent equilibrium samarium at the time of the boron sample (last Xenon-Free startup for Data Sheet 2). If the reactor operated at approximately 100% steady-state power for ≥ 8 days prior to shutdown, enter "100%" for the samarium value. If Reactor Engineering is requested to determine the value of Samarium worth, N/A the appropriate space on Part A, Column I.

   g. Rod Position-Control bank rod position at the time of the boron sample. (last critical position from Xenon-Free startup for Data Sheet 2)

2. Fill in the information on Data Sheet 1(2), Part A, Column II (Critical Data, Expected at Criticality) as follows:

   a. Date and time criticality is expected to occur.

   b. Burnup-Cycle burnup when criticality will occur (most recent). This value can be obtained from cycle power history located in the Reactor Engineering Data Book or contact Reactor Engineering. (Data Sheet 2)

   c. Xenon-Percent xenon at the expected time of criticality. Estimate this value using BV-2 Curve Book, Figure CB-23, "Reactivity Insertion Due to Xenon vs. Time Following Plant Trip After Steady State Operation At Various Power Levels". If Reactor Engineering is requested to determine the value of Xenon worth, N/A the appropriate space on Data Sheet 1, Part A, Column II.

   d. Samarium-Percent Samarium at the expected time of criticality. Estimate this value using BV-2 Curve Book, Figure CB-22, "Samarium Buildup After Shutdown From Equilibrium Samarium". If Reactor Engineering is requested to determine the value of Samarium worth, N/A the appropriate space on Data Sheet 1(2), Part A, Column II.

   e. Control Rod Position-Record the desired critical rod position. (usually Bank-D @ 100 steps)

B. **Reactivity Balance**

1. Determine the power reactivity defect for Data Sheet 1, Part B, Column I (Prior to Shutdown) and record in the appropriate space on Data Sheet 1 as follows:

   a. Based on the power level and RCS Boron concentration at the PRIOR TO SHUTDOWN condition, use BV-2 Curve Book Figure CB-21, "Power Defect vs. Percent Power" to determine the power defect.

   OR

   b. Have the Reactor Engineer provide the power defect using either the PC version of the Nuclear Design Report (PCNDR) or other NRC approved nuclear design codes.

2. For the control rod positions listed on Data Sheet 1(2), Part A (Critical Data) determine and record the control rod reactivity defect for Part B, Columns I and II as follows:

   a. BV-2 Curve Book Figure 24A, 24B, or 24C, "Integral Rod Worth vs. Steps Withdrawn Banks D and C Moving with Overlap".

   OR

   b. Have the Reactor Engineer provide the current value using either the PC version of the Nuclear Design Report (PCNDR) or other NRC approved nuclear design codes.

3. Determine Xenon worth for Data Sheet 1, Part B, Columns I and II as follows:

   a. If BV-2 Curve Book Figure CB-12 and/or CB-23, were used in Steps IV.A.1.e and IV.A.2.c, perform the following calculations and record the value obtained in Column C below on Data Sheet 1, Part B, Columns I and II:

	A	B	C
	Percent Equil. Xenon Part A Critical Data	Equilibrium Xenon BOL, MOL, or EOL CB-12 or CB-23	Col. A x Col. B/100% Xenon Worth
Prior to Shutdown Column I	**100**	**2606** pcm	**2606** pcm
Expected at Criticality Column II	**0**	**2606** pcm	**0** pcm

OR

   b. Have the Reactor Engineer provide Xenon values in pcm using a computer program that approximates Xenon worth.

4. Determine Samarium worth for Data Sheet 1(2), Part B, Columns I and II as follows:

   a. If BV-2 Curve Book, Figure CB-22, was used in Step IV.A.2.d, perform the following calculations and record the value obtained in Column C below on Data Sheet 1(2), Part B, Columns I and II:

	A	B	C
	Percent Equil. Samarium Part A Critical Data	Equilibrium Samarium BOL, MOL, or EOL CB-22	Col. A x Col. B/100% Samarium Worth
Prior to Shutdown Column I	**100**	**628** pcm	**628** pcm
Expected at Criticality Column II	**134**	**628** pcm	**842** pcm

OR

   b. Have the Reactor Engineer provide Samarium values in pcm using a computer program that approximates Samarium worth.

5. Calculate the reactivity change as follows:

   a. On Data Sheet 1(2), Part B, "Reactivity Balance", subtract Column I from Column II for each line.

   b. Enter the results in Column III, "Difference".

   c. Sum all the values in Column III and enter on Line 5.

d. Record this value on Data Sheet 1(2), Part C, Column I, Line 1.

C. **Critical Boron Concentration for Startup**

1. Data Sheet 1 Calculations

a. Using BV-2 Curve Book, Figure CB-20, "HZP Differential Boron Worth vs. Boron Concentration", **AND** the Boron Concentration from Part A, Column I, enter the Differential Boron Worth on Data Sheet 1, Part C, Column II, Line 1.

b. Divide the Reactivity Change (Column I, Line 1) by the Differential Boron Worth (Column II, Line 1) and enter the value on Data Sheet 1, Part C, Column III, Line 1. **Be cautious of signs.**

c. Enter the Boron Concentration from Part A, Column I on Data Sheet 1, Part C, Column IV, Line 1.

d. Add the Boron Change (Column III, Line 1) to the Boron Concentration At Shutdown (Column IV, Line 1) and enter this value on Data Sheet 1, Part C, Column V, Line 1.

e. Using BV-2 Curve Book, Figure CB-20, "HZP Differential Boron Worth vs. Boron Concentration", **AND** the Boron Concentration from Data Sheet 1, Part C, Column V, Line 1, enter the Differential Boron Worth on Data Sheet 1, Part C, Column II, Line 2.

f. Divide the Reactivity Change (Column I, Line 1) by the Differential Boron Worth (Column II, Line 2) and enter the value on Data Sheet 1, Part C, Column III, Line 2. **Be cautious of signs.**

g. Enter the Boron Concentration from Data Sheet 1, Part A, Column I on Data Sheet 1, Part C, Column IV, Line 2.

h. Add the Boron Change (Column III, Line 2) to the Boron Concentration At Shutdown (Column IV, Line 2) and enter this value on Data Sheet 1, Part C, Column V, Line 2.

2. Data Sheet 2 Calculations

a. Using BV-2 Curve Book, Figure CB-20, "HZP Differential Boron Worth vs. Boron Concentration", **AND** the Boron Concentration from Data Sheet 2, Part A, Column I, enter the Differential Boron Worth on Data Sheet 2, Part C, Column II.

b. Divide the Reactivity Change (Column I) by the Differential Boron Worth (Column II) and enter the value on Data Sheet 2, Part C, Column III. **Be cautious of signs.**

c. Enter the Boron Concentration from Data Sheet 2, Part A, Column I on Data Sheet 2, Part C, Column IV.

d. Add the Boron Change (Column III) to the Boron Concentration At Last Xenon-Free Startup (Column IV) and enter this value on Data Sheet 2, Part C, Column V.

e. Using BV-2 Curve Book, Figure CB-13, "Critical Boron Concentration vs. Burnup", enter the Critical Boron Concentration for the cycle burnup at the last Xenon-Free startup on Data Sheet 2, Part C, Column VI.

f. Using BV-2 Curve Book, Figure CB-13, "Critical Boron Concentration vs. Burnup", enter the Critical Boron Concentration for the current cycle burnup on Data Sheet 2, Part C, Column VII.

g. Subtract the value in Column VII from the value in Column VI and enter the result on Data Sheet 2, Part C, Column VIII.

h. Subtract the value in Column VIII from the value in Column V and enter the result on Data Sheet 2, Part C, Column IX. This will be the final boron concentration required for startup.

3. Verify that the expected critical boron concentration on Data Sheet 1, Part C, Column V, Line 2 (Data Sheet 2, Part C, Column IX) is within the limits of BV-2 Curve Book, Figure CB-26, "Operating Limits To Ensure a Negative MTC".[1.9]

D. **Estimated Rod Position Correction (Based on Boron Sample)**

Note:	The following steps correct the Estimated Critical Rod position recorded on Data Sheet 1(2) Part A, Column II for any differences between the measured boron sample and the calculated boron concentration for startup on Data Sheet 1, Part C, Column V, Line 2 (Data Sheet 2, Part C, Column IX).

1. Enter the latest boron sample results from Chemistry on Data Sheet 1(2), Part D, Column I.

2. Enter the calculated boron concentration for startup from Data Sheet 1, Part C, Column V, Line 2 (Data Sheet 2, Part C, Column IX) on Part D, Column II.

3. Subtract Column II from Column I and enter on Part D, Column III.

4. Using BV-2 Curve Book, Figure CB-20, "HZP Differential Boron Worth vs. Boron Concentration", **AND** the Boron Concentration from Part D, Column I enter the Differential Boron Worth on Part D, Column IV.

5. Multiply Columns III and IV and record the result on Part D, Column V. **Be cautious of signs.**

6. Record the Control Rod Worth expected at criticality from Part B, Column 2, Line 2, on Part D, Column VI.

7. Add Columns V and VI to obtain the corrected control rod worth at criticality and record this value as a negative number on Part D, Column VII.

8. Determine the corrected Estimated Rod Position using the reactivity worth in Part D, Column VII and record on Part D, Column VIII by using one of the following:

   a. BV-2 Curve Book, Figure 24A, 24B, or 24C, "Integral Rod Worth vs. Steps Withdrawn Banks D and C Moving with Overlap".

   OR

   b. Have the Reactor Engineer provide the current value using either the PC version of the Nuclear Design Report (PCNDR) or other NRC approved nuclear design codes.

E. **Allowable Critical Rod Position Band**

1. In Data Sheet 1(2), Part E, "Allowable Critical Rod Position Band", fill in each column as explained in the table and fill in the blanks in the lines below the table.

2. If during withdrawal of Banks C or D, it appears that the reactor will go critical at a rod height of less than 500 pcm (item E.V) **OR** Bank D is at maximum Rod height for criticality, notify the SM/US to ensure appropriate action taken in accordance with 2OM-50.4.D, "Reactor Startup From Mode 3 To Mode 2".

F. **Shutdown Margin Verification**

1. Perform a shutdown margin calculation in accordance with 2OST-49.2, "Shutdown Margin Calculation (Plant Shutdown)".

2. Enter the corresponding results from 2OST-49.2 in the first column of Data Sheet 1(2), Part F, "Shutdown Margin Verification".

3. Verify the shutdown margin once every hour while in Mode 2 until the reactor is critical. Additional columns are provided for this reverification.

G. **List Actual Critical Conditions**

1. Enter the date and time the reactor is critical on Log S1-4, 5 or 6 NCO Report.

2. Record the actual critical conditions in Data Sheet 1(2), Part G, "List Actual Critical Conditions", and the critical date and time.

H. **Perform 1/M Plot(s)**

Note:	Taking an average of 10 baseline source range channel background reading(s) is statistically proven to be the most accurate method of determining source range channel baseline counts.

1. Using the source range scaler-timer, determine the average of 10 baseline source range counts from each source range channel and record results on Data Sheet 3, Part A.

   a. Select the N31-N32-OFF switch to either N31 or N32 position.

b. Select DISPLAY-PRESET switch to the PRESET-SEC/DISPLAY-COUNT position.

c. Dial thumbwheel to 60.0. **Thumbwheel has one decimal place.**

d. Set sampling mode switch to either AUTO or MANUAL.

e. If sampling mode switch set to MANUAL, perform the following to obtain count rate (otherwise omit this substep)

1) Press RESET button.

2) Press START button.

3) After the readout displays a value, press the STOP button.

4) Press RESET button.

5) Repeat Steps H.1.e.1) through H.1.e.4) for the other nine readings.

6) Place sampling mode switch in AUTO.

f. For each channel, sum all ten readings and divide this number by 600 to determine the total baseline average in CPS.

2. Record final source range baseline average for each channel on Data Sheet 3, Parts B and C.

3. During control rod banks A, B and C withdrawals, it is preferred to determine inverse count rate ratios (ICRR) (for 1/M plot data points) by completing Data Sheet 3, Part B, "1/M Plotting For Control Banks A, B and C Movement", for each source range channel as follows:

Note:	Allow counts to stabilize prior to taking reading. Time for stabilization will increase as you approach criticality. Stable counts may be indicated by a straight line trace on NR-45.

a. Set the audio channel multiplier to 10, 100, 1K or 10K for a steady, distinguishable tone.

b. Ensure sampling mode switch is in AUTO position.

c. Select the N31-N32-OFF switch to either N31 or N32 position.

d. Select DISPLAY-PRESET switch to the PRESET-SEC/DISPLAY-COUNT position.

e. Dial thumbwheel to a value of 10.0. **Thumbwheel has one decimal place.**

f. Press RESET button.

g. Record the readout under the CPS column for the appropriate source range channel.

h. Divide the average baseline source range counts value (Co) of the appropriate channel as recorded on Data Sheet 3, Part A by the value displayed (in CPS) on the scaler-timer.

i. Enter the resultant ICRR value under the ICRR column for the appropriate source range channel.

4. Repeat Step H.3 for the other source range channel.

5. Plot the ICRR data point on separate copy of Figure 1 for each source range channel during Control Rod Banks movements.

6. Continue control bank rod withdrawal to the next step position listed on Data Sheet 3.

7. Continue repeating Steps H.3 through H.6 for each control rod bank pull.

CAUTION:	P-6 SETPOINT FOR SOURCE RANGE INSTRUMENTATION IS USUALLY REACHED 20 TO 30 STEPS ON CONTROL BANK D BEFORE REACTOR CRITICALITY IS REACHED.

Note:	Data Sheet 3, Part C provides a reference guide of the Control Banks C and D step sequence and overlap. Because criticality can be approached anytime during Bank D movement, it is recommended to plot 1/M points early during Bank D movement and if desired, at any sequence of steps at the discretion of the SRO.

8. After Control Bank C has been withdrawn past 119 steps, continue with Data Sheet 3, Part C, "1/M Plotting For Control Bank D Movement".

Note:	1/M Plot accuracy improves as the reactor gets closer to criticality. Renormalization is not required, however graphical accuracy may be further improved by renormalizing.

9. If desired to renormalize the 1/M plot, perform the following: (Otherwise step is N/A)

a. Stop Control Rod withdrawal.

b. Determine a new source range baseline count rate average for each source range channel by performing Steps H.1 through H.2 above and completing a new copy of Data Sheet 3, Part A, "Baseline Count Rate Determination".

c. Record final new source range baseline average for each channel on Data Sheet 3, Part C.

d. Obtain a new copy of Figure 1 for each channel.

e. Plot the new source range baseline average value on Figure 1 for each channel.

f. Resume Control Rod withdrawals.

g. Obtain ICRR data at any sequence of Control Bank C or D steps in accordance with Steps H.3 through H.7 and record the data on Data Sheet 3, Part C to determine 1/M plot points to approach criticality.

h. Plot the ICRR points on new separate copies of Figure 1 for each source range channel during Control Bank D movements.

I. **Documentation**

1. File all of the following completed documents:

   a. Form ECP-1 (Data Sheet 1) **OR** Xenon-Free ECP Calculation (Data Sheet 2).

   b. 1/M Plots (Data Sheet 3 and Figure 1) (both channels)

Performed By _____

Verified By *R.O. #2*

Reviewed By _____ **Date** _____
SM/US

Route the completed copy of this procedure to Document Control via the Operation Clerk's daily transmittals.

DATA SHEET 1

FORM ECP-1

A. Critical Data

(I) PRIOR TO SHUTDOWN	(II) EXPECTED AT CRITICALITY
Date 5 days ago Time 0000	Date Today Time 0000
Boron Conc. 1000 ppm Power 100 %	
Xenon 100 % (Use Fig CB-12 or N/A)	Xenon 0 % (Use Fig CB-23 or N/A)
Samarium 100 % (Use Fig CB-22 or N/A)	Samarium 134 % (Use Fig CB-22 or N/A)
Control Rod Position A 226 C 226 B 226 D 226	Control Rod Position A 226 C 226 B 226 D 130

B. Reactivity Balance – (Record **absolute values** in Columns I and II)

Reactivity Defects	(I) Prior to Shutdown	(II) Expected at Criticality	(III) (II – I) Difference
1. Power (Fig CB-21) (OR Consult RX ENGR)	2040 pcm	0 (zero) pcm	(-) - 2040 pcm
2. Control Rods (Circle Fig. used) (Fig. CB-24A, 24B, 24C OR Consult RX ENGR)	0 pcm	600 pcm	(±) + 600 pcm
3. Xenon (Fig. CB-23)	2606 pcm	0 pcm	(±) - 2606 pcm
4. Samarium (Fig. CB-22)	628 pcm	842 pcm	(±) + 214 pcm
5. Reactivity Change (Sum of 1-4) =			(±) - 3832 pcm

DATA SHEET 1 (continued)

FORM ECP-1

C. Critical Boron Concentration

	(I)	(II)	(III)	(IV)	(V)
	Reactivity Change (B.5)	Differential Boron Worth (Fig. CB-20)	Boron Change (I) ÷ (II)	Boron Conc. at Shutdown	Boron Conc. for Startup (III) + (IV)
1.	(±) **- 3832** pcm	(-) **- 7.4** pcm/ppm	(±) **+518** ppm	**1000** ppm	**1518** ppm
2.		(-) **- 7.05** pcm/ppm	(±) **+544** ppm	**1000** ppm	**1544** ppm

D. Estimated Rod Position Correction

(I)	(II)	(III)	(IV)
Boron Sample	Boron Conc. For Startup C.1.h	Boron Deviation (I) - (II)	Differential Boron Worth (Fig. CB-20)
ppm	ppm	(±) ppm	(–) pcm/ppm

(V)	(VI)	(VII)	(VIII)
Rod Worth Correction (III) × (IV)	Rod Worth Expected At Criticality (B.2)	Corrected Rod Worth Expected At Criticality (V) + (VI)	Corr Critical Rod Pos (Circle Figure used) (Fig CB-24A, 24B, 24C OR Consult RX ENGR)
(±) pcm	pcm	(–) pcm	Steps

Facility:	**BVPS Unit 2**	Task No.:	1300-009-03-023
Task Title:	Review a Gaseous Waste Discharge Authorization	JPM No.:	2005 NRC SRO Admin No. 4
K/A Reference:	2.3.8 (3.2)		

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 or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	The plant is in Mode 1 at 100% power. [2GWS-TK21A], Gaseous Waste Storage Tank is in the process of being released via an RWDA-G. The discharge started two hours ago and is expected to continue for another 28 hours.
Task Standard:	Identify the error contained in a partially completed RWDA-G and correctly calculate a 2-hour bleed flow rate in accordance with 1/2OM-19.4A.B.
Required Materials:	Calculator
General References:	1/2OM-19.4A.B, Unit 2 GW Storage Tk Disch To Unit 1 Atmos Vent, Rev. 12
Handouts:	1/2OM-19.4A.B, Unit 2 GW Storage Tk Disch To Unit 1 Atmos Vent, Rev. 12 (partially completed) 1/2-HPP-3.006.F01, Gaseous Radioactive Waste Discharge Authorization (Partially Completed) 2GWS-TK21A Parameters Table
Initiating Cue:	As the Unit Supervisor, you are to perform a review of the attached RWDA-G to verify that the information entered is correct, and calculate a 2-hour bleed flow rate in accordance with 1/2OM-19.4A.B, Unit 2 GW Storage Tk Disch To Unit 1 Atmos Vent, Step IV.A.20. Report your results when finished.
Time Critical Task:	No
Validation Time:	10 minutes

(Denote Critical Steps with a check mark)

START TIME: _____

Performance Step: 1 Candidate reviews the procedure for completeness.

Standard: Candidate reviews the procedure verifying that the procedure is signed up to Step IV.A.20.

NOTE: This step may be performed at any time during the JPM.

Comment:

√ **Performance Step: 2** Candidate reviews the RWDA-G.

Standard: Candidate reviews the partially completed RWDA-G for required data entry and completeness.

Standard: (Step IV.A.8 Note) Candidate determines the **Discharge Start** date exceeds the 72-hour limit.

CUE: Inform the Candidate that Chemistry will obtain a confirmatory sample and to continue with the JPM.

Comment:

Performance Step: 3 Candidate obtains required data for 2-hour bleed flow rate.

Standard: Candidate reviews the Data Sheet to obtain the current gaseous waste storage tank pressure and time.

Comment:

√ **Performance Step: 4** Calculate 2-hour bleed flow rate.

(Step IV.A.20.a)

Standard: Candidate determines the discharge flow rate = 1.53 scfm as follows:

$$Bleed\ Flow\ Rate\ (SCFM) = \frac{(132cu.\ ft.)(55.0-34.5)(1)}{(14.7\ psi)(120-0)} = 1.53$$

Comment:

√ **Performance Step: 5** Verify bleed flow rate is within limits.

Standard: Candidate verifies the calculated value is less than the RWDA-G limit of 2 scfm.

NOTE: The JPM may be stopped at this point.

Comment:

Terminating Cue:	When the Candidate verifies the bleed flow rate is within limits, the evaluation for this JPM is complete.

STOP TIME: _____

JPM No.: 2005 NRC SRO No. 4

Examinee's Name:

Examiner's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:_____

_____

_____

Response:_____

_____

_____

_____

Result: Satisfactory/Unsatisfactory

Examiner's Signature: _____ Date: _____

INITIAL CONDITIONS: The plant is in Mode 1 at 100% power. [2GWS-TK21A], Gaseous Waste Storage Tank is in the process of being released via an RWDA-G. The discharge started two hours ago and is expected to continue for another 28 hours.

INITIATING CUE: As the Unit Supervisor, you are to perform a review of the attached RWDA-G to verify that the information entered is correct, and calculate a 2-hour bleed flow rate in accordance with 1/2OM-19.4A.B, Unit 2 GW Storage Tk Disch To Unit 1 Atmos Vent, Step IV.A.20. Report your results when finished.

1/2-HPP-3.06.006.F01

RTL A9.520B
RWDA-G-00811

BEAVER VALLEY POWER STATION- 2
GASEOUS
Radioactive Waste Discharge Authorization

This permit authorizes the discharge of 495. cu.ft. (55.0 psig) of gaseous radioactivity at a maximum undiluted discharge rate of 2 cfm from gaseous waste decay tank: 2GWS-TK21A to the environment via the process vent.

Monitor alarm setpoints shall be adjusted to the default values shown below on this permit. This permit valid until: 27-FEB-05 14:00

Monitor Alarms Adjusted	(cpm)	HI-HI	HI	Prerequisites of ODCM 1/2-ODC-3.03 Table 3.3-13 met
HI H.P. INIT HI-HI H.P. INIT	RM-GW-108B	2.36E+05	1.18E+05	INIT H.P.
	RM-GW-109(5)	3.60E+05	1.20E+05	

Prepared By	Reviewed By	Chemistry Notified
J. Hall 2-25-05	K. York 2-25-05	B. Furdak 2-25-05
RT Signature Date	RP Supervision Sig Date	Chemist Signature Date
Sample ID TEST	Approved By	Approved By
Sample Date/Time: 24-FEB-05 14:00	A. Hartner 2-25-05	B. Sommer 2-25-05
	U1 Shift Mngr Sig Date	U2 Shift Mngr Sig Date

Discharge Record

Discharge Start							Discharge Stop						
mo	dy	yr	hr	mn	psig/psia	init	mo	dy	yr	hr	mn	psig/psia	init
02	28	05	16	30	55.0	RO							

Monitor Alarms Reset	(cpm)	HI-HI	HI	Total Discharge
HI INIT HI-HI INIT	RM-GW-108B	3.60E+05	1.20E+05	_____ minutes
	RM-GW-109(5)	3.60E+05	1.20E+05	

Reviewed By	Reviewed By	Post Review
U1 Shift Mngr Sig Date	U2 Shift Mngr Sig Date	Signature Date

2GWS-TK21A Parameters Table

TIME	2GWS-TK21A PRESSURE (2GWS-PR125)
0	55.0 psig
60	44.8 psig
120	34.5 psig

Beaver Valley Power Station

Unit 1/2

1/2OM-19.4A.B

Unit 2 GW Storage Tk Disch To Unit 1 Atmos Vent

Revision 12

Prepared by **D. A. Kirk**	Date **10/26/02**	Pages Issued **1 through 18**	
Reviewed by **R. C. Plummer**	Date **10/29/02**	Validated by **N/A**	Date
PORC Meeting No. **PORC Not Required**	Date	**PAF-02-04210**	

FOR TRAINING USE ONLY

I. PURPOSE

To provide instructions for discharging the contents of Unit 2 Gaseous Waste Storage Tank to the Unit 1 Atmospheric Vent. One copy of this procedure will be used by Operators at both Unit 1 and Unit 2 to ensure continuous administrative control throughout the evolution. This procedure is written to be started by an operator at Unit 2.

II. PRECAUTIONS

A. Do **NOT** operate a unit cross connect isolation valve without first coordinating the activity with the Unit 1/2 Control Room.

B. Each step of this procedure must be performed in sequence with all preceding steps signed off as a prerequisite for the next step unless the SM/US at both units give permission to deviate.

C. Do **NOT** have more than one Gaseous Waste Storage Tank(s) permit being discharged at a time.

D. Do **NOT** discharge a gaseous waste storage tank until chemistry notification is complete.

E. The maximum calculated bleed flow rate should **NOT** exceed 2 CFM.

F. Ensure that the activity discharge rate to the atmospheric vent does **NOT** exceed the limit specified in the discharge permit.

G. Do **NOT** discharge a Unit 2 Gaseous Waste Storage Tank that is being filled.

III. INITIAL CONDITIONS

A. The SM/US at Unit 2 has given permission to perform this procedure.

Unit 2 ___*SM* / *Today*___
SM / US

B. The Control Room Operator at Unit 2 has notified the Control Room Operator at Unit 1 of the intent to discharge the contents of a Unit 2 Gaseous Waste Storage Tank.

Unit 2 ___*RO*___
Initial

C. Personnel are available to periodically monitor storage tank pressure at the Gaseous Waste Storage Tank Panel [PNL-2GWSTP].

Unit 2 ___*RO*___
Initial

D. The SM/US at Unit 1 has given permission to perform this procedure.

Unit 1 ___*SM*___
Initial

E. The meteorological instrumentation required by Unit 2 Licensing Requirement Manual 3.3 Meteorological Monitoring Instrumentation LR 3.3 is operable.

Unit 1 ___*SM*___
Initial

F. The applicable radioactive gaseous effluent monitoring instrumentation channels specified by 1/2-ODC-3.03, ODCM: "Controls For RETS and REMP Programs", Attachment F, 3.3.3.10 is operable **OR** the applicable action statement has been met.

Unit 1 ___*SM*___
Initial

G. The maximum process vent system flowrate should **NOT** exceed 1450 CFM on [FR-1GW-108].

Unit 1 ___*RO*___
Initial

Note:	The Radiation Technician must enter the Control Room to adjust the alarm setpoints on the analog instrument as required by the RWDA-G and initial it.

H. Radiation Protection has been contacted to adjust the HI and HI-HI alarm setpoints.

Unit 1 ___*RO*___
Initial

Note:	The SM's **OR** US's at Unit 1 **AND** Unit 2 signatures denotes approval for discharge, that only one batch RWDA-G is being discharged at one time, and the appropriate alarms have been adjusted.

I. A gaseous waste discharge permit (Radioactive Waste Discharge Authorization Gas-RWDA) has been obtained **AND** the SM's **OR** US's at Unit 1 and Unit 2 have signed and dated the RWDA-G at the PRE (discharge authorization block).

Unit 1 ___*SM* / *Today*___
SM / US

Unit 2 ___*SM* / *Today*___
SM / US

Note:	Notifying Chemistry will enable the chemist to obtain the appropriate tritium sample. The chemist will sign and date the RWDA-G at PRE (discharge authorization block) for verification of this notification.

J. The US **OR** the Operator has notified the chemist of the intent to discharge the gaseous waste storage tank.

Unit 2 ***RO***
Initial

IV. INSTRUCTIONS

A. Procedure

CAUTION:	DO **NOT** HAVE MORE THAN ONE GASEOUS WASTE STORAGE TANK(S) PERMIT BEING DISCHARGED AT A TIME.

1. Check that the high and high-high setpoints on [RIS-GW-108B] agree with the setpoint in the Radiation Monitor Setpoint Log.

Unit 1 ___*RO*___
Initial

2. Perform a channel check **AND** source check of [RM-1GW-108B].

Unit 1 ___*RO*___
Initial

   a. Perform a channel check of [FR-1GW-108].

Unit 1 ___*RO*___
Initial

3. Hand carry this procedure to the Control Room Operator at Unit 2.

Unit 1 ___*RO*___
Initial

4. Mark the date, time, RWDA-G authorization number, and Operator's initials on [2GWS-PR125] at the beginning of the discharge.

Unit 2 ___*RO*___
Initial

   a. If [2GWS-PR125] is unavailable, monitor pressure using Control Room computer trend. (Otherwise N/A)

Unit 1 ___*N/A*___
Initial

5. Hand carry this procedure to the Control Room Operator at Unit 1.

Unit 2 ___*RO*___
Initial

6. Check closed [FCV-1GW-105] Decay Tank Bleed Control Valve by checking [AM-1GW-105] in MANUAL with output at 0%.

Unit 1 ___*RO*___
Initial

7. After receiving concurrence of transfer from the Operator at Unit 2, open [1GW-276] Unit 2 Isolation to GW Decay Tanks Discharge header. (Unit 1 Decay Tank Valve Room)

Unit 1 ___*RO*___
Initial

8. Hand carry this procedure to the Control Room operator at Unit 2.

Unit 1 ___*RO*___
Initial

Note:	An approved RWDA-G is effective for 72 hours from the sample time.

9. Record the date, time, gaseous waste storage tank pressure in PSIG, and Operator initials on the RWDA-G at the beginning of each discharge.

Unit 2 ___*RO*___
Initial

   a. If a discharge is not initiated within the allowable period, have a confirmatory sample analyzed to extend the effective period of the authorization. (Otherwise N/A)

Unit 2 ___*RO*___
Initial

10. Open the outlet valve [2GWS-SOV125A2-G2] at [PNL-2GWSTP] for the Gaseous Waste Storage tank being discharged.

Unit 2 ___*RO*___
Initial

11. Open [2GWS-AOV105], Gaseous Waste Storage Tank Outlet Header Isol Vlv, by placing its control switch to the OPEN position, Benchboard-Section A.

Unit 2 ___*RO*___
Initial

Note:	In conducting his review, the SM **OR** US shall consider the correct source selection, radiation monitor setpoints, radiation monitor setpoint checks, dilution flow, RWDA-G in use, procedure in use, boundary valve alignment, Chemistry notification, Radiation Protection notification, intended discharge rate and proper documentation to the current step.[4]

12. Prior to INITIATION of all radioactive waste discharges, request that the SM **OR** US review the steps and alignments conducted to this point and authorize the INITIATION of discharge.[4]

RO
Initial

13. Hand carry this procedure to the Control Room Operator at Unit 1.

Unit 2 ***RO***
Initial

14. Open the discharge header trip valve [TV-1GW-103] Benchboard-Section A.

Unit 1 ***RO***
Initial

15. Mark the date, time, RWDA-G authorization number, and Operator's initials on [1RR-200], Radiation Monitor Level Recorder at the beginning of the discharge.

Unit 1 ***RO***
Initial

Note:	Pressure in the Gaseous Waste Storage Tank being discharged must be monitored periodically during the discharge.

16. Slowly open [FCV-1GW-105] Decay Tank Bleed Control Valve, by placing [AM-1GW-105] to MANUAL **AND**, if the maximum bleed flow rate specified in the discharge permit is:

    a. < 2 cfm, verify [FR-1GW-105], GW Decay Tank Flow to Injector, remains on-scale **AND** less than this limit.

    b. ≥ 2 cfm, raise output to 100%.

Unit 1 ***RO***
Initial

17. Notify the Unit 1 Chemist that the gaseous waste discharge is starting.

Unit 1 ***RO***
Initial

18. Hand carry this procedure to the Control Room Operator at Unit 2.

Unit 1 ___*RO*___
Initial

19. Verify [2GWS-PR125] Gaseous Waste Storage Tank pressure decrease for the tank being discharged.

Unit 2 ___*RO*___
Initial

a. If [2GWS-PR125] is unavailable, monitor pressure using Control Room computer trend. (Otherwise N/A)

Unit 2 ___*N/A*___
Initial

20. Two hours after the discharge has been initiated, perform the following steps:

a. Confirm the bleed flow rate using the following equation:

$$Bleed\ Flow\ Rate\ (SCFM) = \frac{(132cu.\ ft.)(Pi - Pf)(No.\ of\ Tanks\ being\ discharged)}{(14.7\ psi)(Tf - Ti)}$$

Unit 2 _____
Initial

Pi = Initial Gaseous Waste Storage Tank pressure in PSIG from [2GWS-PR125] **OR** if [2GWS-PR125] is unavailable, pressure from Control Room computer trend.

Pf = Current Gaseous Waste Storage Tank pressure in PSIG from [2GWS-PR125] **OR** if [2GWS-PR125] is unavailable, pressure from Control Room computer trend.

Ti = Time the discharge started

Tf = Current time

(Tf-Ti) shall have units of minutes

b. Contact the Shift Chemist **AND** Verify that proper tritium sampling has been completed.

Unit 2 _____
Initial

1) If a proper tritium sample has **NOT** been obtained, stop the discharge **AND** do **NOT** reinitiate until a Chemist is prepared to obtain the sample. (Otherwise N/A)

Unit 2 _____
Initial

c. If the bleed flow rate exceeds 2 SCFM, **THEN** Stop the discharge by performing Steps IV.A.21 and IV.A.22 **AND** Notify Radiation Protection of the problem. (Otherwise N/A)

Unit 2 _____
Initial

21. Hand carry this procedure to the Control Room Operator at Unit 1.

Unit 2 _____
Initial

Note:	If [2GWS-PR125] is unavailable, pressure may be monitored using Control Room computer trend.

22. To terminate the discharge when [2GWS-PR125] Gaseous Waste Storage Tank pressure has decreased sufficiently (must remain above 2 PSIG) **OR** to stop the discharge temporarily (such as but **NOT** limited to meteorological conditions becoming unfavorable), perform the following:

a. Close [FCV-1GW-105] Decay Tank Bleed Control Valve by placing [AM-1GW-105] to MANUAL and set output at 0%.

Unit 1 _____
Initial

b. Close [TV-1GW-103] Decay Tank Header to cooling tower.

Unit 1 _____
Initial

c. Close [1GW-276] Unit 2 Isolation to GW Decay Tanks discharge header.

Unit 1 _____
Initial

d. Mark the date, time RWDA-G authorization number and Operators initials on [1RR-200], Radiation Monitor Level Recorder.

Unit 1 _____
Initial

e. Hand carry this procedure to the Control Room Operator at Unit 2.

Unit 1 _____
Initial

f. Close [2GWS-AOV105], Gaseous Waste Storage Tank Outlet Header Isol Vlv.

Unit 2 _____
Initial

g. Mark the date, time, RWDA-G authorization number and Operators initials on [2GWS-PR125].

Unit 2 _____
Initial

h. Record the date, time, Gaseous Waste Storage Tank pressure in PSIG, and Operators initial on the RWDA-G.

Unit 2 _____
Initial

23. If the discharge is to be restarted, perform Attachment 1, (Continuation of gaseous waste discharge). (N/A if no further discharge is required)

a. Commence first continuation of gaseous discharge.

Unit 2 _____
Initial

b. Commence second continuation of gaseous discharge.

Unit 2 _____
Initial

c. Commence third continuation of gaseous discharge.

Unit 2 _____
Initial

24. When the discharge is to be terminated, Close [2GWS-SOV125A2 (125B2)(125C2)(125D2)(125E2)(125F2)(125G2), Gaseous Waste Storage Tank Outlet Isolation.

Unit 2 _____
Initial

25. Determine the Total Discharge Time in minutes and record on the RWDA-G.

Unit 2 _____
Initial

26. Notify Radiation Protection to reset the HI and HI-HI alarm setpoints.

Unit 2 _____
Initial

Note:	The SM **OR** US at Unit 1 **AND** the SM **OR** US at Unit 2 signatures denotes that only one batch RWDA-G was discharged at one time and that the appropriate alarms have been reset.

27. The SM **OR** US at Unit 1 **AND** the SM **OR** US at Unit 2 shall review the RWDA-G to confirm that the data entered by the Operator is complete and correct and sign and date the RWDA-G at POST Review.

Unit 1 _____/_____
SM / US

Unit 2 _____/_____
SM / US

B. <u>Procedure Completion</u>

1. Notify the SM/US at Unit 1 **AND** Unit 2 of the completion of this procedure.

Performed By _____/_____

Verified BY _____/_____

Reviewed By _____/_____
SM/US

Forward the completed copy of procedure to Document Control via the Operations Clerk/s daily transmittal.

Facility:	**BVPS Unit 2**	Task No.:	1350-004-03-023 1350-007-03-023
Task Title:	Classify an Event and Determine Protective Action Recommendations	JPM No.:	2005 NRC SRO Admin No. 5
K/A Reference:	2.4.40 (4.0)		

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 or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions: The Unit was operating at 100% power for 160 days on-line when the following occurred:

- EDG 2-1 was 12 hours into a maintenance outage to replace the motor driven fuel oil pump and not expected to return for another 16 hours.
- A lightning strike in the switchyard resulted in a loss of offsite power and a reactor trip.
- [ACB 2F10], 2-2 Emerg Gen Output Breaker tripped on overcurrent de-energizing the 4KV 2DF Bus.
- 30 minutes into the event, PSMS displayed the 5 hottest CETs at greater than 730°F and RVLIS Full Range at 30%.
- No 4KV emergency power is expected for at least another 2 hours.
- ~~A RELEASE TRANSPORT WILL SPAC SOMTHIST~~ SO

Task Standard: Correctly classify an emergency event using EPP/I-1b and determine Protective Action Recommendations in accordance with 1/2-EPP-IP-4.1.

Required Materials: NONE

General References: EPP/I-1b, Recognition And Classification of Emergency Conditions, Rev. 5
1/2-EPP-IP-4.1, Offsite Protective Actions, Rev. 18

Handouts: EPP/I-1b, Recognition And Classification of Emergency Conditions, Rev. 5
1/2-EPP-IP-4.1, Offsite Protective Actions, Rev. 18

Initiating Cue: As the Emergency Director, you are to evaluate the given plant conditions and determine the emergency classification in accordance with EPP/1-1b, Recognition And Classification of Emergency Conditions. Report your results when finished.

Time Critical Task: **YES**

Validation Time: 12 minutes

(Denote Critical Steps with a check mark)

START TIME: _____

NOTE:	**Provide the Candidate with the first set of Initial Conditions and a copy of the EAL's.**

√ **Performance Step: 1** Correctly classify the emergency event

Standard: Candidate classifies the event based on Tab 3.1, Loss of AC (Power Ops) as a General Emergency using the following criteria:

- AE and DF 4KV emergency buses NOT energized from Unit 1 sources for > 15 minutes, and
- Five hottest CETs > 719F with no RCPs running and RVLIS full range < 40%

NOTE: **If the Candidate does NOT correctly classify the event, then stop the JPM at this point.**

NOTE: **This JPM is conducted in two (2) parts. Once the Candidate determines the correct emergency classification, then administer the PAR section of the JPM. Each section is allotted 15 minutes to complete.**

CUE: **Inform the Candidate that the Initial Notification Form will NOT be completed at this time.**

Comment:

NOTE:	**Provide the Candidate with the second set of Initial Conditions and a copy of 1/2-EPP-IP-4.1, Offsite Protective Actions.**

Performance Step: 2 Locate Offsite Protective Action Recommendation Flowchart

Standard: Candidate refers to 1/2-EPP-IP-4.1, Attachment A, Offsite Protective Action Recommendation Flowchart.

Comment:

Performance Step: 3 Determine offsite protective action

Standard: Candidate navigates PAR flow chart as follows:

- General Emergency already declared (↓)
- Met data provided in Initial Conditions (↓)
- None of the following are TRUE (↓):
  - 35' wind speed LESS than 2 MPH (or unavailable)?
  - Is either 150' or 500' wind directions unavailable?
  - The difference between the 150' & 500' wind directions is ≥ 165 and ≤ 195 degrees? (opposite wind directions) or unavailable?
  - Release (other than a non-routine minor release below Federally approved operating limits or wholly comprised of tritium) has started or is imminent. (within one hour)
  - Release transport will span sunrise or sunset hours. – YES
- Dose projection results available (FSAR, monitor data, etc.)? – YES (→).
- Projected dose at EAB >1 REM TEDE or > 5 REM CDE – YES (→)
- TEDE is less than 10 REM at EAB – NO (↓)
- Projected dose at 5 miles: > 1 REM TEDE or > 5 REM CDE – NO (↓)
- Projected dose at 2 miles: > 1 REM TEDE or > 5 REM CDE – YES (→)

Comment:

√ **Performance Step: 4** Determine Offsite Protective Action Recommendations

Standard: Candidate determines the following PAR's:

- Evacuate 2 miles, 360 degrees, and
- Evacuate 5 mile downwind wedge, and
- Shelter the remainder of 10 mile EPZ, and
- Advise the general public to administer KI

Comment: EVACUATE 0-5 MILES 360° + SHELTER REMAINDER OF 10 mile EPZ + ADVISE G.P. TO ADMINISTER KI I.A.W. THE STATE PLAN

√ **Performance Step: 5** Determine downwind wedge.

Standard: Candidate determines that the 150' elevation downwind sectors are "CDEFG".

Standard: Candidate determines that the 500' elevation downwind sectors are "DEFGH".

Standard: Candidate determines that the combined sectors are "**CDEFGH**".

CUE: **Inform the Candidate that the Initial Notification Form will NOT be completed at this time.**

Comment:

Terminating Cue: When the candidate completes the Protective Action Recommendation, the evaluation for this JPM is complete.

STOP TIME: _____

Job Performance Measure No.: 2005 NRC SRO No. 5

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:
(Emergency Classification)

The Unit was operating at 100% power for 160 days on-line when the following occurred:

- EDG 2-1 was 12 hours into a maintenance outage to replace the motor driven fuel oil pump and not expected to return for another 16 hours.
- A lightning strike in the switchyard resulted in a loss of offsite power and a reactor trip.
- [ACB 2F10], 2-2 Emerg Gen Output Breaker tripped on overcurrent de-energizing the 4KV 2DF Bus.
- 30 minutes into the event, PSMS displayed the 5 hottest CETs at greater than 730°F and RVLIS Full Range at 30%.
- No 4KV emergency power is expected for at least another 2 hours.

INITIATING CUE:

As the Emergency Director, you are to evaluate the given plant conditions and determine the emergency classification in accordance with EPP/1-1b, Recognition And Classification of Emergency Conditions. Report your results when finished.

INITIAL CONDITIONS:

(Protective Action Recommendations)

A General Emergency has been declared at Unit 2 following a small break LOCA and the loss of all 4KV emergency power.

The following plant conditions exist:

- 35' wind direction is from 270° at 4 MPH.
- 150' wind direction is from 270° at 11 MPH.
- 500' wind direction is from 285° at 15 MPH.
- No radioactive release has occurred or is anticipated.
- Health Physics has provided the following dose projections:

  At the EAB: 11 REM TEDE; 8 REM CDE

  At 5 miles: 0.9 REM TEDE, 2.5 REM CDE

  At 2 miles: 1.5 REM TEDE; 4 REM CDE

• RELEASE TRANSPORT WILL SPAN SUNRISE

INITIATING CUE:

You are the Emergency Director and the TSC/EOF have **NOT** yet been activated. You are to evaluate the above conditions and determine which, if any, offsite Protective Action Recommendations are necessary.

FISSION PRODUCT BARRIER MATRIX (Modes 1-4)

1

1.1 Fuel Clad (RCS activity, corecooling, heat sink)
1.2 RCS *(Integrity, SGTR, heat sink)*
1.3 Containment *(CNMT Red Path, CNMT bypass)*

SYSTEM DEGRADATION

2

2.1 Loss of Instrumentation
2.2 Loss of Function/Comm's
2.3 Failure of Rx Prot.-ATWS
2.4 Fuel Clad Degradation
2.5 RCS Unident Leakage
2.6 RCS Ident. Leakage
2.7 Technical Specification S/D
2.8 Safety Limit Exceeded
2.9 Turbine Failure
2.10 Stm/Feed Line Break

LOSS OF POWER

3

3.1 Loss of AC (Power Ops) *(Modes 1-4)*
3.2 Loss of AC (Shutdown) *(Modes 5 & 6)*
3.3 Loss of DC

HAZARDS and ED JUDGEMENT

4

4.1 Fire
4.2 Explosion
Table 4-1
Figure 4-A
4.3 Flammable Gas
4.4 Toxic Gas
Table 4-2
Figure 4-B/Figure 4-C
4.5 Control Room Evacuation
4.6 Security
4.7 ED Judgement
Table 4-3/Table 4-4

DESTRUCTIVE PHENOMENA

5

5.1 Earthquake
5.2 Tornado/High Winds
Table 5-1
Figure 5-A
5.3 Aircraft Crash/Projectile
5.4 River Level High
5.5 River Level Low
5.6 Watercraft Crash (RW/SWS Loss)

SHUTDOWN SYSTEM DEGRADATION

6

6.1 Loss of Shutdown Systems
6.2 RCS Inventory-Shutdown
6.3 Loss of AC (Shutdown) *(Modes 5 & 6)*
6.4 Loss of DC (Shutdown) *(Modes 5 & 6)*
6.5 Fuel Handling *(All Modes)*
6.6 Inadvertent Criticality

RADIOLOGICAL

7

7.1 Gaseous Effluent
7.2 Liquid Effluent
Table 7-1
Figure 7-A
7.3 Radiation Levels
7.4 Fuel Handling (All Modes)
Table 7-2

	3.1 Loss of AC (Power Ops)		3.2 Loss of AC (Shutdown)	
	Mode	**Criterion** / Indicator	Mode	**Criterion** / Indicator
GENERAL	1 2 3 4	**Prolonged loss of offsite <u>and</u> onsite AC power** *[1 and 2]* 1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for >15 minutes 2. *[a or b or c]* a. Ops personnel report CSF status tree **RED PATH <u>or</u> ORANGE PATH** terminus exists for core cooling b. Restoration of either AE <u>or</u> DF 4KV emergency bus is NOT likely from any source within 4 hours of loss c. Three max core exit thermocouples >1200 F <u>or</u> three max core exit thermocouples >729 F with no RCPs running <u>and</u> RVLIS full range <40%		*Refer to Tab 6 "Shutdown System Degradation"*
SITE AREA	1 2 3 4	**Loss of offsite <u>and</u> onsite AC power for >15 minutes** 1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for >15 minutes		*Refer to Tab 6 "Shutdown System Degradation"*
ALERT	1 2 3 4	**AC power to emergency buses reduced to a single source of power such that any additional failure will result in the de-energization of both buses** *[1 and 2]* 1. Either AE <u>or</u> DF 4KV emergency bus is de-energized for >15 minutes 2. The energized AE <u>or</u> DF 4KV emergency bus has only one source of power *[a or b]* a. Emergency diesel generator b. 2A <u>or</u> 2D 4KV normal bus	5 6 De-fuel	**UNPLANNED loss of offsite <u>and</u> onsite AC power for >15 minutes** 1. AE <u>and</u> DF 4KV emergency buses <u>NOT</u> energized from Unit 2 sources for >15 minutes *Also Refer to Tab 6 "Shutdown System Degradation"*
UNUSUAL EVENT	1 2 3 4	**Loss of offsite power supply for >15 minutes** *[1 and 2]* 1. Offsite power supply to AE and DF 4KV buses unavailable for >15 minutes. 2. Each diesel generator is supplying power to its respective emergency bus	5 6 De-fuel	**UNPLANNED loss of offsite power supply for >15 minutes** *[1 and 2]* 1. Offsite power supply to AE and DF 4KV buses unavailable for >15 minutes. 2. Either diesel generator is supplying power to its respective emergency bus

LOSS OF POWER - U2

3.3 Loss of DC Power

Mode	Criterion / Indicator	
	Refer to Tab 1 "Fission Product Barrier Matrix" and Tab 2.2 "Loss of Function", and Tab 6.1 "Loss of Shutdown Systems"	GENERAL
1 2 3 4	**Loss of all vital DC power for >15 minutes** 1. Voltage <110.4 VDC on DC buses 2-1 <u>and</u> 2-2 <u>and</u> 2-3 <u>and</u> 2-4 for >15 minutes *Also Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"*	SITE AREA
	Refer to Tab 1 "Fission Product Barrier Matrix", Tab 2.2 "Loss of Function", and Tab 2.1 "Loss of Instrumentation" and Tab 6.1 "Loss of Shutdown Systems"	ALERT
1 2 3 4	**UNPLANNED loss of one train of DC power for >15 minutes** *[1 or 2]* 1. Voltage <110.4 VDC on DC Buses 2-1 <u>and</u> 2-3 for >15 minutes 2. Voltage <110.4 VDC on DC buses 2-2 <u>and</u> 2-4 for >15 minutes *Refer to Tab 6.4 "Loss of DC (Shutdown)" for modes 5, 6, and defueled*	UNUSUAL EVENT

3.1, 3.2, 3.3

OFFSITE PROTECTIVE ACTION

GENERAL EMERGENCY DECLARATION

Obtain the following information:

1) 35' wind speed _____ MPH
2) 150' wind direction _____ degrees
3) 500' wind direction _____ degrees

IS AT LEAST ONE OF THE FOLLOWING TRUE?

- 35' wind speed LESS than 2 MPH (or unavailable)?
- Is either the 150' **or** 500' wind directions unavailable?
- The difference between the 150' and 500' wind directions is ≥ 165 and ≤ 195 degrees? (opposite wind directions) or unavailable?
- Release (other than a non-routine minor release below Federally approved operating limits or wholly comprised of tritium) has started **or** is imminent. (within one hour)
- Release transport will span sunrise **or** sunset hours.

TSC/EOF ONLY:

- NWS forecast indicates a weather front (Wind speed increased by more than 20%, or, wind direction changes by more than one sector, or, stability class changes one or more classes towards stable (e.g., ABC to D, E to FG, etc.) will pass thru EPZ during release transport.

YES

Dose projection results available (FSAR, monitor data, etc.)?

YES

Projected dose at **EAB** >1 REM TEDE or >5 REM CDE

YES

NO

NO

Recommend EVACUATE 0-5 miles, 360 degrees **AND** SHELTER the remainder of the 10 mile EPZ **AND** advise the general public to administer KI in accordance with the State Plan.
(Minimum Recommendation)

Continue assessments. Expand the affected area if subsequent assessments, including the results of field measurements, indicates the need. *If a new Upgraded PAR is identified, an Initial Notification Form SHALL be completed and appropriate offsite agencies notified within 15 minutes (this does not change the emergency classification status).*

NO

Dose projection results available (FSAR, monitor data, etc.)?

YES

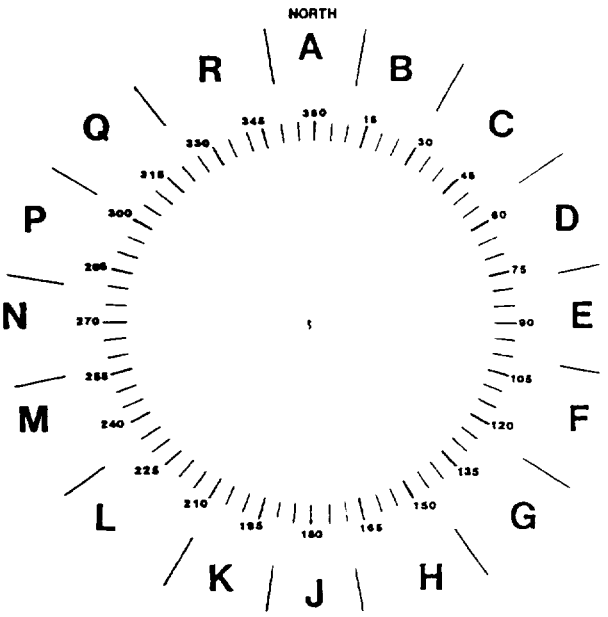
Projected dose at **EAB** >1 REM TEDE or >5 REM CDE

YES

NO

NO

Recommend EVACUATE 2 miles, 360 degrees and **5 mile** downwind wedge **AND** SHELTER the remainder of the 10 mile EPZ. **AND** advise the general public to administer KI in accordance with the State Plan.
(Minimum Recommendation)



DOWNWIND WEDGE DETERMINATION

1) Obtain 150' and 500' Wind Direction
2) Using each wind direction, determine Sectors per the Chart below
3) Combine Sectors for PAR

Sector	Wind From	Downwind Wedge Sectors
A	350 - 11	GHJKL
B	12 - 34	HJKLM
C	35 - 56	JKLMN
D	57 - 79	KLMNP
E	80 -101	LMNPQ
F	102 -124	MNPQR
G	125 -146	NPQRA
H	147 -169	PQRAB
J	170 -191	QRABC
K	192 -214	RABCD
L	215 -236	ABCDE
M	237 -259	BCDEF
N	260 -281	CDEFG
P	282 -304	DEFGH
Q	305 -326	EFGHJ
R	327 -349	FGHJK

RECOMMENDATION FLOWCHART