Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	Work Hour Limitations – RO Only
JPM NUMBER:	551	REVISION:	2

TASK APPLICABILITY:	☐ SRO	☐ STA	■ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):				
K/A RATINGS:	RO 2.9* SRO 3.9			
K/A STATEMENT:	2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	Admin - Conduct of Operations			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: N/A TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*

(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

neid 1/7/15

Job Performance Measure (JPM)

OPERATOR: _____ JPM Number 551

RO ____ DATE: _____

TASK STANDARD:
Evaluates Schedule and determines that the work hour limit requiring a continuous break of at least 34 hours in any 9 day period is not met. Determines that the schedule needs to be revised or a waiver granted IAW NPG-SPP-03.21.

PRA: NA

REFERENCES/PROCEDURES NEEDED:
NPG-SPP-03.21, Fatigue Management and Work Hour Limits

VALIDATION TIME: 15 Minutes

PERFORMANCE TIME: _____

COMMENTS: _____
_____
_____
_____
_____
_____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

INITIAL CONDITIONS: You are a Reactor Operator.
Unit 1 is operating at 100%, Unit 3 is coming out of a Refuel Outage and startup is planned for tomorrow. Unit 2 has just pulled critical after a forced outage.

You were on Annual Leave Friday 11/07 and Saturday 11/08 but were called in today 11/09 to support the U2 Startup.
You were in compliance with all work hour limits during your last shift cycle.

Below is your proposed work schedule for the 5 week shift cycle starting today.
You are assigned to Unit 2 for this shift cycle.
Assume that you will arrive 30 minutes prior to the start of your shift for shift turnover each work day.

The eSOMS NFR program is not available.

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/09	11/10	11/11	11/12	11/13	11/14	11/15
0700-1900	0700-1900	1900-0700	1900-0700	1900-0700	OFF	0700-1900

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/16	11/17	11/18	11/19	11/20	11/21	11/22
0700-1900	0700-1900	OFF	1900-0700	1900-0700	1900-0700	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/23	11/24	11/25	11/26	11/27	11/28	11/29
OFF	0700-1900	0700-1900	0700-1900	0700-1900	OFF	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/30	12/01	12/02	12/03	12/04	12/05	12/06
OFF	OFF	OFF	OFF	OFF	1900-0700	1900-0700

Sun	Mon	Tues	Wed	Thu	Fri	Sat
12/07	12/08	12/09	12/10	12/11	12/12	12/13
1900-0700	1900-0700	OFF	OFF	OFF	0700-1900	0700-1900

INITIATING CUES: Review the proposed work schedule to verify all work hour limits will be met. If any limits are not met, then identify what administrative measures are required.

START TIME _____

STEP / STANDARD	SAT / UNSAT
Step 1: Applicant reviews proposed schedule against 10CFR26 limits.	
3.2 Requirements	
3.2.1 10 Code of Federal Regulations (CFR) 26 Overtime Limits [R.21]	
A. The following limits apply to covered individuals regardless of unit status [R.22, 23]:	
1. No more than 16 work hours in any 24 hour period	
2. No more than 26 work hours in any 48 hour period	
3. No more than 72 work hours in any 7 day (168 hour) period	
4. At least a 10 hour break between successive work periods.	
5. A continuous break of at least 34 hours in any 9 day (216 hour) period.	**Critical Step**
B. Online Requirements [R.24]	___SAT
1. During online operations and without issuance of a waiver, an individual's required average minimum days off shall adhere to the requirements listed in Table 1 below (averaged over the shift cycle):	___UNSAT ___N/A

Table 1. Required Average Minimum Days Off (MDO) for Various Shift Cycle Schedules

Group	8 Hour Shift	10 Hour Shift	12 Hour Shift
Maintenance	1 day off/week	2 days off/week	2 days off/week
Operations, Radiation Protection, Chemistry, Fire Brigade (Incident Commander)	1 day off/week	2 days off/week	2.5 days off/week
Security	1 day off/week	2 days off/week	3 days off/week

2. For the purposes of calculating an average number of days off, the duration of the shift cycle may not exceed six weeks nor be less than one week.
3. Online rules will be applied for a shift when any portion of the shift where the unit is defined to be online.

STEP / STANDARD	SAT / UNSAT
Step 1 Standard: Evaluates schedule and determines that only the work hour limit requiring a continuous break of at least 34 hours in any 9 day period is not met.	
Step 2: Applicant determines required actions. Standard: Determines that the schedule needs to be revised or a waiver granted.	**Critical Step** ___SAT ___UNSAT ___N/A

STOP TIME _____

END OF TASK

Provide to Applicant

INITIAL CONDITIONS: You are a Reactor Operator.
Unit 1 is operating at 100%, Unit 3 is coming out of a Refuel Outage and startup is planned for tomorrow. Unit 2 has just pulled critical after a forced outage.

You were on Annual Leave Friday 11/07 and Saturday 11/08 but were called in today 11/09 to support the U2 Startup.
You were in compliance with all work hour limits during your last shift cycle.

Below is your proposed work schedule for the 5 week shift cycle starting today.
You are assigned to Unit 2 for this shift cycle.
Assume that you will arrive 30 minutes prior to the start of your shift for shift turnover each work day.

The eSOMS NFR program is not available.

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/09	11/10	11/11	11/12	11/13	11/14	11/15
0700-1900	0700-1900	1900-0700	1900-0700	1900-0700	OFF	0700-1900

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/16	11/17	11/18	11/19	11/20	11/21	11/22
0700-1900	0700-1900	OFF	1900-0700	1900-0700	1900-0700	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/23	11/24	11/25	11/26	11/27	11/28	11/29
OFF	0700-1900	0700-1900	0700-1900	0700-1900	OFF	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/30	12/01	12/02	12/03	12/04	12/05	12/06
OFF	OFF	OFF	OFF	OFF	1900-0700	1900-0700

Sun	Mon	Tues	Wed	Thu	Fri	Sat
12/07	12/08	12/09	12/10	12/11	12/12	12/13
1900-0700	1900-0700	OFF	OFF	OFF	0700-1900	0700-1900

INITIATING CUES: Review the proposed work schedule to verify all work hour limits will be met. If any limits are not met, then identify what administrative measures are required.

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	Work Hour Limitations – SRO Only
JPM NUMBER:	641	REVISION:	1

TASK APPLICABILITY:	■ SRO	☐ STA	☐ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):				
K/A RATINGS:	RO 2.9* SRO 3.9			
K/A STATEMENT:	2.1.5 Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	Admin - Conduct of Operations			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: N/A TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*

(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

rev'd 1/7/15

Job Performance Measure (JPM)

OPERATOR: _____ JPM Number 641

RO ____ DATE: _____

TASK STANDARD:
Evaluates Schedule and determines that the work hour limit requiring a continuous break of at least 34 hours in any 9 day period is not met. Determines that the schedule needs to be revised or a waiver granted IAW NPG-SPP-03.21.

PRA: NA

REFERENCES/PROCEDURES NEEDED:
NPG-SPP-03.21, Fatigue Management and Work Hour Limits

VALIDATION TIME: 20 Minutes

PERFORMANCE TIME: _____

COMMENTS: _____
_____
_____
_____
_____
_____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

INITIAL CONDITIONS: You are a Senior Reactor Operator.
Unit 1 is operating at 100%, Unit 3 is coming out of a Refuel Outage and startup is planned for tomorrow. Unit 2 has just pulled critical after a forced outage.

The BOP operator was on Annual Leave Friday 11/07 and Saturday 11/08 but was called in today 11/09 to support the U2 Startup.
He was in compliance with all work hour limits during his last shift cycle.

Below is his proposed work schedule for the 5 week shift cycle starting today.
He will be assigned to Unit 2 for this shift cycle.
Assume that he will arrive 30 minutes prior to the start of his shift for shift turnover each work day.

The eSOMS NFR program is not available.

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/09	11/10	11/11	11/12	11/13	11/14	11/15
0700-1900	0700-1900	1900-0700	1900-0700	1900-0700	OFF	0700-1900

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/16	11/17	11/18	11/19	11/20	11/21	11/22
0700-1900	0700-1900	OFF	1900-0700	1900-0700	1900-0700	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/23	11/24	11/25	11/26	11/27	11/28	11/29
OFF	0700-1900	0700-1900	0700-1900	0700-1900	OFF	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/30	12/01	12/02	12/03	12/04	12/05	12/06
OFF	OFF	OFF	OFF	OFF	1900-0700	1900-0700

Sun	Mon	Tues	Wed	Thu	Fri	Sat
12/07	12/08	12/09	12/10	12/11	12/12	12/13
1900-0700	1900-0700	OFF	OFF	OFF	0700-1900	0700-1900

INITIATING CUES: Review the proposed work schedule to verify all work hour limits will be met. If any limits are not met, then identify what administrative measures are required.

START TIME _____

STEP / STANDARD	SAT / UNSAT
Step 1: Applicant reviews proposed schedule against 10CFR26 limits	
3.2 Requirements	
3.2.1 10 Code of Federal Regulations (CFR) 26 Overtime Limits [R.21]	
A. The following limits apply to covered individuals regardless of unit status [R.22, 23]:	
1. No more than 16 work hours in any 24 hour period	
2. No more than 26 work hours in any 48 hour period	
3. No more than 72 work hours in any 7 day (168 hour) period	
4. At least a 10 hour break between successive work periods.	
5. A continuous break of at least 34 hours in any 9 day (216 hour) period.	**Critical Step**
B. Online Requirements [R.24]	___SAT
1. During online operations and without issuance of a waiver, an individual's required average minimum days off shall adhere to the requirements listed in Table 1 below (averaged over the shift cycle):	___UNSAT ___N/A

Table 1. Required Average Minimum Days Off (MDO) for Various Shift Cycle Schedules

Group	8 Hour Shift	10 Hour Shift	12 Hour Shift
Maintenance	1 day off/week	2 days off/week	2 days off/week
Operations, Radiation Protection, Chemistry, Fire Brigade (Incident Commander)	1 day off/week	2 days off/week	2.5 days off/week
Security	1 day off/week	2 days off/week	3 days off/week

2. For the purposes of calculating an average number of days off, the duration of the shift cycle may not exceed six weeks nor be less than one week.
3. Online rules will be applied for a shift when any portion of the shift where the unit is defined to be online.

STEP / STANDARD	SAT / UNSAT
Step 1 Standard: Evaluates Schedule and determines that only the work hour limit requiring a continuous break of at least 34 hours in any 9 day period is not met.	
Step 2: Applicant determines required actions. Standard: Determines that the schedule needs to be revised or a waiver granted.	**Critical Step** ___SAT ___UNSAT ___N/A
CUE: **If the schedule cannot be revised what actions would be required and who must authorize the UO to work the scheduled shifts in accordance with TVA procedures?**	
Step 3: Applicant reviews NPG-SPP-03.21 and determines the required actions and authorizing authority. Standard: Determines that a 10CFR26 Overtime Limits Waiver (attachment 2) and A Fatigue Assessment (attachment 1) must be performed prior to Exceeding overtime limits and that the Site Vice President (SVP) or Senior-level manager with SVP signature authority must approve the Waiver.	**Critical Step** ___SAT ___UNSAT ___N/A

STOP TIME _____

END OF TASK

Provide to Applicant

INITIAL CONDITIONS: You are a Senior Reactor Operator.
Unit 1 is operating at 100%, Unit 3 is coming out of a Refuel Outage and startup is planned for tomorrow. Unit 2 has just pulled critical after a forced outage.

The BOP operator was on Annual Leave Friday 11/07 and Saturday 11/08 but was called in today 11/09 to support the U2 Startup.
He was in compliance with all work hour limits during his last shift cycle.

Below is his proposed work schedule for the 5 week shift cycle starting today.
He will be assigned to Unit 2 for this shift cycle.
Assume that he will arrive 30 minutes prior to the start of his shift for shift turnover each work day.

The eSOMS NFR program is not available.

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/09	11/10	11/11	11/12	11/13	11/14	11/15
0700-1900	0700-1900	1900-0700	1900-0700	1900-0700	OFF	0700-1900

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/16	11/17	11/18	11/19	11/20	11/21	11/22
0700-1900	0700-1900	OFF	1900-0700	1900-0700	1900-0700	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/23	11/24	11/25	11/26	11/27	11/28	11/29
OFF	0700-1900	0700-1900	0700-1900	0700-1900	OFF	OFF

Sun	Mon	Tues	Wed	Thu	Fri	Sat
11/30	12/01	12/02	12/03	12/04	12/05	12/06
OFF	OFF	OFF	OFF	OFF	1900-0700	1900-0700

Sun	Mon	Tues	Wed	Thu	Fri	Sat
12/07	12/08	12/09	12/10	12/11	12/12	12/13
1900-0700	1900-0700	OFF	OFF	OFF	0700-1900	0700-1900

INITIATING CUES: Review the proposed work schedule to verify all work hour limits will be met. If any limits are not met, then identify what administrative measures are required.

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	3-SR-3.4.9.3&4 Reactor Recirculation Pump Start Limitations
JPM NUMBER:	639	REVISION:	0

TASK APPLICABILITY:	■ SRO	☐ STA	■ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):	U-068-SU-04 / Perform Reactor Recirculation Pump Start Limitations SI			
K/A RATINGS:	2.1.20	RO 4.6	SRO 4.6	
K/A STATEMENT:	Ability to interpret and execute procedure steps			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	Admin - Conduct of Operations			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: N/A TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*

(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

Rev 1 1/7/15

Job Performance Measure (JPM)

OPERATOR: _____ JPM Number 639

RO ____ SRO ____ DATE: _____

TASK STANDARD: Upon performing 3-SR-3.4.9.3&4, determine that Recirculation Pump 3A can be started and that Recirculation Pump 3B can NOT be started

PRA: NA

REFERENCES/PROCEDURES NEEDED: 3-SR-3.4.9.3&4 Reactor Recirculation Pump Start Limitations and STS Sheet attached.

VALIDATION TIME: 15 Minutes

PERFORMANCE TIME: _____

COMMENTS: _____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

INITIAL CONDITIONS:

You are the Unit 3 Unit Operator. Unit 3 is in Mode 4 preparing for startup. Forced reactor coolant circulation has been lost. It is required to restore forced circulation. RWCU is in service.

INITIATING CUE:

Perform 3-SR-3.4.9.3&4 Reactor Recirculation Pump Start Limitations.

KEY

Table 1
(Page 1 of 1)
Reactor Recirculation Pump Start Limitations Data

STEP	PARAMETER	Panel NO.	INSTRUMENT **OR** COMPUTER LOG NO.	UNITS
7.0[3]	Recirc Loop A Temp.	Computer Computer Computer 3-9-4	68-6A, Recirc Pmp A Suct Temp **OR** 68-6B, Recirc Pmp A Suct Temp **OR** 68-2, Recirc Pmp A Discharge Temp **OR** 3-XR-68-2/5, 3-TE-68-2 (Point 003) RED - Pump A	**172.2 or 164.4** °F
	Recirc Loop B Temp.	Computer Computer Computer 3-9-4	68-83A, Recirc Pmp B Suct Temp **OR** 68-83B, Recirc Pmp B Suct Temp **OR** 68-78, Recirc Pmp B Discharge Temp **OR** 3-XR-68-2/5, 3-TE-68-78 (Point 004) GRN - Pump B	**160 or 151.8** °F
7.0[4]	Reactor Steam Dome Press.	3-9-5 3-9-5 Computer	3-PI-3-54, Press A **OR** 3-PI-3-61, Press B **OR** 3-54, Reactor Press	**0** psig
7.0[5]	RPV Coolant Temp.	As DETERMINED in Step 7.0[5]		**212** °F
7.0[6]	Reactor Bottom Head Drain Temp.	As DETERMINED in Step 7.0[6]		**123.2** °F
7.0[7] **AND** 7.0[8]	Dome/Drain ΔT ($\leq$145°F)	Step (7.0[5] - 7.0[6])		**88.8** °F(AC)
7.0[9] **AND** 7.0[10]	Dome/Loop ΔT $\leq$50°F [In Mode 2 with **BOTH** pumps **NOT** in operation ($\leq$75°F)]	Step (7.0[5] - 7.0[3])		**39.8 or 47.6** °F(AC) Loop A **52 or 60.2** °F(AC) Loop B

NOTE

Where applicable circle the instrument used. May **N/A EITHER** loop that is **NOT** being started.

START TIME _____

STEP / STANDARD	SAT / UNSAT
Step 1: **7.0 PROCEDURE STEPS** **NOTE** Notification of the US AND UO upon start AND finish of this SR is NOT required since it involves only data recording AND calculations. [1] **VERIFY** that the following initial conditions are satisfied: [1.1] **VERIFY ALL** precautions AND limitations in Section 3.0 have been reviewed. [1.2] **VERIFY ALL** prerequisites listed in Section 4.0 are satisfied. Standard: Reviews P&L's in Section 3.0 Verifies all prerequisites in section 4.0 are satisfied.	___ SAT ___UNSAT ___N/A
Step 2: [2] **RECORD** the start date **AND** time started, reason for test, plant conditions, **AND ANY** pre-test remarks on the Surveillance Task Sheet (STS). Standard: Records the start date, time started on the STS.	___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 3: **NOTE** The following steps are required to be completed within 15 minutes of starting a recirc pump. On occasions where RWCU is out of service, the Bottom Head Drain temperature is required to be obtained using a Contact Pyrometer (Step 7.0[6.2.2]). This is required to be coordinated in advance **AND** the data taker is required to be in place **AND** ready to record the temperature prior to continuing with Step 7.0[3]. [3] **RECORD** Recirc Loop temperature(s) in Table 1 **AND RECORD** the time the Recirc Loop temperature(s) data was taken (**IF** applicable, **THEN N/A** the loop temperature for the loop **NOT** being started). Record time _____ Standard: Records the recirc loop 3A temperature of 172.2 °F and/or 164.4°F in table 1, records recirc loop 3B temperature of 160 °F and/or 151.8°F and records current time.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 4: [4] **RECORD** Reactor Steam Dome pressure in Table 1. Standard: Records Reactor Steam Dome Pressure of 0 psig in Table 1.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 5: [5] **DETERMINE** Reactor Coolant temperature as follows using the first step that satisfies its conditional requirement: (N/A the steps NOT used.): [5.1] **If** the Reactor Coolant System is producing steam, (in a saturated steam condition. Standard: Step 5.1 is NA	___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 6: [5.2] **IF** one Recirculation Loop is in operation **AND** the reactor is **NOT** in Mode 1, **THEN** Standard: Step is N/A.	___ SAT ___UNSAT ___N/A
Step 7: [5.3] **IF** Shutdown Cooling is in service, **THEN** Standard: Step is N/A.	___ SAT ___UNSAT ___N/A
Step 8: [5.4] **IF** the reactor is in cold shutdown at zero pressure with **NO** forced circulation, **THEN RECORD** 212°F in Table 1. Standard: Records 212°F in Table 1.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 9: [6] **DETERMINE** Reactor Bottom Head Drain temperature as follows using **EITHER** step that satisfies its conditional requirement (**N/A** the step **NOT** used): [6.1] **IF** RWCU is in service, **THEN RECORD** 3-TR-56-4, Point 7 (3-TE-56-8) **OR RECORD** Integrated Computer System (ICS) Point 56-8 as the bottom Head Drain temperature in Table 1. Standard: Records Bottom Head Drain temperature of 123.2°F in Table 1 using the Integrated Computer System (ICS) Point 56-8.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 10: [6.2] **IF** RWCU is out of service, or Step [6.1] cannot be performed, **THEN PERFORM** the following (**OTHERWISE, N/A**): Standard: Step is N/A.	___ SAT ___UNSAT ___N/A
Step 11: [7] **CALCULATE** the difference between Bottom Head Coolant temperature AND the RPV Coolant Temperature by **SUBTRACTING** Reactor Bottom Head Drain temperature from RPV coolant temperature **AND RECORD** this value in Table 1. Standard: Subtracts 123.2°F from 212°F and records 88.8°F in Table 1.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 12: [8] **VERIFY** the difference between the Bottom Head Coolant temperature **AND** the RPV Coolant temperature is ≤145°F, **AND RECORD** the time of verification. Record time _____ Standard: Verifies the temperature difference is less than 145°F.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 13: [9] **CALCULATE** the difference between the Coolant temperature in the Recirculation Loop to be started **AND** the RPV Coolant temperature by **SUBTRACTING** the Recirculation Loop to be started from the RPV Coolant temperature **AND RECORD** this value in Table 1. (**N/A the other loop on occasions where only one loop is being started**). Standard: Subtracts recirc loop 3A temperature of either 172.2°F or 164.4°F from 212°F and records 39.8°F or 47.6°F for Loop A and then subtracts loop 3B temperature of either 160°F or 151.8°F from 212°F and records 52°F or 60.2°F for Loop B.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 14: [10] **VERIFY** the difference between the Coolant temperature in the Recirculation Loop to be started the AND the RPV Coolant is ≤50°F. OR In Mode 2 AND Both Recirc Pumps are NOT in operation, the difference may be ≤75°F. Standard: Determines that the **3A** recirc pump can be started **(< 50°F Δ** Temp) and that the **3B** recirc pump can NOT be started **(> 50°F Δ** Temp).	**Critical Step** ___ SAT ___UNSAT ___N/A

STOP TIME _____

END OF TASK

Provide to Applicant

INITIAL CONDITIONS:

You are the Unit 3 Unit Operator. Unit 3 is in Mode 4 preparing for startup. Forced reactor coolant circulation has been lost. It is required to restore forced circulation. RWCU is in service.

INITIATING CUE:

Perform 3-SR-3.4.9.3&4 Reactor Recirculation Pump Start Limitations.

Job Performance Measure (JPM)

Provide to Applicant

SURVEILLANCE TASK SHEET (STS)

Work Order #:	
PM#:	P04284
Procedure:	3-SR-3.4.9.3&4
Title:	Rx Recirc Pump Start Limitations
Data Sheets Attached:	No
Perf Grp:	Operations
Unit:	3
Loop/Div:	Both
Test Reason:	Recirc Pump Start
Due Date:	Today
Frequency:;	See Comments below
Tech Spec:	
ASME XI:	
Applicable Modes:	
Perf Modes:	
Clearance Required:	
EQ:	
LCO Entered:	
Dry-Cask Storage:	

Page1 1 of 1

Senior Operator | Today | Now

Authorization to Begin: SRO | Date | Time

Start Date & Time | Completion Date & Time

Was this a complete or partial performance?
(Explain "Partial" in Remarks) Complete ☒ Partial ☐

Were all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC acceptance criteria satisfied? Yes ☐ No ☐ N/A ☐

Were all other acceptance Criteria satisfied? Yes ☐ No ☐ N/A ☐

Performed By Print Name	Signature	Initial	Section

If all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC criteria were not satisfied, was an LCO /TR / ODCM / OR action required?
(Explain in Remarks)
Service Request #: Yes ☐ No ☐ N/A ☐

Alert Work Control Required? ☐

*PWR only

Subsequent Reviews:

Group:	Signature	Date

Copy of STS sent to Work Control (next business day) _____ / _____
Initials Date

Test Coord/Lead | Date

Acceptance Criteria Review: SRO | Date | Time

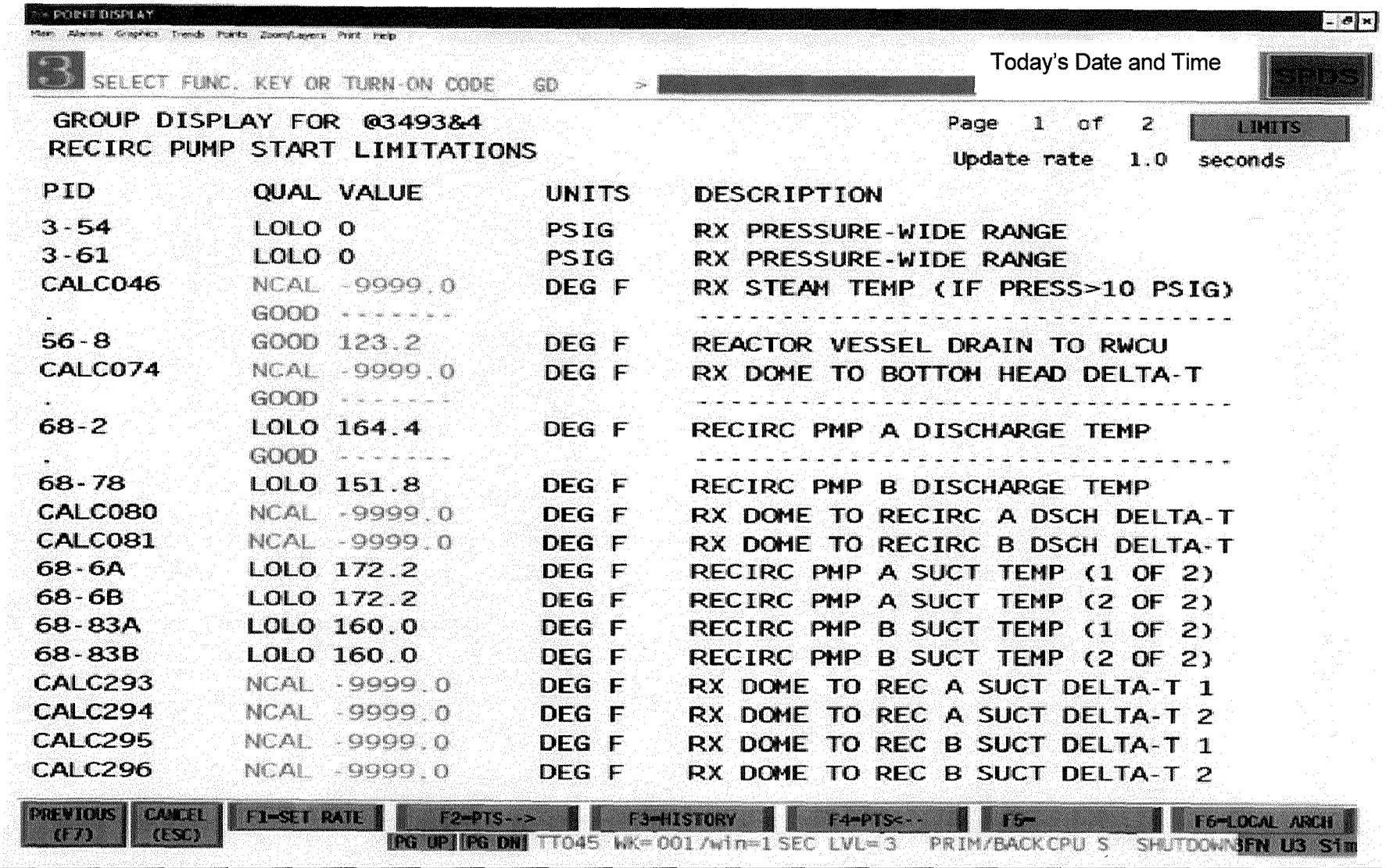
Independent Reviewer | Date | Time

PERMANENT COMMENTS:

Required once within 15 minutes prior to each start up of the Recirc Pumps.

REMARKS:

Provide to Applicant



SURVEILLANCE TASK SHEET (STS)

Work Order #:	
PM#:	P04284
Procedure:	3-SR-3.4.9.3&4
Title:	Rx Recirc Pump Start Limitations
Data Sheets Attached:	No
Perf Grp:	Operations
Unit:	3
Loop/Div:	Both
Test Reason:	
Due Date:	
Frequency:;	
Tech Spec:	
ASME XI:	
Applicable Modes:	
Perf Modes:	
Clearance Required:	
EQ:	
LCO Entered:	
Dry-Cask Storage:	

Page1 1 of 1

Senior Operator | Today | Now

Authorization to Begin: SRO | Date | Time

Start Date & Time | Completion Date & Time

Was this a complete or partial performance?
(Explain "Partial" in Remarks) Complete ☒ Partial ☐

Were all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC acceptance criteria satisfied? Yes ☐ No ☐ N/A ☐

Were all other acceptance Criteria satisfied? Yes ☐ No ☐ N/A ☐

Performed By Print Name	Signature	Initial	Section

If all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC criteria were not satisfied, was an LCO /TR / ODCM / OR action required? (Explain in Remarks) Service Request #: Yes ☐ No ☐ N/A ☐

Alert Work Control Required? ☐

*PWR only

Subsequent Reviews:

Group:	Signature	Date

Copy of STS sent to Work Control (next business day) _____ / _____ Initials / Date

Test Coord/Lead | Date

PERMANENT COMMENTS:

Acceptance Criteria Review: SRO | Date | Time

Independent Reviewer | Date | Time

REMARKS:

Browns Ferry Nuclear Plant

Unit 3

Surveillance Procedure

3-SR-3.4.9.3&4

Reactor Recirculation Pump Start Limitations

Revision 0015

Quality Related

Level of Use: Continuous Use

Effective Date: 08-03-2012

Responsible Organization: PGM, Engineering Program Group

Prepared By: Victor D. Schiavone

Approved By: John E. Colvin

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	1-SI-4.7.A.2.A Primary Containment Nitrogen Consumption and Leakage
JPM NUMBER:	638	REVISION:	0

TASK APPLICABILITY:	■ SRO	☐ STA	■ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):	U-064-SU-05 / Perform Primary Containment Nitrogen Consumption and Leakage SI			
K/A RATINGS:	RO 3.7 SRO 4.1			
K/A STATEMENT:	2.2.12 / Knowledge of surveillance procedures			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	Admin – Equipment Control			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: NA TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*
(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

Revd 1/7/15

Job Performance Measure (JPM)

OPERATOR: _____ JPM Number 638

RO ____ SRO ____ DATE: _____

TASK STANDARD: Perform sections 7.3 through 7.8 of 1-SI-4.7.A.2.A and determines Average Leakage meets the Acceptance Criteria

PRA: NA

REFERENCES/PROCEDURES NEEDED: Procedure 1-SI-4.7.A.2.A

VERIFICATION TIME: 20 Min

PERFORMANCE TIME:

COMMENTS: _____

_____

_____

_____

_____

_____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

****

CLASSROOM:

****

INITIAL CONDITIONS:

You are an Operator. The Unit is at 100% power. The time is 2400 hours on 10/2/2014. 1-SI-4.7.A.2.A, Primary Containment Nitrogen Consumption and Leakage, is in progress.

INITIATING CUE:

The Unit Supervisor (US) directs you to complete 1-SR-4.7.A.2.A, Primary Containment Nitrogen Consumption and Leakage (provided), by incorporating the 10/02/2014, Midnight 24:00 readings (attached) into the appropriate attachments, and determine whether the acceptance criteria is met.

Attachment 1
(Page 1 of 1)

Suppression Chamber Level Correction

KEY **Date** 10/2/14

1.0 SUPPRESSION CHAMBER LEVEL CORRECTION DATA

NOTES

1) If both Instruments are Operable, then calculate the average of BOTH Operable Instruments by Dividing the sum of their SUPPRESSION CHAMBER LEVEL CORRECTION (column 5) by 2 (two) and record as the TOTAL SUPPRESSION CHAMBER LEVEL CORRECTION.

2) If one of the instruments is INOP, then use only the Operable Instrumentation Correction Factor for the TOTAL SUPPRESSION CHAMBER LEVEL CORRECTION.

A. Suppression Chamber Level Correction Data (Section 7.3.1)

	(1)	(2)	(3)	(4)	(5)	
Instrument	Initial Suppr Chbr Level (IN.) (0000 Hours)	Ending Suppr Chbr LEVEL (IN.) (2400 Hours)	Change in Suppr Chbr Level (IN.)	Conversion Factor 909.8 FT^3/IN.	Suppr Chbr Level Correction (FT^3)	UO INIT
1-LI-64-54A	-5.3 -	-5.0 =	-0.3	x 909.8 =	-272.94	UO
1-LI-64-66	-4.0 -	-3.7 =	-0.3	x 909.8 =	-272.94	UO

B. Total Suppression Chamber Level Correction Calculation (Section 7.3.2)

$$\frac{\text{Column 5}(ft^3)\text{ for 1-LI-64-54A} + \text{Column 5}(ft^3)\text{ for 1-LI-64-66}}{2} = \text{Average Suppression Chamber Level}$$

$$\frac{-272.94\ (ft^3)\ (1-LI-64-54A) + -272.94\ (ft^3)\ (1-LI-64-66)}{2} = -272.94\ (ft^3)$$

UO
UO

KEY

Attachment 2
(Page 1 of 1)

Drywell Control Air Leakage

KEY **Date** 10/2/14

A. Drywell Control Air Leakage (Section 7.4)

Drywell Control Air Line A FLOW		
DW CONT AIR TO X-50, 1-FIQ-032-0092		
(1) ENDING (2400 hours)	(2) INITIAL (0000 hours)	(3) Difference
1252903 (FT³) -	1251227 (FT³) =	1676 (FT³)

Drywell Control Air Line B Flow		
DW CONT AIR TO X-22, 1-FIQ-032-0075		
(1) ENDING (2400 hours)	(2) INITIAL (0000 hours)	(3) Difference
347673 (FT³) -	347180 (FT³) =	493 (FT³)

Drywell Control Air Leakage		
1-FIQ-032-0092 Difference (Column 3)	1-FIQ-032-0075 Difference (Column 3)	Total
1676 (FT³) +	493 (FT³) =	2169 (FT³)

KEY

UO

Attachment 3
(Page 2 of 4)

Containment Air Temperature Correction

KEY **Date** 10/2/14

A. Drywell and Suppression Chamber Data

	DRYWELL			Differential Pressure		Suppression Chamber	
	Pressure		Temp (°F)			Air Temp	Level
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1-PI-64-135 (psig)	1-PI-64-136 (psig)	1-TI-64-52AB or 1-XR-64-50	1-PDI-64-137 (psid)	1-PDI-64-138 (psid)	1-XR-64-52 Point 1(°F) or 1-TR-64-161 (Point 10)	1-LI-64-54A or 66
0000 hours	P_{B1} 1.40	P_{B2} 1.36	T_{B1} 141	P_{B3} 1.27	P_{B4} 1.24	T_{B2} 94.2	N/A
2400 hours	P_{A1} 1.44	P_{A2} 1.40	T_{A1} 141	P_{A3} 1.28	P_{A4} 1.25	T_{A2} 94.2	L_A -5.0

(8) DRYWELL VENTING CORRECTION		(9) SUPRESSION CHMBR VENTING CORRECTION		(10) Total VENTING CORRECTION		UO
Ø	FT^3 +	Ø	FT^3 =	Ø	FT^3	UO.

KEY

Attachment 7
(Page 1 of 2)

Average Nitrogen Consumption and Leakage

KEY **Date** 10/2/14

A. Net Nitrogen Leakage (Section 7.8)

1. **SUM** all Gas additions to obtain the Total Addition:

Gas Addition to the Drywell	
Total Drywell Control Air Leakage	2169 ft^3 Attachment 2, Section A
Cumulative Nitrogen Makeup	+ Ø ft^3 Attachment 4, Section A
Total Gas Addition	= 2169 ft^3

2. Air Temperature Correction

Air Temperature	
Total DW and SC Temperature Correction	Ø ft^3 Attachment 3, Section A

3. **SUM** all the Correction Factors to obtain a Total Correction Factor:

Correction Factor	
Total Supp Chamber Level Correction	-272.94 ft^3 Attachment 1, Section B
Total Venting Correction using 1-FIC 84-20	2600 ft^3 Attachment 5, Section A
Total Alternate Venting Correction	+ Ø ft^3 Attachment 6, Section B
Total Correction Factor	= 2327.06 ft^3

4. **CALCULATE** Net Nitrogen leakage:

Total Gas Addition - Total DW and SC Tempe Correction - Total Correction Factor

Nitrogen Leakage	
Total Gas Addition	2169 ft^3 (Step 1 above)
Total DW and SC Temperature Correction	- Ø ft^3(Step 2 above)
Total Correction Factor	- 2327.06 ft^3(Step 3 above)
Net Nitrogen Leakage	= -158.06 ft^3

KEY

Attachment 7
(Page 2 of 2)

Average Nitrogen Consumption and Leakage

KEY Date 10/2/14

NOTES

1) For calculation purposes, a day consist of 24-hours. During the days when the time changes to Daylight Savings Time (DST) 23-hours will be used. When returning to Central Standard Time (CST) 25-hours will be used.
2) The average nitrogen leakage (adjusted) must be <542 SCFH (Step 6.0A.1). **NOTIFY** the Unit Supervisor (US) if the nitrogen leakage exceeds 542 SCFH (**REFER TO** 1-AOI-64-7 and Tech Specs 3.6.1.1).

B. Average Nitrogen Leakage (Section 7.8.2)

Calculate the Average Nitrogen Leakage

$$\text{Avg. Nitrogen Leakage} = \frac{\text{Net nitrogen leakage} \times 1.136}{\text{Hours during the day}} =$$

$$\text{Avg. Nitrogen Leakage} = \frac{(158.06 \text{ ft}^3) \times 1.136}{(24 \text{ Hours})}$$

Avg. Nitrogen Leakage $\frac{-7.48}{(AC)}$ SCFH

(AC)
UO
IV

KEY

START TIME_____

STEP / STANDARD	SAT / UNSAT
Step 1: **7.8.1 Attachment 7 - Section A - Net Nitrogen Leakage** [1] Total Drywell Control Air Leakage, - **RECORD** the Total Drywell Control Air Leakage from Attachment 2 Section A in the Gas Addition to the Drywell table. Standard: Refers to Attachment 2 and records 2169 ± 0 ft^3 for Total Drywell Control Air Leakage on Attachment 7.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 2: [2] Cumulative Nitrogen Makeup, - **RECORD** the total cumulative nitrogen makeup from Attachment 4 Section A in the Gas Addition to the Drywell table. Standard: Refers to Attachment 4 and records 0± 0 ft^3 for cumulative nitrogen makeup on attachment 7.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 3: [3] **CALCULATE** the Total Gas Addition as follows: **ADD** all the Gas addition types together from the Gas Addition Table an **RECORD** the sum as the Total Gas Addition in the Gas Addition to the Drywell table. Standard: Adds the Total Drywell Control Air Leakage and the Cumulative Nitrogen Makeup and determines the Total Gas Addition is 2169 ± 0 ft^3.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 4: [4] Total Drywell and Suppression Chamber Temperature Correction, - **RECORD** the TOTAL VENTING CORRECTION from Attachment 3, Section A in the Correction Factor table. Standard: Refers to Attachment 3 and records 0 ± 0 ft^3 for Total DW and SC Temperature Correction on Attachment 7.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 5: [5] Total Suppression Chamber Level Correction, - **RECORD** the total Suppression Chamber level correction from Attachment 1, Section A in the Correction Factor table. Standard: Refers to Attachment 1 and records -272.94 OR -272.9 ft^3 for Total Suppression Chamber Level Correction on Attachment 7.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 6: [6] Total Venting Correction using 1-FIC 84-20, - **RECORD** the total Drywell Venting Correction from Attachment 5, Section A in the Correction Factor table Standard: Refers to Attachment 5 and records 2600 ± 0 ft^3 for Total Venting Correction.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 7: [8] **CALCULATE** the Total Correction Factor as follows **ADD** all the Correction Factor Types together from the Correction Factor Table and **RECORD** the sum as the Total Correction Factor in the Correction Factor table. Standard: Adds the Total Suppression Chamber Level Correction, the Total Venting Correction, and the Total Alternate Venting Correction together and determines the Total Correction Factor is 2327.06 OR 2327.1 ft^3.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 8: [9] **CALCULATE** the Net Nitrogen Leakage as follows Total Gas Addition for the Net Nitrogen Leakage and **SUBTRACT** the Air Temperature calculation and **SUBTRACT** the Total Correction Factor. Standard: Subtracts the Total DW and SC Temperature Correction and the Total Correction Factor from the Total Gas Addition and determines the Net Nitrogen Leakage is -158.06 OR -158.1 ft^3.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 9: **NOTE** Leakage rates, for comparison purposes, should always be converted to standard flow rate conditions (flow at 70°F, one standard atmosphere). Since nitrogen gas is supplied by evaporating liquid nitrogen and heating it to approximately 70°F then reducing the pressure to 2.0 psig the conversion is: $\frac{14.7psia + 2.0psig}{14.7psi} \times \frac{460°R + 70°}{460°R + 70°F} = 1.136$ Where: 14.7 psia = 1 standard atmosphere 2.0 psig = nitrogen supply pressure 460°R = Fahrenheit to Rankine conversion factor 70°F = degrees Fahrenheit of nitrogen, actual and standard For calculation purposes, a day consists of 24-hours. During the days when the time changes to Daylight Savings Time (DST) 23-hours will be used. When returning to Central Standard Time (CST) 25-hours will be used. To average the net nitrogen usage (in ft3) for a day, a 24 hour period is normally used and the results are expressed in standard cubic feet per hour. The net nitrogen leakage is multiplied by a conversion factor 1.136, then divided by the number of hours in the day. The result gives the average nitrogen leakage in standard cubic feet per hour for that day. When Daylight Savings Time and Central Standard Time changes take place, the appropriate number of hours will be used instead of 24 (hours). [1] **MULTIPLY** the net nitrogen leakage from Attachment 6, Section A, (Nitrogen Leakage table) by (1.136/Hours during the day). [2] **RECORD** the result on the Average Nitrogen Leakage line. Standard: Multiplies Net Nitrogen Leakage of -158.06 OR -158.1ft^3 by 1.136 and divides by 24 hours to determine an Average Nitrogen Leakage of -7.48 OR -7.5 SCFH. Determines that the Average Nitrogen Leakage is less than 542 SCFH (AC) and initials for the Acceptance Criteria.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 19: The applicant determines and indicates whether the surveillance acceptance criterion is met or not. Standard: The applicant indicates the surveillance acceptance criterion **is met.**	**Critical Step** ___ SAT ___UNSAT ___N/A
CUE: ANOTHER OPERATOR WILL CONTINUE FROM HERE	

STOP TIME _____

END OF TASK

Provide to Applicant

INITIAL CONDITIONS:

You are an Operator. The Unit is at 100% power. The time is 2400 hours on 10/2/2014. 1-SI-4.7.A.2.A, Primary Containment Nitrogen Consumption and Leakage, is in progress.

INITIATING CUE:

The Unit Supervisor (US) directs you to complete 1-SR-4.7.A.2.A, Primary Containment Nitrogen Consumption and Leakage, by incorporating the 10/02/2014, Midnight 24:00 readings (attached) into the appropriate attachments, and determine whether the acceptance criteria is met.

Provide to Applicant

Data recorded at 2400 on 10/02/2014
To be used to complete 1-SI-4.7.A.2.A
Primary Containment Nitrogen Consumption and Leakage

Suppression Chamber Level
1-LI-64-159A 14.8 Ft
1-LI-64-54A (-) 5.0 inches
1-IL-64-66 (-) 3.7 inches

Drywell Control Air Line Flow
1-FIQ-032-0092 1252903 Ft^3
1-FIQ-032-0075 347673 Ft^3

Drywell Pressure
1-PI-64-135 1.44 psig
1-PI-64-136 1.40 psig
1-PI-64-67B 0 psig

Drywell Temperature
1-XR-64-50 133°F
1-TI-64-52AB 141°F

Drywell-Suppression Chamber Differential Pressure
1-PDI-64-137 1.28 psid
1-PDI-64-138 1.25 psid

Suppression Chamber Air Temperature
1-TR-64-161 Point 10 90.8°F
1-XR-64-52 Point 1 94.2°F

Containment venting data was recorded in Attachment 5 when venting was completed.

Surveillance Task Sheet (STS)

Work Order #: 115277270

PM#: P1402

Procedure: 1-SI-4.7.A 2.A

Title: 1-SI-4.7.A 2.A - PRIMARY CONTAINMENT NITROGEN CONSUMPTION & LEAKAGE

Data Sheets Attached:

Perf Grp: OPS Unit: 1 Loop/Div: /NA

Test Reason: Periodic

Due Date: 10/02/14

Frequency: 1 DAYS Tech Spec: Y ASME XI:

Applicable Modes: Perf Modes:

Clearance Required: N EQ: LCO Entered: N

Dry-Cask Storage: N

Keith Nichols — Authorization to Begin: SRO

10/1/14 2350 — Date & Time

10/2/14 0000 — Start Date & Time

Completion Date & Time

Was this a complete or partial performance? (Explain "Partial" in Remarks below) Complete [ ] Partial [ ]

Performed By:

Print Name	Signature	Initial	Section
John Doe	John Doe	JD	OPS

Were all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC* acceptance criteria satisfied? Yes [ ] No [ ] N/A [ ]

Were all other acceptance criteria satisifed? Yes [ ] No [ ] N/A [ ]

If all Tech Spec / Tech Req / ISFSI CoC / ODCM / Fire Protection Req / AMSAC* criteria were not satisfied, was an LCO / TR / ODCM / OR action required? (Explain in Remarks) Yes [ ] No [ ] N/A [ ]

Service Request #:

Alert Work Control Required? [ ]

*PWR only.

Subsequent Reviews:

Group	Signature	Date
OP		
NSSS		

Copy of STS sent to Work Control (next business day) ____ / ____ Initials Date

Test Coord/Lead — Date

Acceptance Criteria Review: SRO — Date & Time

Independent Reviewer — Date & Time

Permanent Comments:

Remarks: SHALL BE PERFORMED EACH DAY WHILE THE REACTOR IS IN THE RUN MODE (MODE 1) AND PRIMARY CONTAINMENT IS INERTED. -

Remarks: ____

Browns Ferry Nuclear Plant

Unit 1

Surveillance Instruction

1-SI-4.7.A.2.A

Primary Containment Nitrogen Consumption and Leakage

Revision 0012

Quality Related

Level of Use: Continuous Use

Level of Use or Other Information: Key Number P1402

Effective Date: 11-24-2014

Responsible Organization: OPS, Operations

Prepared By: David Threadgill

Approved By: Walter R. Miller

Current Revision Description

Type of Change: Enhancement Tracking Number: 013

PCRs: None

Documentation: None

In Step 7.8.2[1], corrected Attachment reference. Changed Attachment 6 to Attachment 7

This change is a Minor/Editorial change as defined in NPG-SPP 01.2 (Administration of Site Technical Procedures) and NPG-SPP 03.14 Section 3.2.11 (Licensing Compliance review) Section 3.2.1 and does not require a 10 CFR 50.59 evaluation or a Licensing Compliance Review.

Table of Contents

Table of Contents (continued)

1.0 INTRODUCTION

1.1 Purpose

This Surveillance Instruction provides the necessary steps to monitor the primary containment nitrogen consumption rate (i.e., primary containment system leakage) in compliance with the requirements in Technical Specification 3.6.1.1 and TRM 3.6.2, and 3.6.5.

1.2 Scope

Primary containment nitrogen consumption is monitored to determine the average daily nitrogen consumption. Corrections are made for Suppression Chamber level changes and Drywell/Suppression Chamber venting that may occur. The average nitrogen leakage is calculated using data gathered during the day of this test.

For calculation purposes, a day consists of 24-hours. During the days when the time changes to Daylight Savings Time (DST) 23-hours will be used. When returning to Central Standard Time (CST) 25-hours will be used.

1.3 Frequency

This Surveillance Instruction shall be performed each day (24-hour duration except the days converting to Daylight Saving Time and returning to Central Standard Time) and reviewed each shift while the reactor is in the RUN mode (Mode 1) and primary containment is inerted.

This procedure is initially started when the conditions are met during Reactor Startup and remains in process until the following Midnight (2400 Hours).

This procedure should be initiated at Midnight (0000 Hours) and remain in process for a 24 Hour period (until the following Midnight (2400 Hours)) or when conditions are no longer met during Reactor Shutdown per Tech Specs.

2.0 REFERENCES

2.1 Technical Specifications

Section 3.6.1.1, Primary Containment

2.2 Technical Requirements Manual - TRM

Section 3.6.2, Oxygen Concentration Monitors

Section 3.6.5, Nitrogen Makeup to Containment

2.3 Final Safety Analysis Report

Section 5.2.2.8, Primary Containment-Safety Design Basis

Section 5.2.3.8, Containment Inerting System

Section 5.2.4.5, Primary Containment Leakage Analysis

Section 5.2.5.1, Primary Containment Integrity and Leak-Tightness

Table 5.2-1, Principal Design Parameters and Characteristics of Primary Containment

2.4 Plant Instructions

1-AOI-64-7, Primary Containment N_2 Usage High Abnormal Operating Instructions

0-OI-57C, 208/120V AC Electrical System Operating Instructions

1-OI-64, Primary Containment System Operating Instructions

1-OI-84, Containment Atmosphere Dilution System Operating Instructions

NPG-SPP-06.9.1, Conduct of Testing

NPG-SPP-06.9.2, Surveillance Test Program

2.5 Plant Drawings

0-47E610-76-1, Mechanical Control Diagram Containment Inerting System

1-47E610-76-1, Mechanical Control Diagram Containment Inerting System

1-47E610-64-1, 2, and 3, Mechanical Control Diagram Primary Containment System

1-47E610-84-1, Mechanical Control Diagram Containment Atmosphere Dilution System

1-47E860-1, Flow Diagram Containment Inerting System

1-47E862-1, Flow Diagram Containment Atmosphere Dilution System

1-47E865-1, Flow Diagram Heating and Ventilating Air Flow

2.6 Plant Generated Calculations

PGC-001-064-0, Change in Torus Free Volume per 1" of Water Level

2.7 Miscellaneous

BFPER970886, Calculating Leakage when CAD is cross-tied to Drywell Control Air

3.0 PRECAUTIONS AND LIMITATIONS

3.1 General Precautions

A. This procedure should be initiated at Midnight (0000 Hours) and remain in process for a 24 Hour period (until the following Midnight (2400 Hours)).

B. If it is necessary to begin a new revision of the procedure before the time period is completed, then the appropriate data must be transferred to the new document and the two procedures maintained together.

C. For an INDEPENDENT REVIEWER signature, the STA or SRO cannot perform any actions or signoffs in the body of the procedure. This will ensure an adequate review of the procedure.

3.2 Operability and LCO's

A. If Nitrogen leakage exceeds 542 SCFH, 1-AOI-64-7, and TECH SPECS must be referred to for further action.

1. If 24-Hour average N_2 makeup to the primary containment is > 542 SCFH then Primary Containment must be declared INOP immediately. (Refer to LCO 3.6.1.1.)

B. If the nitrogen consumption demonstrates a trend that will be greater than 542 SCFH for the 24-hour period, notify the Unit Supervisor (US) immediately.

3.3 Equipment

A. When a Drywell Control Air Totalizer is INOP, the DWCA System Engineer will use the AUO rounds to determine the average flow to be used for N2 Drywell Control Air Flow.

B. When a Drywell Control Air Totalizer is INOP and a break or a leak occurs in the drywell from an air line, the number of times the drywell is vented will rise based on the severity of the leak or break. System Engineering should monitor and address any rise in Venting Requirements to determine if it is caused by a Drywell Control Air Line leak or due to atmospheric conditions.

3.4 Initiation/Isolation/Trips

None

3.5 Interlocks

None

3.6 Performance Testing

A. Since changes in Suppression Chamber level change the Suppression Chamber free volume, the Torus atmospheric pressure will change, although nitrogen may not have been lost or added.

1. The Suppression Chamber level may change for any number or events such as venting the Drywell/Suppression Chamber, pumping down the Suppression Chamber, MRSVs Leakage or testing Core Spray, RHR, HPCI, or RCIC Systems.

2. The correction for level changes is based on the assumption that the Suppression Chamber level change is relatively small (-1" to -7.25" indicated level) allowing the effect of Suppression Chamber curvature to be neglected. Therefore, the 909.8 cubic feet change in volume per one inch change in Suppression Chamber level is assumed constant.

B. Changes in either the Drywell or Suppression Chamber Air Temperature would cause a change in Containment Pressure under ideal conditions. Due to the continuous Drywell Control Air addition and possible venting during the 24 hour period the changes in containment pressures may not be as expected. Therefore when a change of more than 2 °F in either area occurs a Temperature Correction will be performed for that area's Air Temperature, otherwise zero "0" will be used for the correction factor.

C. For Sections 7.5 and 7.7.1 if one pressure indicator and/or differential indicator is inoperable, then the appropriate column on the Attachment is to be marked N/A, the INOP indicator noted on Attachment 1, and dividing by 2 is to be omitted for that particular term in the equation.

D. Attachment 3, Section B should be used to calculate the venting correction factor when any of the following instrumentation is unavailable.

1. Both DRYWELL PRESSURE, 1-PI-64-135 and 1-PI-64-136

2. DRYWELL TEMPERATURE, 1-TI-64-52AB

E. Attachment 4, Section B should be used to calculate the venting correction factor when any of the following instrumentation is unavailable.

1. Both DRYWELL PRESSURE, 1-PI-64-135 and 1-PI-64-136

2. Both DW/SUPPR CHBR DIFF PRESS, 1-PDI-64-137 and 1-PDI-64-138

3. DRYWELL TEMPERATURE, 1-XR-64-52

4. SUPPR POOL WATER LEVEL, 1-LI-64-54A and 1-LI-64-66.

3.6 Performance Testing (continued)

F. Drywell/Suppression Chamber venting may be required to maintain Drywell pressure within limits during changes in barometric pressure, maintenance on Drywell Delta P Air Compressor, or other similar events. When using the Alternate Venting Correction equation in Attachment 6, the following assumptions are used.

1. The Drywell free volume is 159,000 cubic feet.

2. The Suppression Chamber free volume is 126,200 cubic feet at -1 inches (SUPPR POOL WATER LEVEL, 1-LI-64-54A, or SUPPR POOL WATER LEVEL, 1-LI-64-66), and an additional 909.8 cubic feet of free volume for each inch that water level is lowered.

3. The actual venting process is a rapid event so barometric pressure changes can be neglected.

4. The average Drywell temperature change is represented by DRYWELL TEMPERATURE, 1-TI-64-52AB, and DRYWELL TEMPERATURE/PRESSURE 1-XR-64-50.

5. Drywell and Suppression Chamber nitrogen pressures are low enough to use the ideal gas law as a model, i.e.

$$V_C = 1 - \left[\frac{P_B T_A}{P_A T_B} \right] \times V_t$$

Where:
- V_C= Venting Correction
- P_B= Drywell or Suppression Chamber pressure before venting
- P_A= Drywell or Suppression Chamber pressure after venting
- T_B= Drywell or Suppression Chamber temperature before venting
- T_A= Drywell or Suppression Chamber temperature after venting
- V_t= Total free volume of Drywell or Suppression Chamber

6. The Suppression Chamber water and atmospheric temperatures are in equilibrium.

3.6 Performance Testing (continued)

G. Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)

H. TSB 3.3.3.1 (PAM instrumentation) states that for DW temperature that two wide range drywell atmosphere temperature signals are transmitted from separate temperature sensors and are continuously recorded and displayed on one CR recorder (XR-64-50) and one control room indicator (TI-64-52AB). Therefore, it's reasonable that either indicator should be adequate for use in the calculation of N2 consumption.

Date 10/2/14

4.0 PREREQUISITES

[1] **VERIFY** this copy of 1-SI-4.7.A.2.A is the most current revision. JD

[2] **OBTAIN** a Surveillance Task Sheet (STS) for this procedure and Work Activity. (Key Number P1402) JD

[3] **VERIFY** that Cabinet 2, Panel 9-9 is energized in accordance with 0-OI-57C, 208/120V AC Electrical System Operating Instruction. JD

5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

A. Calculator

6.0 ACCEPTANCE CRITERIA

A. Responses which fail to meet the following acceptance criteria constitute unsatisfactory surveillance instruction results and require the immediate notification of the Unit Supervisor at the time of failure:

1. Nitrogen makeup to the primary containment, averaged over 24 hours (corrected for Suppression Chamber level changes and Drywell/Suppression Chamber venting) is less than 542 standard cubic feet per hour (SCFH).

B. Steps which determine the above criteria are designated by (AC) next to the initials blank.

Date 10/2/14

NOTES

1) This procedure is required to be initiated at Midnight which is represented as (0000 Hours) and remain in process for a 24 Hour period (until the following Midnight which is represented as (2400 Hours)). These times are used to represent the difference from the start and the completion of this SR and may not match the proper military time that is used by the electronic narrative logs.
2) If it is necessary to begin a new revision to the procedure before the time period is completed, the appropriate data must be transferred to the new document and the two procedures maintained together.

7.0 PROCEDURE STEPS

7.1 Initial Requirements and Notifications

[1] **VERIFY** the Precautions and Limitations in Section 3.0 have been reviewed. JD

[2] **VERIFY** the Prerequisites in Section 4.0 are satisfied. JD

[3] On the Surveillance Task Sheet (STS)

OBTAIN Authorization Signature and Date/Time from the Unit Supervisor to perform this surveillance. JD

[4] On the Surveillance Task Sheet (STS)

RECORD the Start Date & Time. JD

[5] **RECORD** the date on each data sheet, Attachments 1 through 7. JD

Date 10/2/14

NOTES

1) This procedure should be initiated by the midnight shift Unit Supervisor or by the Unit Supervisor of any shift meeting the requirements in Section 1.3.
2) For the first run of the 24-hour period, the previous cumulative total is zero since totals are not carried over from the previous 24-hour test.

7.2 Data Collection As Close to Midnight (0000 Hour) As Possible

[1] **RECORD** on Attachment 1 Part A, the initial Suppression Pool Level (0000 Hour), in column (1) for each of the following instruments (if available) on Panel 1-9-3.

- SUPPR POOL WATER LEVEL, 1-LI-64-54A
- SUPPR POOL WATER LEVEL, 1-LI-64-66 JD

[2] **RECORD** on Attachment 2 in the "INITIAL" column, the Drywell Control Air Loop A flow from the N2 Containment Inerting System, from one of the following:

- DW CONT AIR TO X-50, 1-FIQ-032-0092

OR

- Average flow as determined by the DWCA System Engineer if DW CONT AIR TO X-50, 1-FIQ-032-0092, is INOP. (**REFERENCE** Step 3.3A) JD

[3] **RECORD** on Attachment 2 in the "INITIAL" column, the Drywell Control Air Loop B flow from the N2 Containment Inerting System, from one of the following:

- DW CONT AIR TO X-22, 1-FIQ-032-0075

OR

- Average flow as determined by the DWCA System Engineer if DW CONT AIR TO X-22, 1-FIQ-032-0075, is INOP. (Reference Step 3.3A) JD

Date 10/2/14

7.2 **Data Collection As Close to Midnight (0000 Hour) As Possible (continued)**

NOTE

It is assumed in 3.6F.6 that the suppression chamber water and atmospheric temperatures are in equilibrium, therefore the use of the average suppression pool water temperature is an acceptable substitute in place of the suppression chamber air temperature.

IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted.
[BFNPER 607653-002]

[4] **RECORD** on Attachment 3 in the 0000 Hours column the following data.

- Drywell Pressure 1-PI-64-135
- Drywell Pressure 1-PI-64-136
- Drywell Temperature 1-TI-64-52AB or 1-XR-64-50.
- Drywell Differential Pressure 1-DPI-64-137
- Drywell Differential Pressure 1-DPI-64-138
- SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1)

  OR

  IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

  Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

JD

NOTE

The correction for level changes is based on the assumption that the Suppression Chamber level change is relatively small (-1" to -7.25" indicated level) allowing the effect of Suppression Chamber curvature to be neglected. Therefore, the 909.8 cubic feet change in volume per one inch change in Suppression Chamber level is assumed constant.

7.3 Suppression Chamber Level

7.3.1 Attachment 1 - Section A - Suppression Chamber Level Corrections Data

[1] At the beginning of the surveillance (0000 hours), **RECORD** the level from SUPPR POOL WATER LEVEL, 1-LI-64-54A and 1-LI-64-66 on Panel 1-9-3, in column (1) for each available instrument.

[2] At the end of the surveillance (2400 hours), **RECORD** the Suppression Chamber level from indicators SUPPR POOL WATER LEVEL, 1-LI-64-54A and1-LI-64-66 on Panel 1-9-3, in column (2), for each available instrument.

[3] If both instruments are available, 1-LI-64-54A and 1-LI-64-66, **SUBTRACT** column (2) from column (1) to determine the amount of change in Suppression Chamber level and **RECORD** in column (3) (negative numbers are possible).

[4] For each instrument, 1-LI-64-54A and 1-LI-64-66, **CALCULATE** the change in Suppression Chamber free volume as standard cubic feet (SCF) by multiplying column (3) by column (4) (909.8 ft^3/in.) and **RECORD** in column (5).

7.3.2 Attachment 1 - Section B - Total Suppression Chamber Level Correction

- **IF** both (64-54A & 64-66) instruments are available, **THEN**

  ADD column (5) for each instrument and **DIVIDE** by two (for calculating the average) and **RECORD** results in the Total Suppression Chamber Level Correction blank.

- **IF** an instrument is unavailable, **THEN**

  USE only the operable instrument and **ENTER** the column (5) value for the operable instrument in Total Suppression Chamber Level Correction blank.

7.4 Calculating the Drywell Control Air Leakage

7.4.1 Attachment 2 - Calculate the Drywell Control Air Line A Leakage

[1] At the beginning of the surveillance (0000 hours), **RECORD** the DW CONT AIR TO X-50, 1-FIQ-032-0092, (Drywell Control Air Loop A) in the column (2) "INITIAL" (0000 hours).

[2] At the end of the surveillance (2400 hours), **RECORD** the DW CONT AIR TO X-50, 1-FIQ-032-0092, (Drywell Control Air Loop A) in the column (1) "ENDING" (2400 hours).

[3] **CALCULATE** the daily difference for DW CONT AIR TO X-50, 1-FIQ-032-0092, (Drywell Control Air Loop A)

Column (1) - Column (2) = Difference (Column 3)

7.4.2 Attachment 2 - Calculate the Drywell Control Air Line B Leakage

[1] At the beginning of the surveillance (0000 hours), **RECORD** the DW CONT AIR TO X-22, 1-FIQ-032-0075, (Drywell Control Air Loop B) in the column (2) "INITIAL" (0000 hours).

[2] At the end of the surveillance (2400 hours), **RECORD** the DW CONT AIR TO X-22, 1-FIQ-032-0075, (Drywell Control Air Loop B) in the column (1) "ENDING" (2400 hours).

[3] **CALCULATE** the daily difference for DW CONT AIR TO X-22, 1-FIQ-032-0075, (Drywell Control Air Loop B)

Column (1) - Column (2) = Difference (Column 3).

7.4.3 Calculate The Total Drywell Control Air Leakage

SUM the DW CONT AIR TO X-50, 1-FIQ-032-0092, (Drywell Control Air Loop A) Difference and DW CONT AIR TO X-22, 1-FIQ-032-0075, (Drywell Control Air Loop B) Difference.

1-FIQ-032-0092 (Difference) + 1-FIQ-032-0075 (Difference) = Total.

Date 10/2/14

7.5 Air Temperature Correction

NOTES

1) Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)
2) TSB 3.3.3.1 (PAM instrumentation) states that for DW temperature that two wide range drywell atmosphere temperature signals are transmitted from separate temperature sensors and are continuously recorded and displayed on one CR recorder (XR-64-50) and one control room indicator (TI-64-52AB). Therefore, it's reasonable that either indicator should be adequate for use in the calculation of N2 consumption.
3) It is assumed in 3.6F.6 that the suppression chamber water and atmospheric temperatures are in equilibrium, therefore the use of the average suppression pool water temperature is an acceptable substitute in place of the suppression chamber air temperature.

   IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

   Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted.

   [BFNPER 607653-002]

7.5.1 Attachment 3 - Section A - Drywell and Suppression Chamber Data

[1] At the beginning of the surveillance (0000 hours), **RECORD** on Attachment 3 in the 0000 Hours column the following data.

- DRYWELL PRESSURE 1-PI-64-135
- DRYWELL PRESSURE 1-PI-64-136
- DRYWELL TEMPERATURE 1-TI-64-52AB or 1-XR-64-50
- DW/SUPPR CHBR DIFF PRESS 1-DPI-64-137
- DW/SUPPR CHBR DIFF PRESS 1-DPI-64-138
- SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1)

  OR

  IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

  Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

Date 10/2/14

7.5.1 Attachment 3 - Section A - Drywell and Suppression Chamber Data (continued)

[2] At the end of the surveillance (2400 hours), **RECORD** on Attachment 3 in the 2400 Hours column the following data.

- DRYWELL PRESSURE 1-PI-64-135
- DRYWELL PRESSURE 1-PI-64-136
- DRYWELL TEMPERATURE 1-TI-64-52AB or 1-XR-64-50
- DW/SUPPR CHBR DIFF PRESS 1-DPI-64-137
- DW/SUPPR CHBR DIFF PRESS 1-DPI-64-138
- SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1)

  OR

  IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

  Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]
- Suppression Pool Level 1-LI-64-54A or 1-LI-64-66

[3] **IF** the Drywell Temperature has changed by 2°F or more, **THEN**

PERFORM the calculation using Section B for Drywell and enter the result in column (8) of Section A. (Otherwise enter "0" (Zero) for the calculation.)

[4] **IF** the Suppression Chamber Air Temperature has changed by 2°F or more, **THEN**

PERFORM the calculation using Section C for Suppression Chamber and enter the result in column (9) of Section A. (Otherwise enter "0" (Zero) for the calculation.)

[5] Calculate the Total Correction Factor as follows

SUM the Drywell (Column 8) and Suppression Chamber (Column 9) and entering the results in Column (10).

NOTES

1) A Stopwatch may be used to perform Section 7.3.1.
2) Nitrogen flow is required to be less than 60 SCFM in accordance with 1-OI-64, Primary Containment System Operating Instructions, when performing Section 7.3.1.

7.6 Nitrogen Makeup

7.6.1 Attachment 4 - Section A - Nitrogen Makeup Data

[1] **IF** Makeup is from the Nitrogen Storage Tank, **THEN**

PERFORM the following during Nitrogen additions:

[1.1] In EVENT column, - **RECORD** "N2 Tank".

[1.2] In column (1), - **RECORD** the time each nitrogen addition begins.

[1.3] In column (2), - **RECORD** the nitrogen makeup duration, in minutes, from the chart of DW/SUPPR CHBR N2 MAKEUP FLOW/PRESS, 1-XR-76-14 on Panel 1-9-3 or from stopwatch.

[1.4] In column (3), - **RECORD** the nitrogen makeup flow in cubic feet per minute as indicated by the Red Pen on DW/SUPPR CHBR N2 MAKEUP FLOW/PRESS, 1-XR-76-14 on Panel 1-9-3.

[1.5] **CALCULATE** the amount of nitrogen, in cubic feet (ft^3), added during the run by multiplying column (2) by column (3) and **RECORD** in column (4).

[1.6] **CALCULATE** the total cumulative nitrogen use in cubic feet for the 24-hour period of this test by adding the latest entry in column (4) to the previous cumulative total in column (5) and **RECORD** the new cumulative total in column (5).

7.6.1 Attachment 4 - Section A - Nitrogen Makeup Data (continued)

[2] [QC/C] **IF** the CAD is cross-tied to Drywell Control Air, **THEN**

PERFORM the following: (**REFER TO** 1-OI-84, Containment Atmosphere Dilution System). [BFPER950835]

[2.1] In EVENT Column, **RECORD** "CAD/DCA".

[2.2] In Column (1), **RECORD** the time CAD was cross-tied to Drywell Control Air on the CAD/DCA line provided.

[2.3] In Column (2), **RECORD** the duration in minutes that CAD was cross-tied to Drywell control air.

[2.4] **OBTAIN** calculated Total Leakage (CFM) from Site Engineering.

[2.5] In Column (3), **RECORD** the calculated Total Leakage (CFM) obtained from Site Engineering

[2.6] **CALCULATE** the amount of nitrogen added during the period by multiplying columns (2) and (3) and **RECORD** in column (4).

[2.7] **CALCULATE** the total cumulative nitrogen use in cubic feet for the 24-hour period of this test by adding the latest entry in column (4) to the previous cumulative total in column (5) and **RECORD** the new cumulative total in column (5).

7.6.1 Attachment 4 - Section A - Nitrogen Makeup Data (continued)

NOTES

1) Measure the CAD addition using a stopwatch.
2) A separate Event Column is required for each CAD TRAIN if both trains are being used at the same time.

[3] **IF** CAD is aligned to the Containment other than Sections 7.6.1[2] , **THEN**

PERFORM the following for CAD additions:

[3.1] In EVENT Column, **RECORD** "CAD/CONT"

[3.2] In column (1), **RECORD** the time each CAD addition begins.

[3.3] In column (2), **RECORD** the CAD addition duration, in minutes from the stopwatch.

[3.4] In column (3), **RECORD** the CAD makeup flow in cubic feet per minute for each CAD train being used:

CAD A N2 SYSTEM FLOW

- 0-FI-84-7/3, CAD A N2 SYSTEM FLOW, on 3-PNL-9-54.

  OR

- 0-FI-84-7, CAD LINE A N2 FLOW, on (Unit 1) PNL-9-54

CAD B N2 SYSTEM FLOW

- 0-FI-84-18/3, CAD B N2 SYSTEM FLOW, on 3-PNL-9-55.

  OR

- 0-FI-84-18, CAD B N2 SYSTEM FLOW, on (Unit 1) PNL-9-55.

[3.5] **CALCULATE** the amount of nitrogen, in cubic feet (ft3), added during the run by multiplying column (2) by column (3) and **RECORD** in column (4).

[3.6] **CALCULATE** the total cumulative nitrogen use in cubic feet for the 24-hour period of this test by adding the latest entry in column (4) to the previous cumulative total in column (5) and **RECORD** the new cumulative total in column (5).

7.7 Containment Venting

NOTE
Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)

7.7.1 **Attachment 5 - Section A - Containment Venting Data using 1-FIC-84-20**

[1] In column (1),

RECORD the time the venting begins.

[2] In column (4),

RECORD the vent flow rate indicated on PATH A VENT FLOW CONT, 1-FIC-84-20 on Panel 1-9-55.

[3] In column (2),

RECORD the time the venting ends.

[4] In column (3),

RECORD the elapsed venting time in minutes by subtracting column (1) from column (2).

[5] In column (5),

RECORD the Drywell Venting Correction Factor by multiplying column (3) by column (4).

[6] In column (6), Total Cumulative Correction -

RECORD the SUM of the previous event column (6) and the current event column (5).

NOTES

1) Alternate Containment Venting Data is performed when 1-FIC-84-20 indication is not available.

2) It is assumed in 3.6F.6 that the suppression chamber water and atmospheric temperatures are in equilibrium, therefore the use of the average suppression pool water temperature is an acceptable substitute in place of the suppression chamber air temperature.

   IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

   Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted.

   [BFNPER 607653-002]

7.7.2 Attachment 6 - Section A - Alternate Containment Venting Data

[1] **PRIOR** to Venting

PERFORM the following using instruments on Panel 9-3:

A. In column (1),

   RECORD the time the venting begins and ends.

B. In column (2), block P_{B1},

   RECORD the DRYWELL PRESSURE, 1-PI-64-135 indication.

C. In column (3), block P_{B2},

   RECORD the DRYWELL PRESSURE, 1-PI-64-136 indication.

D. In column (4), block T_{B1}

   RECORD the Drywell temperature, using 1-TI-64-52AB or 1-XR-64-50.

E. In column (5), block P_{B3},

   RECORD the DW/SUPPR CHBR DIFF PRESS, 1-PDI-64-137 indication.

F. In column (6), block P_{B4},

   RECORD the DW/SUPPR CHBR DIFF PRESS, 1-PDI-64-138 indication.

7.7.2 Attachment 6 - Section A - Alternate Containment Venting Data (continued)

G. In column (7), block T_{B2}

RECORD the SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1).

OR

IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

[2] **AFTER** the Venting Event is completed,

A. In column (2), block P_{A1}, **RECORD** the Drywell pressure from DRYWELL PRESSURE, 1-PI-64-135 indication.

B. In column (3), block P_{A2}, **RECORD** the Drywell pressure from DRYWELL PRESSURE, 1-PI-064-136 indication.

C. In column (4), block T_{A1} - **RECORD** the Drywell temperature, 1-TI-64-52AB or 1-XR-64-50.

D. In column (5), block P_{A3}, **RECORD** the DW/SUPPR CHBR DIFF PRESS, 1-PDI-64-137 indication.

E. In column (6), block P_{A4}, **RECORD** the DW/SUPPR CHBR DIFF PRESS, 1-PDI-64-138 indication.

F. In column (7), block T_A, **RECORD** the SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1).

OR

IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

7.7.2 Attachment 6 - Section A - Alternate Containment Venting Data (continued)

G. In column (8), block L_A, **RECORD** the SUPPR POOL WATER LEVEL, 1-LI-64-54A. (Use 1-LI-64-66 if 1-LI-64-54A is INOP.)

H. In column (9), - **CALCULATE** the DRYWELL VENTING CORRECTION using the Drywell Venting Correction Formula in Section C.

I. In column (10), - **CALCULATE** the SUPPRESSION CHAMBER VENTING CORRECTION using the Suppression Chamber Venting Correction Formula in Section C.

J. In column (11), - **RECORD** the sum the DRYWELL VENTING CORRECTION Column (9) and SUPPRESSION CHAMBER VENTING CORRECTION Column (10).

7.7.3 Attachment 6 Section B Alternate Containment Venting Correction

[1] At the completion of the 24-hour period

- In column (12) - **RECORD** the Total Venting Correction, Attachment 6, Section B by

  ADDING all the TOTAL VENTING CORRECTION from Section A, Column (11).

7.8 Average Nitrogen Consumption and Leakage

7.8.1 Attachment 7 - Section A - Net Nitrogen Leakage

[1] Total Drywell Control Air Leakage, - **RECORD** the Total Drywell Control Air Leakage from Attachment 2 Section A in the Gas Addition to the Drywell table.

[2] Cumulative Nitrogen Makeup, - **RECORD** the total cumulative nitrogen makeup from Attachment 4 Section A in the Gas Addition to the Drywell table.

[3] **CALCULATE** the Total Gas Addition as follows:

ADD all the Gas addition types together from the Gas Addition table and **RECORD** the sum as the Total Gas Addition in the Gas Addition to the Drywell Table.

[4] Total Drywell and Suppression Chamber Temperature Correction, - **RECORD** the TOTAL VENTING CORRECTION from Attachment 3, Section A in the Correction Factor table.

[5] Total Suppression Chamber Level Correction - **RECORD** the total Suppression Chamber level correction from Attachment 1, Section A in the Correction Factor table.

[6] Total Venting Correction using 1-FIC 84-20, - **RECORD** the total Drywell Venting Correction from Attachment 5, Section A in the Correction Factor table

[7] Total Alternate Venting Correction, - **RECORD** the total Drywell Venting Correction from Attachment 6, Section B in the Correction Factor table.

[8] **CALCULATE** the Correction Factor as follows

ADD all the Correction Factor Types together from the Correction Factor Table and **RECORD** the sum as the Total Correction Factor in the Correction Factor table.

[9] **CALCULATE** the Net Nitrogen Leakage as follows

Total Gas Addition for the Net Nitrogen Leakage and **SUBTRACT** the Air Temperature calculation and **SUBTRACT** the Total Correction Factor.

7.8.2 Attachment 7 - Section B - Average Nitrogen Leakage

NOTE

Leakage rates, for comparison purposes, should always be converted to standard flow rate conditions (flow at 70°F, one standard atmosphere). Since nitrogen gas is supplied by evaporating liquid nitrogen and heating it to approximately 70°F then reducing the pressure to 2.0 psig the conversion is:

$$\frac{14.7\text{psia} + 2.0\text{psig}}{14.7\text{psia}} \times \frac{460°\text{R} + 70°\text{F}}{460°\text{R} + 70°\text{F}} = 1.136$$

Where:
- 14.7 psia = 1 standard atmosphere
- 2.0 psig = nitrogen supply pressure
- 460°R = Fahrenheit to Rankine conversion factor
- 70°F = degrees Fahrenheit of nitrogen, actual and standard

For calculation purposes, a day consist of 24-hours. During the days when the time changes to Daylight Savings Time (DST) 23-hours will be used. When returning to Central Standard Time (CST) 25-hours will be used.

To average the net nitrogen usage (in $ft^{3)}$ for a day, a 24 hour period is normally used and the result are expressed in standard cubic feet per hour. The net nitrogen leakage is multiplied by a conversion factor 1.136, then divided by the number of hours in the day. The result gives the average nitrogen leakage in standard cubic feet per hour for that day. When Daylight Savings Time and Central Standard Time changes take place, the appropriate number of hours will be used instead of 24 (hours).

[1] **MULTIPLY** the net nitrogen leakage from Attachment 7, Section A, (Nitrogen Leakage table) by (1.136/Hours during the day).

[2] **RECORD** the result on the Average Nitrogen Leakage line.

Date 10/2/14

7.9 Completion and Notifications

[1] On the Surveillance Task Sheet (STS),

[1.1] **RECORD** the Completion Date & Time. _____

[1.2] **REVIEW** and **COMPLETE** the Surveillance Task Sheet (STS) through the Test Director/Lead Performer & Date fields. _____

[2] **NOTIFY** the Unit Supervisor that this Surveillance Instruction is complete. _____

8.0 ILLUSTRATIONS/ATTACHMENTS

Attachment 1: Suppression Chamber Water Level

Attachment 2: Drywell Control Air Leakage

Attachment 3: Containment Air Temperature Correction

Attachment 4: Nitrogen Makeup Correction

Attachment 5: Containment Venting Corrections

Attachment 6: Alternate Venting Corrections

Attachment 7: Average Nitrogen Consumption and Leakage

Attachment 1
(Page 1 of 1)

Suppression Chamber Level Correction

Date 10/2/14

1.0 SUPPRESSION CHAMBER LEVEL CORRECTION DATA

NOTES

1) If both Instruments are Operable, then calculate the average of BOTH Operable Instruments by Dividing the sum of their SUPPRESSION CHAMBER LEVEL CORRECTION (column 5) by 2 (two) and record as the TOTAL SUPPRESSION CHAMBER LEVEL CORRECTION.

2) If one of the instruments is INOP, then use only the Operable Instrumentation Correction Factor for the TOTAL SUPPRESSION CHAMBER LEVEL CORRECTION.

A. Suppression Chamber Level Correction Data (Section 7.3.1)

	(1)	(2)	(3)	(4)	(5)	
Instrument	Initial Suppr Chbr Level (IN.) (0000 Hours)	Ending Suppr Chbr LEVEL (IN.) (2400 Hours)	Change in Suppr Chbr Level (IN.)	Conversion Factor 909.8 FT^3/IN.	Suppr Chbr Level Correction (FT^3)	UO INIT
1-LI-64-54A	5.3 -	_____ =	_____	x 909.8 =	_____	_____
1-LI-64-66	4.0 -	_____ =	_____	x 909.8 =	_____	_____

B. Total Suppression Chamber Level Correction Calculation (Section 7.3.2)

$$\frac{\text{Column 5}(ft^3)\text{ for 1-LI-64-54A} + \text{Column 5}(ft^3)\text{ for 1-LI-64-66}}{2} = \text{Average Suppression Chamber Level}$$

$$\frac{\_\_\_\_\_(ft^3)_{1-LI-64-54A} + \_\_\_\_\_(ft^3)_{1-LI-64-66}}{2} = \_\_\_\_\_(ft^3)$$

UO

Attachment 2
(Page 1 of 1)

Drywell Control Air Leakage

Date 10/2/14

A. Drywell Control Air Leakage (Section 7.4)

Drywell Control Air Line A FLOW		
DW CONT AIR TO X-50, 1-FIQ-032-0092		
(1) ENDING (2400 hours)	(2) INITIAL (0000 hours)	(3) Difference
_____ (FT^3)	- 1251227 (FT^3)	= _____ (FT^3)

Drywell Control Air Line B Flow		
DW CONT AIR TO X-22, 1-FIQ-032-0075		
(1) ENDING (2400 hours)	(2) INITIAL (0000 hours)	(3) Difference
_____ (FT^3)	- 347180 (FT^3)	= _____ (FT^3)

Drywell Control Air Leakage		
1-FIQ-032-0092 Difference (Column 3)	1-FIQ-032-0075 Difference (Column 3)	Total
_____ (FT^3)	+ _____ (FT^3)	= _____ (FT^3)

UO

Attachment 3
(Page 1 of 4)

Containment Air Temperature Correction

Date 12/2/14

NOTES

1) If Drywell Temperature changed less than 2 °F, enter zero (0) in Column 8.
2) If Suppression Chamber Air Temperature changed less than 2 °F, enter zero (0) in Column 9
3) Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)
4) Drywell Temperature can be obtained using 1-TI-64-52AB or 1-XR-64-50.
5) It is assumed in 3.6F.6 that the suppression chamber water and atmospheric temperatures are in equilibrium, therefore the use of the average suppression pool water temperature is an acceptable substitute in place of the suppression chamber air temperature.

   IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

   Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

Attachment 3
(Page 2 of 4)

Containment Air Temperature Correction

Date 10/2/14

A. Drywell and Suppression Chamber Data

	DRYWELL			Differential Pressure		Suppression Chamber	
	Pressure		Temp (°F)			Air Temp	Level
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1-PI-64-135 (psig)	1-PI-64-136 (psig)	1-TI-64-52AB or 1-XR-64-50	1-PDI-64-137 (psid)	1-PDI-64-138 (psid)	1-XR-64-52 Point 1(°F) or 1-TR-64-161 (Point 10)	1-LI-64-54A or 66
0000 hours	P_{B1} 1.40	P_{B2} 1.36	T_{B1} 141	P_{B3} 1.27	P_{B4} 1.24	T_{B2} 94.2	N/A
2400 hours	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A

(8) DRYWELL VENTING CORRECTION		(9) SUPRESSION CHMBR VENTING CORRECTION		(10) Total VENTING CORRECTION		UO
_____	FT^3 +	_____	FT^3 =	_____	FT^3	_____

Attachment 3
(Page 3 of 4)
Containment Air Temperature Correction

B. Containment Air Temperature Correction

1. Drywell Air Temperature Correction Equation

$$\left[1 - \left[\frac{\left[14.7 + \left(\frac{P_{B1} + P_{B2}}{2}\right)\right] \times (T_{A1} + 460)}{\left[14.7 + \left(\frac{P_{A1} + P_{A2}}{2}\right)\right] \times (T_{B1} + 460)}\right]\right] \times 159000 = \text{Drywell Temperature Correction}$$

where:

P_{B1} = Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-135

P_{B2} = Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-136

P_{A1} = Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-135

P_{A2} = Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-136

$T_{B1}+460$ = Drywell temperature before venting taken from DRYWELL TEMPERATURE indicator 1-TI-64-52AB or 1-XR-64-50 and corrected to absolute temperature (Rankine)

$T_{A1}+460$ = Drywell temperature after venting taken from DRYWELL TEMPERATURE indicator 1-TI-64-52AB or 1-XR-64-50 and corrected to absolute temperature (Rankine)

Attachment 3
(Page 4 of 4)

Containment Air Temperature Correction

2. Suppression Chamber Air Temperature Correction Equation

$$\left[1 - \left[\frac{14.7 + \left(\frac{P_{B1} + P_{B2}}{2}\right) - \left(\frac{P_{B3} + P_{B4}}{2}\right)}{14.7 + \left(\frac{P_{A1} + P_{A2}}{2}\right) - \left(\frac{P_{A3} + P_{A4}}{2}\right)} \times (T_{A2} + 460)\right] \times (T_{B2} + 460)\right] \times [126200 - [(L_A + 1) \times 909.8]] =$$ Suppression Chamber Temperature Correction

where:

P_{B1}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{B2}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
P_{B3}	=	Drywell/Suppression Chamber differential pressure before venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-137
P_{B4}	=	Drywell/Suppression Chamber differential pressure before venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-138
$T_{B2} + 460$	=	Suppression Chamber temperature before venting taken from SUPPRESSION CHAMBER TEMPERATURE/PRESSURE recorder, (1-XR-64-52 Point 1) OR Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) **IF** (1-XR-64-52 Point 1) is unavailable and corrected to absolute temperature (Rankine) [BFNPER 607653-002]
$T_{A2} + 460$	=	Suppression Chamber temperature after venting taken from SUPPRESSION CHAMBER TEMPERATURE/PRESSURE recorder, 1-XR-64-52 (Point 1) OR Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) **IF** (1-XR-64-52 Point 1) is unavailable and corrected to absolute temperature (Rankine) [BFNPER 607653-002]
P_{A1}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{A2}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
P_{A3}	=	Drywell/Suppression Chamber differential pressure after venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-137
P_{A4}	=	Drywell/Suppression Chamber differential pressure after venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-138
L_A	=	Suppression Chamber water level taken from SUPPR POOL WATER LEVEL indicator 1-LI-64-54A or 66.

Attachment 4
(Page 1 of 1)

Nitrogen Makeup/Suppression Chamber Level

Date 10/2/14

A. Nitrogen Makeup Data (Section 7.6.1)

	EVENT	(1) TIME	(2) MAKEUP DURATION (MINUTES)		(3) N_2 MAKEUP FLOW (CFM)		(4) N_2 ADDED (2) X (3) (FT^3)	(5) CUMULATIVE N_2 MAKEUP (4) + PREVIOUS (5) (FT^3)	UNIT OPER INITIAL
1.				x		=			
2.				x		=			
3.				x		=			
4.				x		=			
5.				x		=			
6.				x		=			
7.				x		=			
8				x		=			

Remarks: _____

Attachment 5
(Page 1 of 1)

Containment Venting Correction

Date 10/2/14

A. Venting Data using 1-FIC 84-20,

NOTES

1) Enter data for each venting event: (ie. flow started and stopped through vent valves)
2) Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)

	EVENT		Calculations				
	(1)	(2)	(3)	(4)	(5)	(6)	
	START TIME	END TIME	ELAPSED VENT TIME (MIN)	FLOW RATE 1-FIC-84-20 (SCFM)	Event Total (SCF) (Note 1)	Total Cumulative Correction (Note 2)	UO
1	2322	2335	13	100	1300	1300	SD
2	2342	2355	13	100	1300	2600	SD
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							

Note 1 Column (3) x Column (4)
Note 2 Previous Event Column (6) + Current Event Column (5)

Attachment 6
(Page 1 of 4)

Alternate Venting Correction

Date 10/2/14

NOTES

1) Alternate Containment Venting Data is performed when 1-FIC-84-20 indication is not available.
2) In this table the BEFORE is prior to establishing flow through the vent valves.
3) The AFTER is when venting is completed, regardless of the number of times for the event. It can also be taken either before or after the DP Air Compressor pumps up the drywell, but do not take data while the DP is running.
4) Use 1-LI-64-54A unless INOP then use 1-LI-64-66.
5) Drywell/Suppression Chamber Venting Correction Factor are absolute values. (No Negative totals)
6) It is assumed in 3.6F.6 that the suppression chamber water and atmospheric temperatures are in equilibrium, therefore the use of the average suppression pool water temperature is an acceptable substitute in place of the suppression chamber air temperature.

   IF SUPP CHBR TEMP,1-TE-64-52B on SUPPRESSION CHAMBER TEMPERATURE/PRESSURE, 1-XR-64-52 (point 1), is unavailable, **THEN**

   Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) can be substituted. [BFNPER 607653-002]

Attachment 6
(Page 2 of 4)

Date 10/2/14

A. Alternate Venting Data (Section 7.7.2)

			DRYWELL			Differential Pressure		Suppression Chamber	
			Pressure		Temp (°F)			Air Temp	Level
(1)			(2)	(3)	(4)	(5)	(6)	(7)	(8)
EVENT TIME			1-PI-64-135 (psig)	1-PI-64-136 (psig)	1-TI-64-52AB or 1-XR-64-50	1-PDI-64-137 (psid)	1-PDI-64-138 (psid)	1-XR-64-52 Point 1(°F) or 1-TR-64-161 (Point 10)	1-LI-64-54A or 66
1		(BEFORE)	P_{B1}	P_{B2}	T_{B1}	P_{B3}	P_{B4}	T_{B2}	N/A
		(AFTER)	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A
2		(BEFORE)	P_{B1}	P_{B2}	T_{B1}	P_{B3}	P_{B4}	T_{B2}	N/A
		(AFTER)	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A
3		(BEFORE)	P_{B1}	P_{B2}	T_{B1}	P_{B3}	P_{B4}	T_{B2}	N/A
		(AFTER)	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A
4		(BEFORE)	P_{B1}	P_{B2}	T_{B1}	P_{B3}	P_{B4}	T_{B2}	N/A
		(AFTER)	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A
5		(BEFORE)	P_{B1}	P_{B2}	T_{B1}	P_{B3}	P_{B4}	T_{B2}	N/A
		(AFTER)	P_{A1}	P_{A2}	T_{A1}	P_{A3}	P_{A4}	T_{A2}	L_A

Attachment 6
(Page 3 of 4)

Date 10/2/14

	(9) DRYWELL VENTING CORRECTION		(10) SUPRESSION CHMBR VENTING CORRECTION		(11) TOTAL VENTING CORRECTION	UO Initials
1	_____ ft^3	+	_____ ft^3	=	_____ ft^3	_____
2	_____ ft^3	+	_____ ft^3	=	_____ ft^3	_____
3	_____ ft^3	+	_____ ft^3	=	_____ ft^3	_____
4	_____ ft^3	+	_____ ft^3	=	_____ ft^3	_____
5	_____ ft^3	+	_____ ft^3	=	_____ ft^3	_____

B. Total Alternate Venting Correction

Sum all of the Total Venting Corrections from Section A, Column 11

(12) TOTAL VENTING CORRECTION	UO Initial
_____ FT^3	_____

Attachment 6
(Page 4 of 4)

C. Alternate Venting Correction Formulas(Section 7.7.2)

1. Drywell Correction Equation

$$\left[1-\left[\frac{14.7+\left(\frac{P_{B1}+P_{B2}}{2}\right)}{14.7+\left(\frac{P_{A1}+P_{A2}}{2}\right)}\times\frac{(T_{A1}+460)}{(T_{B1}+460)}\right]\right]\times 159000 = \text{Drywell Temperature Correction}$$

where:

P_{B1}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{B2}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
P_{A1}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{A2}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
T_{B1}+460	=	Drywell temperature before venting taken from DRYWELL TEMPERATURE indicator 1-TI-64-52AB or 1-XR-64-50 and corrected to absolute temperature (Rankine)
T_{A1}+460	=	Drywell temperature after venting taken from DRYWELL TEMPERATURE indicator 1-TI-64-52AB or 1-XR-64-50 and corrected to absolute temperature (Rankine)

2. Suppression Chamber Correction Equation

$$\left[1-\left[\frac{14.7+\left(\frac{P_{B1}+P_{B2}}{2}\right)-\left(\frac{P_{B3}+P_{B4}}{2}\right)}{14.7+\left(\frac{P_{A1}+P_{A2}}{2}\right)-\left(\frac{P_{A3}+P_{A4}}{2}\right)}\times\frac{(T_{A2}+460)}{(T_{B2}+460)}\right]\right]\times\left[126200-\left[(L_A+1)\times 909.8\right]\right] = \text{Suppression Chamber Temperature Correction}$$

where:

P_{B1}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{B2}	=	Drywell pressure before venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
P_{B3}	=	Drywell/Suppression Chamber differential pressure before venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-137
P_{B4}	=	Drywell/Suppression Chamber differential pressure before venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-138
T_{B2} + 460	=	Suppression Chamber temperature before venting taken from SUPPRESSION CHAMBER TEMPERATURE/PRESSURE recorder, (1-XR-64-52 Point 1) OR Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) **IF** (1-XR-64-52 Point 1) is unavailable and corrected to absolute temperature (Rankine) [BFNPER 607653-002]
T_{A2} + 460	=	Suppression Chamber temperature after venting taken from SUPPRESSION CHAMBER TEMPERATURE/PRESSURE recorder, 1-XR-64-52 (Point 1) OR Suppression Pool Water Temperature, 1-TR-64-161 (Point 10) **IF** (1-XR-64-52 Point 1) is unavailable and corrected to absolute temperature (Rankine) [BFNPER 607653-002]
P_{A1}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-135
P_{A2}	=	Drywell pressure after venting taken from DRYWELL PRESSURE indicator 1-PI-64-136
P_{A3}	=	Drywell/Suppression Chamber differential pressure after venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-137
P_{A4}	=	Drywell/Suppression Chamber differential pressure after venting taken from DW/SUPPR CHBR DIFF PRESS indicator 1-PDI-64-138
L_A	=	Suppression Chamber water level taken from SUPPR POOL WATER LEVEL indicator 1-LI-64-54A or 66.

Attachment 7
(Page 1 of 2)

Average Nitrogen Consumption and Leakage

Date 10/2/14

A. Net Nitrogen Leakage (Section 7.8)

1. **SUM** all Gas additions to obtain the Total Addition:

Gas Addition to the Drywell	
Total Drywell Control Air Leakage	_____ ft^3 Attachment 2, Section A
Cumulative Nitrogen Makeup	+ _____ ft^3 Attachment 4, Section A
Total Gas Addition	= _____ ft^3

2. Air Temperature Correction

Air Temperature	
Total DW and SC Temperature Correction	_____ ft^3 Attachment 3, Section A

3. **SUM** all the Correction Factors to obtain a Total Correction Factor:

Correction Factor	
Total Supp Chamber Level Correction	_____ ft^3 Attachment 1, Section B
Total Venting Correction using 1-FIC 84-20	_____ ft^3 Attachment 5, Section A
Total Alternate Venting Correction	+ _____ ft^3 Attachment 6, Section B
Total Correction Factor	= _____ ft^3

4. **CALCULATE** Net Nitrogen leakage:

Total Gas Addition - Total DW and SC Tempe Correction - Total Correction Factor

Nitrogen Leakage	
Total Gas Addition	_____ ft^3 (Step 1 above)
Total DW and SC Temperature Correction	- _____ ft^3(Step 2 above)
Total Correction Factor	- _____ ft^3(Step 3 above)
Net Nitrogen Leakage	= _____ ft^3

Attachment 7
(Page 2 of 2)

Average Nitrogen Consumption and Leakage

Date 10/2/14

NOTES

1) For calculation purposes, a day consist of 24-hours. During the days when the time changes to Daylight Savings Time (DST) 23-hours will be used. When returning to Central Standard Time (CST) 25-hours will be used.
2) The average nitrogen leakage (adjusted) must be <542 SCFH (Step 6.0A.1). **NOTIFY** the Unit Supervisor (US) if the nitrogen leakage exceeds 542 SCFH (**REFER TO** 1-AOI-64-7 and Tech Specs 3.6.1.1).

B. Average Nitrogen Leakage (Section 7.8.2)

Calculate the Average Nitrogen Leakage

$$\text{Avg. Nitrogen Leakage} = \frac{\text{Net nitrogen leakage} \times 1.136}{\text{Hours during the day}} =$$

$$\text{Avg. Nitrogen Leakage} = \frac{(\quad \text{ft}^3) \times 1.136}{(\quad \text{Hours})}$$

Avg. Nitrogen Leakage _____ SCFH
(AC)

_____(AC)
UO

_____
IV

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	Perform a Loss of Safety Function Determination
JPM NUMBER:	633	REVISION:	0

TASK APPLICABILITY:	■ SRO	☐ STA	☐ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):	S-000-AD-27; Assess LCO/TRM Actions Required for Inoperable Equipment			
K/A RATINGS:	SRO 4.7			
K/A STATEMENT:	2.2.25 - Knowledge of the bases in Technical Specification for limiting conditions for operations and safety limits.			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	Admin – Equipment Control			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: NA TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*
(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

Reed
1/7/15

Job Performance Measure (JPM)

OPERATOR: _____ JPM Number 633

SRO ____ DATE: _____

TASK STANDARD: Performs a Loss of Safety Function Evaluation for the inoperable equipment in accordance with OPDP-8 Attachment 7 Step 3.1, Initiating an LOSF Evaluation.

PRA: NA

REFERENCES/PROCEDURES NEEDED: OPDP-8 Attachment 7 - Safety Function Determination Program (SFDP) BFN Only.

Unit 2 Tech Specs

VERIFICATION TIME: 20 Min

PERFORMANCE TIME: _____

COMMENTS: _____

_____

_____

_____

_____

_____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

****

CLASSROOM:

****

INITIAL CONDITIONS:

Units 1 and 3 are at 100% power.

Unit 2 is at 40% power with 2-GOI-100-1A Unit Startup and Power Operation in progress following a refueling outage.

The B Train of Standby Gas Treatment (SGT) is INOP for scheduled maintenance and is in day 2 of a planned 5 day outage. All LCO actions were taken.

Subsequently,

The IM Forman reports that review of:
2-SR-3.3.1.1.13(4A) **and** 2-SR-3.3.1.1.13(4C) Reactor Protection and Primary Containment Isolation Systems Low Reactor Water Level Instrument Channel A1 (A2) Calibration (2-L-3-203A) **and** (2-L-3-203C), indicate that 2-LIS-3-203A **and** 2-LIS-3-203C were calibrated incorrectly and that they would not produce a trip output until Reactor Water Level lowered to (-) 10 inches.

The appropriate Tech Spec LCO(s) were entered.

INITIATING CUE:

The Shift Manager directs you to perform a Loss of Safety Function Determination.

START TIME_____

STEP / STANDARD	SAT / UNSAT
Step 1: A. Upon determining that a SSC is in a degraded or nonconforming condition and has been declared inoperable, an LOSF evaluation shall be initiated. A flow chart of the process is depicted in Figure 1. B. Determine if the inoperable SSC is directly addressed by a TS LCO. If the SSC is addressed in TS, then go to Step 3.1D, otherwise continue with Step C. C. If the inoperable SSC is not addressed in TS, then determine if it renders another SSC directly addressed in TS inoperable. If the initially inoperable SSC does not render a SSC addressed in TS inoperable, then no further action is required, and no further LOSF evaluation is required. D. Enter the applicable TS Conditions and Required Actions for the inoperable TS SSCs determined in Steps 3.1B and/or 3.1C, above. Standard: Evaluates Step 3.1 A and determines a LOSF Evaluation shall be initiated. Determines the inoperable SSC is directly addressed by a TS LCO and continues to step 3.1.D. Determines that step C is N/A and continues to step D.	___ SAT ___UNSAT ___N/A
NOTE: the initial conditions state The appropriate Tech Spec LCO(s) were entered.	

STEP / STANDARD	SAT / UNSAT
Step 2: E. Determine if any active LCO applies to any of the Support System(s) listed on Attachment 1. Standard: Determines that the Support Systems from Attachment 1 is LCO **3.3.6.1, PCIS INSTRUMENTATION** **3.3.6.2, SECONDARY CONTAINMENT INSTRUMENTATION.** And continues at step F.	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 3: F. Using Attachment 1, determine all Supported System(s) associated with the Support Systems identified in Step 3.1E. (The identified supported system may in turn also be a support system in which case this evaluation would need to be repeated.) Standard: Determines the Supported Systems associated with the Support System identified in Step 3.1E are **LCO 3.6.1.3 PCIVs** **LCO 3.6.4.2 SCIVs** **LCO 3.6.4.3 SGTs.**	**Critical Step** ___ SAT ___UNSAT ___N/A
Step 4: G. Do any current inoperabilities exist against the Supported Systems identified in Step 3.1F? If no, no further evaluations are required. If yes, go to Step 3.1H. Standard: Determines that current inoperabilities exist against the Supported Systems identified in Step 3.1F (SGT) Answers yes, and goes to Step 3.1H.	**Critical Step** ___ SAT ___UNSAT ___N/A

STEP / STANDARD	SAT / UNSAT
Step 5: H. Review Attachment 2 to determine if an LOSF exists. If no LOSF exists, then no further actions are required. If an LOSF exists, then go to Step 3.1I. Standard: Reviews Attachment 2 and determines a LOSF exists because, for Tech Spec 3.3.6.2, Function1 (Reactor Low Level), loss of all required channels in a trip system OR for Tech Spec 3.6.4.3, (Standby Gas Treatment System) two or more SGT subsystems inoperable.	**Critical Step** ___ SAT ___UNSAT ___N/A

STOP TIME _____

END OF TASK

Provide to Applicant

INITIAL CONDITIONS:

Units 1 and 3 are at 100% power.

Unit 2 is at 40% power with 2-GOI-100-1A Unit Startup and Power Operation in progress following a refueling outage.

The B Train of Standby Gas Treatment (SGT) is INOP for scheduled maintenance and is in day 2 of a planned 5 day outage. All LCO actions were taken.

Subsequently,

The IM Forman reports that review of:
2-SR-3.3.1.1.13(4A) **and** 2-SR-3.3.1.1.13(4C) Reactor Protection and Primary Containment Isolation Systems Low Reactor Water Level Instrument Channel A1 (A2) Calibration (2-L-3-203A) **and** (2-L-3-203C), indicate that 2-LIS-3-203A **and** 2-LIS-3-203C were calibrated incorrectly and that they would not produce a trip output until Reactor Water Level lowered to (-) 10 inches.

The appropriate Tech Spec LCO(s) were entered.

INITIATING CUE:

The Shift Manager directs you to perform a Loss of Safety Function Determination.

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	Review a Radiological Survey Map
JPM NUMBER:	544	REVISION:	2

TASK APPLICABILITY:	■ SRO	☐ STA	■ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):	A-000-AD-35 / Use a Radiation Work Permit			
K/A RATINGS:	2.3.7 K/A RATING: RO 3.5 SRO 3.6			
K/A STATEMENT:	Ability to comply with radiation work permit requirements during normal or abnormal conditions.			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	N/A			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐ Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: N/A TIME CRITICAL (Y/N) N ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*

(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

Rec'd
1/7/14

OPERATOR: _____ JPM Number 544

RO ____ SRO ____ DATE: _____

TASK STANDARD: Review a Radiological Survey Map to determine if a task can be completed without exceeding exposure limits

PRA: NA

REFERENCES/PROCEDURES NEEDED: None

VALIDATION TIME: 10 Minutes

PERFORMANCE TIME: _____

COMMENTS: _____

_____

_____

_____

_____

_____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

****

Classroom

****

INITIAL CONDITIONS:

You are a Browns Ferry employee who has obtained a cumulative yearly dose of 850 mrem.

The job will require you to vent the RWCU Regenerative Hx and to manually close the 3-FCV-69-2 (RWCU OUTBD SUCT ISOLATION) valve and place a mechanical restraining device on the valve. You are expected to stay at the vent valve the entire duration of the vent and will require 30 minutes for venting.

Then proceed to 3-FCV-69-2 (RWCU OUTBD SUCT ISOLATION) valve to manually close and install the mechanical restraining device, it will require 10 minutes to close the valve and another 10 minutes to install the mechanical restraining device.

The map of the room has radiological survey information you must interpret to successfully complete this JPM. Assume the 30cm reading will be the whole body dose rate received at each location.

Assume that any transit time has NO dose.

INITIATING CUE:

Given the following survey map, DETERMINE if you can complete the assigned task in the area without exceeding limits.

EXAMINER KEY

ANSWER:

Hx Vent at 30 min
30/60 = .5 hrs
.5 x 250 = 125 mrem to vent Hx

10 min to close valve + 10 min to install device = 20 min
20/60 = .33 hrs
.33 x 100 = 33.3mrem to close valve & install device

125 + 33.3 = 158.3 **(Between 155.0 to 160.0) (Critical)**

158.3 + 850 = 1008.3 (**NO** - not within TVA annual limit of 1Rem) **(Critical)**

Work areas at 30cm dose rate 250 & 100 are both < 500mrem rate alarm

Provide to Applicant

****

Classroom

****

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The map of the room has radiological survey information you must interpret to successfully complete this JPM. Assume the 30cm reading will be the whole body dose rate received at each location.

Assume that any transit time has NO dose.

INITIATING CUE:

Given the following survey map, DETERMINE if you can complete the assigned task in the area without exceeding limits.

Provide to Applicant

BROWNS FERRY NUCLEAR PLANT

Unit: 3
Permit Number: Training
Page: 1

RADIOLOGICAL WORK PERMIT
BRIEFING REQUIRED EVERY ENTRY

GENERAL DESCRIPTION

Status: Active Start Date: 01-Jan-This year End Date: 01-Jan-Next year
Type: SPECIFIC MAP ID: Outage: Y Name:
Task: ROUTINE PLANT MAINTENANCE PSE: N
HP CONTINUOUS Authorization Type: INDIVIDUAL
ALARA Review Number: 0A-0010 Primary Work Doc:
Person-mrem Estimate: 1904 Person-Hrs Estimate: 1082
Dose Alarm: 200 Dose Rate Alarm: 500
DAC-Hrs Tracked: N
Work Area Description: Unit 3 Areas All Elevations

DESCRIPTION OF WORK TO BE PERFORMED

Unit 3 Maintenance on RWCU (69) Systems	(LHRA VARIOUS DRESS) 200 / 250 / 500

ANTI-CONTAMINATION CLOTHING REQUIREMENTS

1	LAB COAT	1,2	BOOTIES, CLOTH, ONE PAIR
1,2	GLOVES, RUBBER, ONE PAIR	1,2,3	CLOTH INSERTS
1,2,3	SHOE COVERS, ONE PAIR	1,2,3	MODESTY CLOTHING
1,2,3	NO PERSONAL OUTER CLOTHING	1,2,3	SURGEON'S CAP
2,3	COVERALLS, ONE PAIR	3	BOOTIES, PLASTIC, TWO PAIR
3	FACE SHIELD	3	RAIN SUIT
3	GLOVES, RUBBER, TWO PAIR	3,4	HOOD

DOSIMETRY REQUIREMENTS

ELECTRONIC DOSIMETER	TLD

BRIEFING REQUIREMENTS

PRE-JOB BRIEFING	

EQUIS

WORK STEPS

1	MANAGEMENT / WO WALKDOWN
2	3-CI-412
3	OPS VALVE LINEUP - 3-OI-69 & HX VENTING
4	07-712928-000
5	06-722560-000

Provide to Applicant

BROWNS FERRY NUCLEAR PLANT

Unit: 3
Permit Number: Training
Page: 1

RADIOLOGICAL WORK PERMIT
BRIEFING REQUIRED EVERY ENTRY

WORKER INSTRUCTIONS

1 DRESSOUT CODE APPLICATIONS 1) FLOOR LEVEL INSP, LOW TO MODERATE CONTAMINATION. 2) MINOR MAINTENANCE, NO PRIMARY SYSTEM BREACH. 3) PRIMARY SYSTEM BREACH, HEAT EXCHANGER VENTING. 4) ANY WORK ABOVE FLOOR LEVEL REQUIRES SAFETY BELT W/ LIFELINE. 5) REQUIRED TO WEAR HEADGEAR OTHER THAN PERSONAL HARDHAT.
2 MONITOR YOUR ED (DAD) FREQUENTLY, EXIT THE AREA PRIOR TO REACHING THE DOSE ALARM SET POINT OR UPON RECEIVING ANY UNEXPECTED ALARMS.
3 DO NOT EXCEED 250 mrem PER ENTRY OR DOSE MARGIN (RAD-REMAINING ALLOWABLE DOSE).
4 REMOTE MONITORING , PEA , OR SIMILAR DEVICE REQUIRED.
5 ED (DAD) TO BE BAGGED (WRAPPED) AND WORN OUTSIDE OF C-ZONE CLOTHING.
6 REVIEW PLANNED WORK OR INSPECTIONS WITH RAD PROTECTION PRIOR TO ENTRY.
7 UTILIZE TIME, DISTANCE, AND SHIELDING ALARA PRINCIPLES.
8 REVIEW APPROPRIATE SURVEY DATA PRIOR TO ENTRY. NOTE AND AVOID POSTED HOT SPOTS. LOCATE AND UTILIZE LOW DOSE WAITING AREAS.
9 RADWORKER SHALL ADHERE TO ANY SPECIAL INSTRUCTIONS (APR, ETC) ON WHICH HE/SHE HAS BEEN BRIEFED BY RAD PROTECTION.
10 NOTIFY RADCON PRIOR TO ANY SYSTEM BREACH.
11 RAD PROTECTION COVERAGE MAY BE PROVIDED FROM OUTSIDE THE C-ZONE.
12 SECURE ALL HOSES, ELECTRICAL CORDS, WELDING LEADS AND OTHER SERVICES ENTERING THE C-ZONE AT THE C-ZONE BOUNDRY AND NOTIFY RAD PROTECTION.
13 NOTIFY RAD PROTECTION OF ANY UNUSUAL RADIOLOGICAL CONDITIONS (FOR EXAMPLE: WATER, LEAKS, RADIATION MONITOR ALARMS).
14 RAD PROTECTION PERMISSION REQUIRED PRIOR TO WELDING, GRINDING, BUFFING OR OTHER SURFACE DISTURBING ACTIVITIES.

APPROVAL

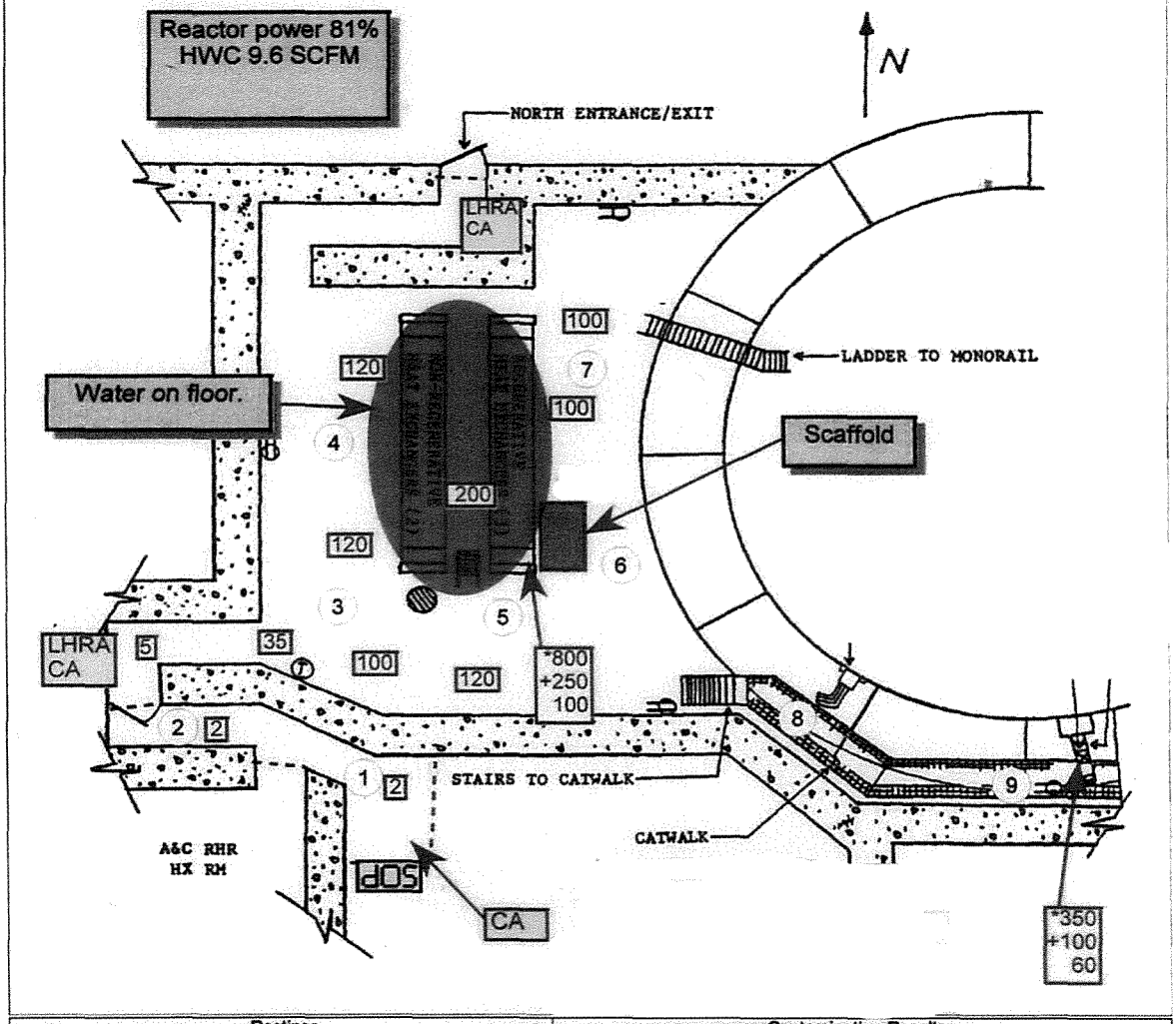
Prepaired by: TJFRANK Approved by: MJHAZEL Final Approval: JWSMITH3

End of RWP

Provide to Applicant

Browns Ferry Radiological Survey

M0044.tif - M0044 Unit 3 RXB 593' RWCU Heat Exchanger Rc | **Survey # 021407-2** | **Date/Time:** Today



Postings
M0044 RX-3 593 RWCU HTX Room OPS venting heat exchangers. ND Beta HWC 9.6 scfm power @81%
Surveyed by: Rose, Edward D. Instrument Nos.: 534105,448,562898

Date	Survey #	Surveyed By:

Contamination Results:	
1)	20000 DPM/100 cm2
2)	40000 DPM/100 cm2
3)	300000 DPM/100 cm2
4)	1300000 mrad/hr/100 cm2
5)	200000 DPM/100 cm2
6)	250000 DPM/100 cm2
7)	400000 DPM/100 cm2
8)	80000 DPM/100 cm2
9)	200000 DPM/100 cm2

Symbol Legend (for example only)

Dose Rate
*150 Contact Reading
+ 75 30 cm Reading
20 General Area
HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear 15 Air Sample 0 RM 15 Wipe

Survey printed on: Today

Job Performance Measure (JPM)

SITE:	BFN	JPM TITLE:	Classify the event per REP (Uncontrolled water level decrease in SFSP)
JPM NUMBER:	621TC	REVISION:	1

TASK APPLICABILITY:	■ SRO	☐ STA	☐ UO	☐ NAUO
TASK NUMBER / TASK TITLE(S):	S-000-EM-21 / Classify and Declare an Abnormal/Emergency Event			
K/A RATINGS:	2.4.41	K/A RATING: SRO 4.6		
K/A STATEMENT:	Knowledge of the emergency action level thresholds and classifications			
RELATED PRA INFORMATION:	N/A			
SAFETY FUNCTION:	N/A			

EVALUATION LOCATION:	☐ In-Plant	☐ Simulator	☐ Control Room	☐ Lab
	■ Other - List	Classroom		

APPLICABLE METHOD OF TESTING: ☐Discussion ☐ Simulate/Walkthrough ■ Perform

TIME FOR COMPLETION: 15+15 TIME CRITICAL (Y/N) Y ALTERNATE PATH (Y/N) N

Developed by: _____ _____
Developer *Date*

(Ensure validator is briefed on exam security per NPG-SPP-17.8.1)
(See JPM Validation Checklist in NPG-SPP-17.8.2)

Validated by: _____ _____
Validator *Date*

Approved by: _____ _____
Site Training Management *Date*

Approved by: _____ _____
Site Training Program Owner *Date*

Rec'd 1/7/15

OPERATOR: _____ JPM Number: 621TC

RO ____ SRO X DATE: _____

TASK STANDARD: The event is classified as an ALERT based on uncontrolled water level decrease in the spent fuel pool with irradiated fuel assemblies expected to result in irradiated fuel assemblies being uncovered

PRA: NA

REFERENCES/PROCEDURES NEEDED: EPIP-1, EPIP-3

VALIDATION TIME: 15 min. to classify and 15 minutes to complete Appendix A

PERFORMANCE TIME: _____

COMMENTS: _____

Additional comment sheets attached? YES ___ NO ___

RESULTS: SATISFACTORY ____ UNSATISFACTORY ____ (Retain entire JPM for records)

SIGNATURE: _____ DATE: _____
EXAMINER

CLASSROOM

INITIAL CONDITIONS:

You are the Shift Manager. Units 1, 2, and 3 were operating at 100% power when Unit 1 received Start of Strong Motion Accelerograph (9-22C, W5) and personnel in the Control Room felt the floor shake.

- The Condensate makeup valve 2-SHV-078-0532 is danger tagged closed.
- Unit 2 received Fuel Pool Skimmer Surge Tank Level Lo/Lo-Lo (9-4C, W4).
- Compensatory hoses connected to demin water connections are not maintaining Fuel Pool level.
- Unit 2 received Fuel Pool System Abnormal (9-4C, W1) AND Fuel Pool Floor Area Radiation High (9-3A, W1)
- The Fuel Pool liner is leaking and Fuel Pool level is lowering. Unit 2 entered 2-AOI-78-1, Fuel Pool Cleanup System Failure
- Loss of Offsite Power occurred and the C and D Diesel Generators failed to start.
- Unit 2 attempted to restore Fuel Pool level using EECW however, 1-SHV-067-0792 North Header supply to Emergency Fuel Pool Make Up will not open and the South EECW header is depressurized.
- Unit 2 attempted to align RHRSW to inject to the Fuel Pool; however, 1-FCV-23-57, Standby Coolant valve would not open electrically.
- The Fuel Pool leak is progressively getting larger and the Fuel Pool level will be at the top of the fuel bundles within 15 minutes.

CURRENT CONDITIONS:

Reactor Water Level	(-) 20 inches and rising
Reactor Pressure	650 psig and lowering
DW Pressure	1.35 psig and steady
DW Temperature	148 °F and steady
SP Temperature	115 °F and slowly rising
Torus Level	+1 inch on narrow range and slowly rising
Fuel Pool Level	15 feet below the ventilation duct opening
2-RI-90-1A Fuel Pool Area El 664	250 mR/HR and slowly rising
2-RI-90-2A Service Floor Area El 664	200 mR/HR and slowly rising
Wind Direction	105°
Wind Speed	10 mph

0-SI-4.8.b.1.a.1, Airborne Effluent Release Rate, Release Fraction 0.91

INITIATING CUE:

Identify the HIGHEST <u>REQUIRED</u> emergency classification, and complete the required actions. Raise your hand <u>immediately</u> once you have classified the event, and the examiner will provide you with the EPIP associated with the classification you have declared.

THIS JPM IS TIME CRITICAL

BFN Unit 0	EMERGENCY CLASSIFICATION PROCEDURE EVENT CLASSIFICATION MATRIX	EPIP-1 Rev. 0049 PAGE 19 OF 205

WATER LEVEL

	Description	Description	
	1.1-U1 NOTE	1.1-U2	UNUSUAL EVENT
	Uncontrolled water level decrease in Reactor Cavity with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION: Mode 5	Uncontrolled water level decrease in Spent Fuel Pool with irradiated fuel assemblies expected to remain covered by water. OPERATING CONDITION ALL	
	1.1-A1 NOTE	1.1-A2	ALERT
	Uncontrolled water level decrease in Reactor Cavity expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: Mode 5	Uncontrolled water level decrease in Spent Fuel Storage Pool expected to result in irradiated fuel assemblies being uncovered. OPERATING CONDITION: ALL	
	1.1-S1 NOTE	1.1-S2	SITE EMERGENCY
	Reactor water level can NOT be maintained above -162 inches. (TAF) OPERATING CONDITION: ALL	Reactor water level can NOT be determined. OPERATING CONDITION: Mode 1 or 2 or 3	
	1.1-G1	1.1-G2 NOTE TABLE	GENERAL EMERGENCY
	Reactor water level can NOT be restored and maintained above -180 inches. OPERATING CONDITION: Mode 1 or 2 or 3	Reactor water level can NOT be determined **AND** Either of the following exists: • The reactor will remain subcritical without boron under all conditions, and ➢ Less than 4 MSRVs can be opened, or ➢ Reactor pressure can NOT be restored and maintained above Suppression Chamber pressure by at least 70 psi. • It has NOT been determined that the reactor will remain subcritical without boron under all conditions and unable to restore and maintain MARFP in Table 1.1-G2. OPERATING CONDITION: Mode 1 or 2 or 3	

Key

APPENDIX A
Page 1 of 1
ALERT INITIAL NOTIFICATION FORM

1. ☒ This is a Drill ☐ This is an Actual Event - Repeat - This is an Actual Event

2. The SED at **Browns Ferry** has declared an **ALERT**.

3. **EAL Designator:** 1.1-A2 (USE ONLY ONE EAL DESIGNATOR)

4. **Radiological Conditions:** (Check one under both Airborne and Liquid column.)

Airborne Releases Offsite	**Liquid** Releases Offsite
☒ Minor releases within federally approved limits[1]	☒ Minor releases within federally approved limits[1]
☐ Releases above federally approved limits[1]	☐ Releases above federally approved limits[1]
☐ Release information not known ([1]Tech Specs/ODCM)	☐ Release information not known ([1]Tech Specs/ODCM)

5. **Event Declared:** Time: Now Central Time Date: Today

6. **Protective Action Recommendation:** ☒ None

Completed By : Student's signature

Peer Checked By: _____

START TIME: _____

STEP / STANDARD	SAT / UNSAT
Step 1: Refers to EPIP-1 to classify the event Standard: Classifies an ALERT, EAL 1.1-A2, based on uncontrolled water level decrease in Spent Fuel Storage Pool expected to result in irradiated fuel assemblies being uncovered.	**Critical Step** ___ SAT ___UNSAT ___N/A

TIME CLASSIFIED: _____

START TIME: _____

STEP / STANDARD	SAT / UNSAT

Step 2:
 	
Refers to EPIP-3
 	
Standard:
 	
Completes Appendix A of EPIP-3, with the following critical items
• Item 3 (EAL Designator)
• Item 4
  o Airborne Releases Offsite (Minor releases within federally approved limits)
  o Liquid Releases Offsite (Minor releases within federally approved limits)
• Item 5 (Current time and date)
• Signature
	Critical Step
	
	___ SAT
	
	___UNSAT
	
	___N/A

TIME APPENDIX COMPLETE: _____

End of Task

Provide to Applicant

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INITIATING CUE:

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THIS JPM IS TIME CRITICAL