INITIAL SUBMITTAL

CATAWBA EXAM
50-413, 414/2001-301

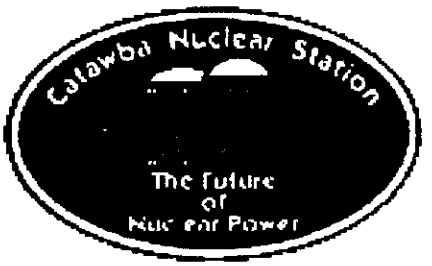
APRIL 2 - 6 & 16 - 20, 2001

INITIAL SUBMITTAL JPMS

ADMINISTRATIVE JPMs/QUESTIONS
SIMULATOR JPMs,
IN-PLANT JPMs, AND
INITIAL ADMIN TOPICS OUTLINE
(ES-301-1),
CONTROL ROOM SYSTEMS &
FACILITY WALK-THROUGH OUTLINE
(ES-301-2)

Duke Power SM

A Duke Energy Company



2001 NRC EXAM
RO ADMIN JPM SET

2001 NRC EXAM RO ADMIN JPM SET	
JPM #	Title
R-1/ADMIN	Perform Autolog Entry
R-2/ADMIN	Perform a Manual Shutdown Margin Calculation (Unit at Power)
R-3/ADMIN	Perform a Review of a R&R Procedure
R-4/ADMIN	Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits
R-5/ADMIN	Activate the Oil Spill Response Team

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM 1R/ADMIN

Perform Autolog Entry

CANDIDATE _____

EXAMINER _____

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform an Autolog Entry for PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test)

Alternate Path:

N/A

Facility JPM #:

NEW

K/A Rating(s):

GA2.1.18 (2.9/3.0)

Task Standard:

Candidate performs an Autolog Entry to perform PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test).

Preferred Evaluation Location:

Simulator ____ In-Plant _X___

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OMP 2-17 (Unit Unified Logbook Maintenance) Rev. 31

Validation Time: 8 min **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Tools/Equipment/Procedures Needed:

Computer with Autolog Capability

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

You are the Unit 1 Balance of Plant Operator

PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test) is to be performed by a current, on duty shift NLO.

INITIATING CUE:

The CRSRO instructs you to make applicable Autolog entry for performance of PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test) to begin at the current date and time.

JPM OVERALL STANDARD:

Candidate correctly completes Autolog entry for PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test) to begin at the current date and time.

STEP 1: Candidate initializes Autolog program for Unit 1 from the DAE Screen. STANDARD: Candidate clicks on "Autolog – CNS" on DAE Screen COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 2: Candidate enters proper LAN ID and Autolog Password STANDARD: Information correctly entered. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 3: Candidate clicks "New Entry" button to bring up "Log Entry" menu STANDARD: "New Entry" button is clicked and "Log Entry" menu appears COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 4: Candidate selects "Open/Performed" option located beside "Periodic Tests" STANDARD: "Open/Performed" is selected and list of procedure numbers and titles appears COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT

STEP 5: Operator highlights PT/1/A/4200/005A TANDARD: PT/1/A/4200/005A highlighted COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 6: Operator selects "START" button and "Log Entry" Screen appears STANDARD: "START" selected and "Log Entry" Screen appears COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 7: Candidate enters following data: Date and Time: Current date and time Train: A Test Group: Operations Test Coordinator: Title of any on duty SRO STANDARD: Date and Time: Current date and time Train: A Test Group: Operations Test Coordinator: Any on duty SRO, (OSM, CRSRO, Unit SRO, WCC SRO COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 8: Candidate selects "PT Logs – PT Logs" From the pulldown menu of the sublog and selects "OK" STANDARD: "PT Logs – PT Logs" highlighted COMMENTS:	___SAT ___UNSAT

NOTE: Candidate may deselect Spell Check or run Spell Check. Either is acceptable STEP 9: Candidate selects "OK" to complete entry STANDARD: Candidate selects "OK" to complete entry *****CUE: "OK" has been selected.*** COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
This JPM is complete.	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

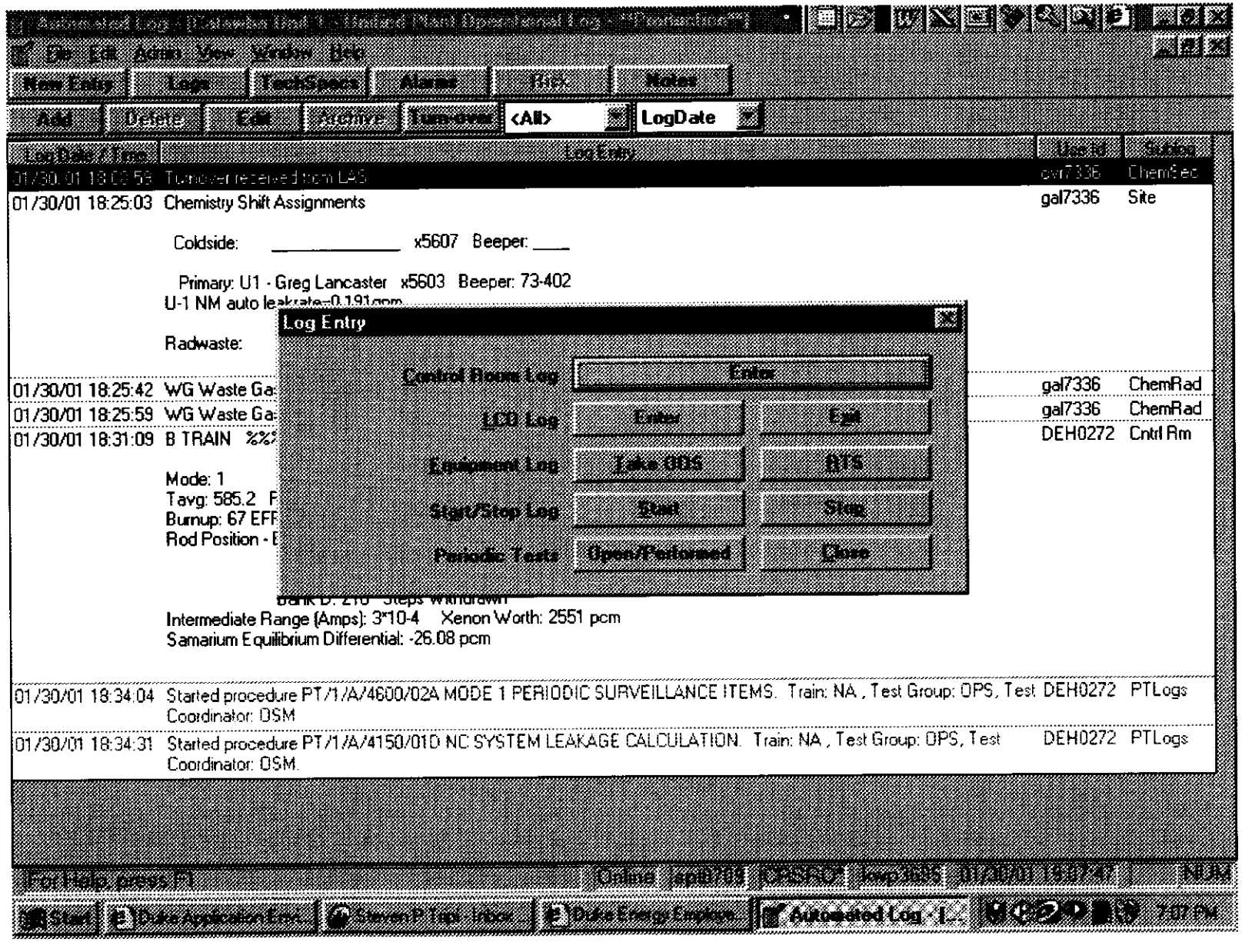
INITIAL CONDITIONS:

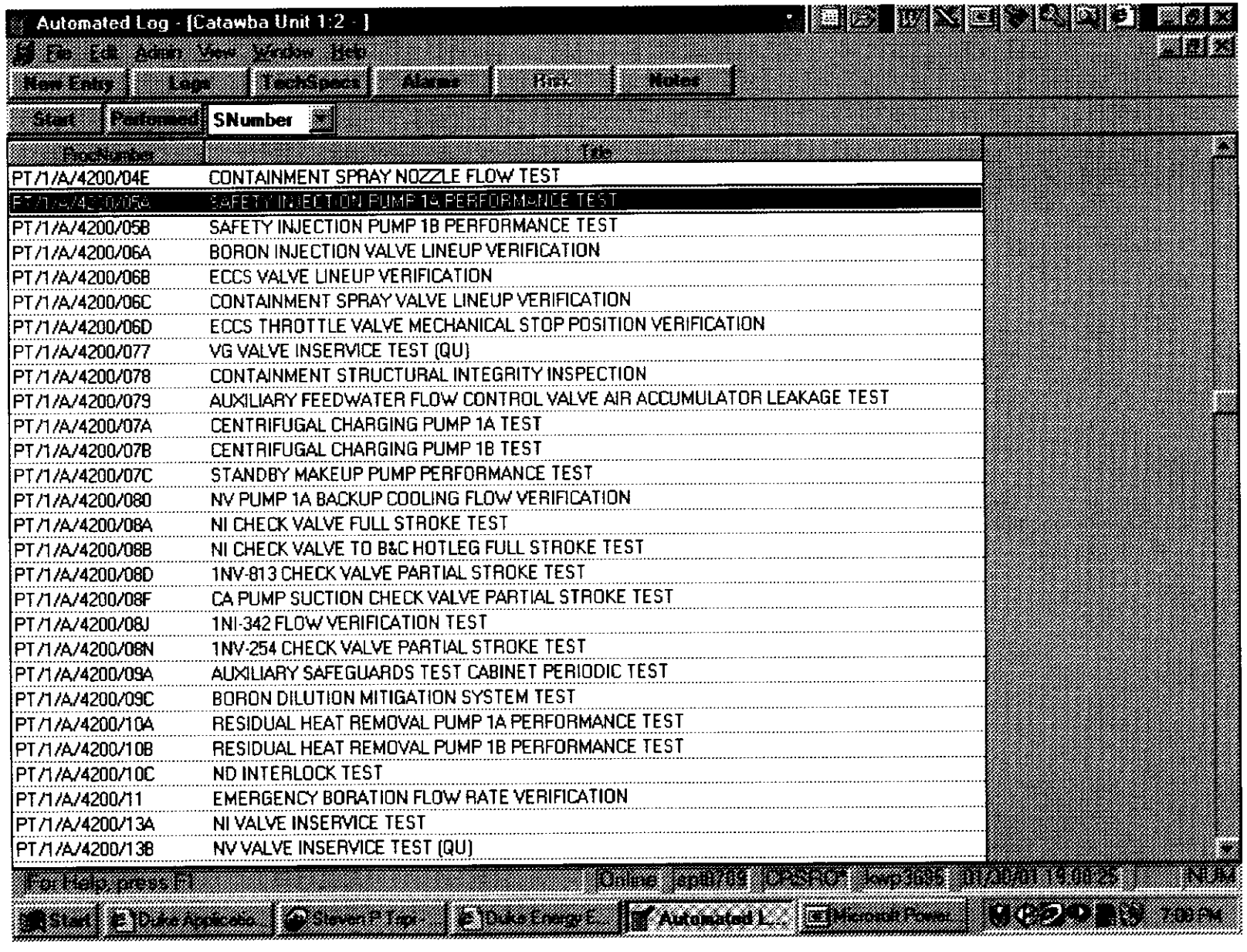
You are the Unit 1 Balance of Plant Operator

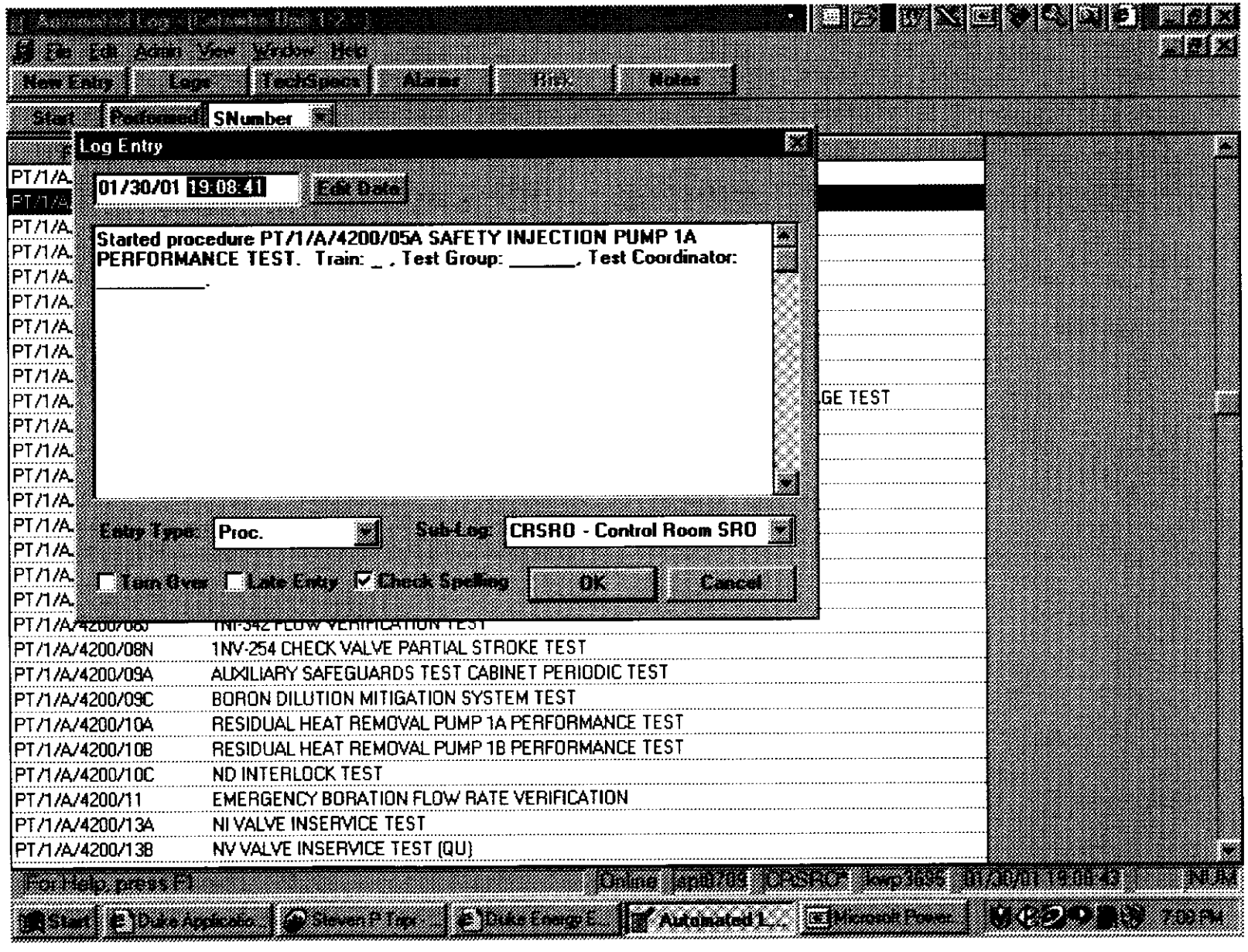
PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test) is to be performed by a current, on duty shift NLO.

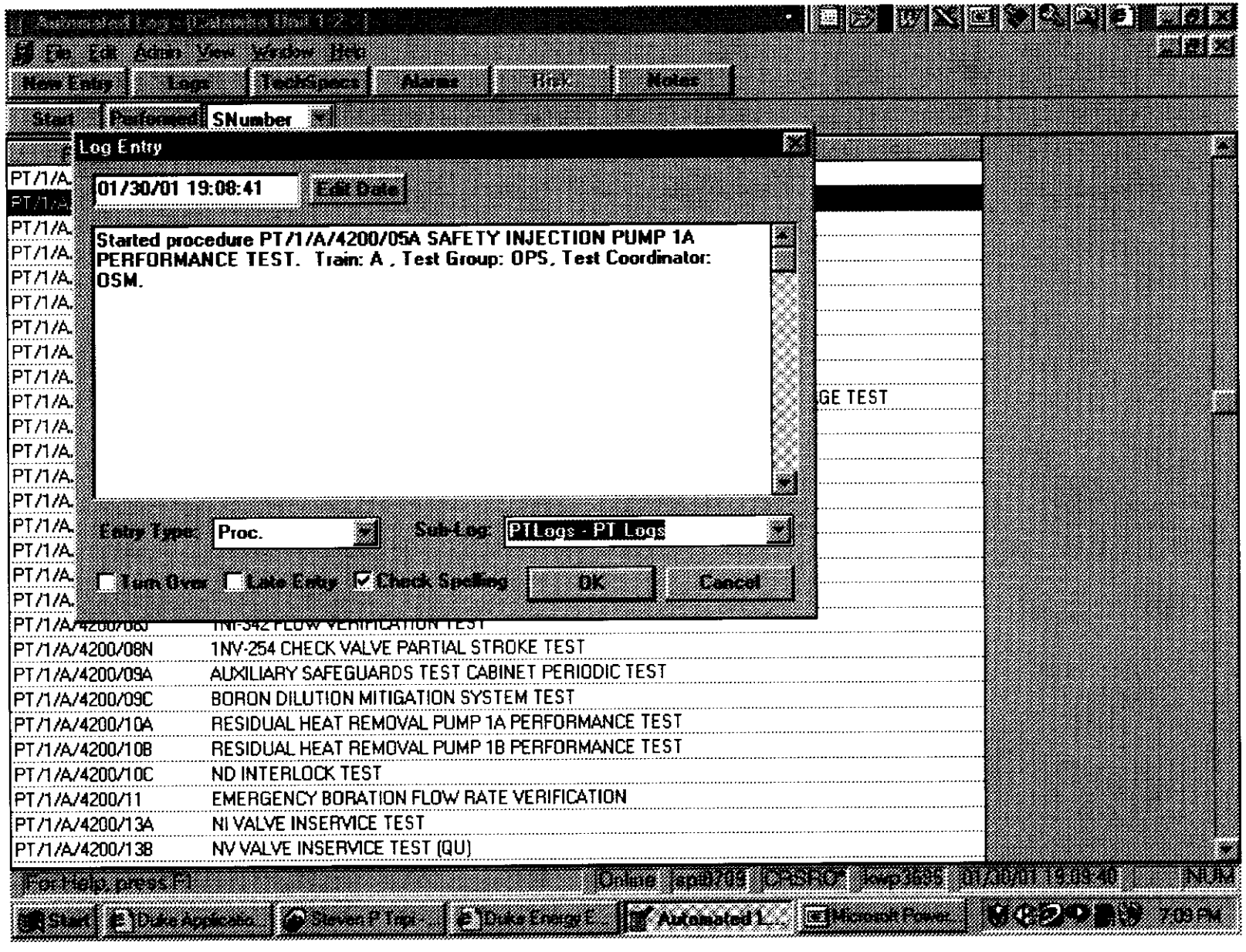
INITIATING CUE:

The CRSRO instructs you to make applicable Autolog entry for performance of PT/1/A/4200/005A (Safety Injection Pump 1A Performance Test) to begin at the current date and time.


File Edit Admin View Window Help
New Entry
Logs
TechSpecs
Alarms
Tools
Notes
Add
Delete
Edit
Archive
Turnover
<All>
LogDate
Log Date / Time
Log Entry
User Id
Status
01/30/01 18:25:03 Chemistry Shift Assignments
gal7336 Site
Coldside: _____ x5607 Beeper: ____
Primary: U1 - Greg Lancaster x5603 Beeper: 73-402
Radwaste:
Log Entry
Control Room Log
Enter
LCO Log
Enter
Exit
Equipment Log
Lake ODS
RTS
Start/Stop Log
Start
Stop
Periodic Tests
Open/Performed
Close
01/30/01 18:25:42 WG Waste Ga
gal7336 ChemRad
01/30/01 18:25:59 WG Waste Ga
gal7336 ChemRad
01/30/01 18:31:09 B TRAIN
DEH0272 Cntrl Rm
Mode: 1
Tavg: 585.2
Burnup: 67 EFF
Rod Position -
Intermediate Range (Amps): 3*10-4 Xenon Worth: 2551 pcm
Samarium Equilibrium Differential: -26.08 pcm
01/30/01 18:34:04 Started procedure PT/1/A/4600/02A MODE 1 PERIODIC SURVEILLANCE ITEMS. Train: NA , Test Group: OPS, Test Coordinator: OSM
DEH0272 PTLogs
01/30/01 18:34:31 Started procedure PT/1/A/4150/01D NC SYSTEM LEAKAGE CALCULATION. Train: NA , Test Group: OPS, Test Coordinator: OSM.
DEH0272 PTLogs
For Help, press F1
Online
NUM
Start
Automated Log - L...
7:07 PM


Automated Log - [Catawba Unit 1:2 -]
File Edit Admin View Window Help
New Entry
Logs
TechSpecs
Alarms
Risk
Notes
Start
Performed
SNumber
ProcNumber
Title
PT/1/A/4200/04E CONTAINMENT SPRAY NOZZLE FLOW TEST
PT/1/A/4200/05A SAFETY INJECTION PUMP 1A PERFORMANCE TEST
PT/1/A/4200/05B SAFETY INJECTION PUMP 1B PERFORMANCE TEST
PT/1/A/4200/06A BORON INJECTION VALVE LINEUP VERIFICATION
PT/1/A/4200/06B ECCS VALVE LINEUP VERIFICATION
PT/1/A/4200/06C CONTAINMENT SPRAY VALVE LINEUP VERIFICATION
PT/1/A/4200/06D ECCS THROTTLE VALVE MECHANICAL STOP POSITION VERIFICATION
PT/1/A/4200/077 VG VALVE INSERVICE TEST (QU)
PT/1/A/4200/078 CONTAINMENT STRUCTURAL INTEGRITY INSPECTION
PT/1/A/4200/079 AUXILIARY FEEDWATER FLOW CONTROL VALVE AIR ACCUMULATOR LEAKAGE TEST
PT/1/A/4200/07A CENTRIFUGAL CHARGING PUMP 1A TEST
PT/1/A/4200/07B CENTRIFUGAL CHARGING PUMP 1B TEST
PT/1/A/4200/07C STANDBY MAKEUP PUMP PERFORMANCE TEST
PT/1/A/4200/080 NV PUMP 1A BACKUP COOLING FLOW VERIFICATION
PT/1/A/4200/08A NI CHECK VALVE FULL STROKE TEST
PT/1/A/4200/08B NI CHECK VALVE TO B&C HOTLEG FULL STROKE TEST
PT/1/A/4200/08D 1NV-813 CHECK VALVE PARTIAL STROKE TEST
PT/1/A/4200/08F CA PUMP SUCTION CHECK VALVE PARTIAL STROKE TEST
PT/1/A/4200/08J 1NI-342 FLOW VERIFICATION TEST
PT/1/A/4200/08N 1NV-254 CHECK VALVE PARTIAL STROKE TEST
PT/1/A/4200/09A AUXILIARY SAFEGUARDS TEST CABINET PERIODIC TEST
PT/1/A/4200/09C BORON DILUTION MITIGATION SYSTEM TEST
PT/1/A/4200/10A RESIDUAL HEAT REMOVAL PUMP 1A PERFORMANCE TEST
PT/1/A/4200/10B RESIDUAL HEAT REMOVAL PUMP 1B PERFORMANCE TEST
PT/1/A/4200/10C ND INTERLOCK TEST
PT/1/A/4200/11 EMERGENCY BORATION FLOW RATE VERIFICATION
PT/1/A/4200/13A NI VALVE INSERVICE TEST
PT/1/A/4200/13B NV VALVE INSERVICE TEST (QU)
For Help, press F1
Online
Start
7:00 PM


File Edit Admin View Window Help
New Entry
Logs
TechSpecs
Alarms
RIR
Notes
Start
Performed
SNumber
Log Entry
01/30/01 19:08:41
Edit Date
Started procedure PT/1/A/4200/05A SAFETY INJECTION PUMP 1A PERFORMANCE TEST. Train: _ . Test Group: _____. Test Coordinator: _____.
Entry Type: Proc.
Sub-Log: CRSRO - Control Room SRO
Turn Over
Late Entry
Check Spelling
OK
Cancel
PT/1/A/4200/08N 1NV-254 CHECK VALVE PARTIAL STROKE TEST
PT/1/A/4200/09A AUXILIARY SAFEGUARDS TEST CABINET PERIODIC TEST
PT/1/A/4200/09C BORON DILUTION MITIGATION SYSTEM TEST
PT/1/A/4200/10A RESIDUAL HEAT REMOVAL PUMP 1A PERFORMANCE TEST
PT/1/A/4200/10B RESIDUAL HEAT REMOVAL PUMP 1B PERFORMANCE TEST
PT/1/A/4200/10C ND INTERLOCK TEST
PT/1/A/4200/11 EMERGENCY BORATION FLOW RATE VERIFICATION
PT/1/A/4200/13A NI VALVE INSERVICE TEST
PT/1/A/4200/13B NV VALVE INSERVICE TEST (QU)
For Help, press F1
Online
Start
7:09 PM


Automated Logs - [Rotating Unit 1 (2...]
File Edit Admin View Window Help
New Entry
Logs
TechSpecs
Alarms
RIPC
Notes
Start
Performed
SNumber
Log Entry
01/30/01 19:08:41
Edit Date
Started procedure PT/1/A/4200/05A SAFETY INJECTION PUMP 1A PERFORMANCE TEST. Train: A , Test Group: OPS, Test Coordinator: OSM.
Entry Type:
Proc.
Sub-Log:
PTLogs - PT Logs
Turn Over
Late Entry
Check Spelling
OK
Cancel
PT/1/A/4200/08N 1NV-254 CHECK VALVE PARTIAL STROKE TEST
PT/1/A/4200/09A AUXILIARY SAFEGUARDS TEST CABINET PERIODIC TEST
PT/1/A/4200/09C BORON DILUTION MITIGATION SYSTEM TEST
PT/1/A/4200/10A RESIDUAL HEAT REMOVAL PUMP 1A PERFORMANCE TEST
PT/1/A/4200/10B RESIDUAL HEAT REMOVAL PUMP 1B PERFORMANCE TEST
PT/1/A/4200/10C ND INTERLOCK TEST
PT/1/A/4200/11 EMERGENCY BORATION FLOW RATE VERIFICATION
PT/1/A/4200/13A NI VALVE INSERVICE TEST
PT/1/A/4200/13B NV VALVE INSERVICE TEST (QU)
For Help, press F1
Online
01/30/01 19:09:40
NUM
Start
Automated L...
7:09 PM

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM 2R/ADMIN

Perform a Manual Shutdown Margin Calculation
(Unit at Power)

CANDIDATE _____

EXAMINER _____

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform a manual shutdown margin calculation (Unit at Power) per OP/0/A/6100/006 (Reactivity Balance Calculation)

Alternate Path:

N/A

Facility JPM #:

OP-CN-RT-RB-121 (Modified)

K/A Rating(s):

GKA 2.1.25 (2.8/3.1)

Task Standard:

Determine if adequate shutdown margin exists per Technical Specifications.

Preferred Evaluation Location:

Simulator ___ In-Plant __X___

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OP/0/A/6100/006 (Reactivity Balance Calculation), Rev. 62
Unit 1 Reactor Operating Data Bok

Validation Time: 15 min **Time Critical:** No

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Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Simulator Setup

N/A

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

You are the Unit 1 OATC. The Reactivity Computer (REACT) is out of-service.

Current plant conditions are as follows:

- Power level = 99%
- Boron Concentration: 959 ppm
- Core burnup: 150 EFPD
- Control rod bank A: 226 steps
- Control rod bank B: 226 steps
- Control rod bank C: 226 steps
- Control rod bank D: 198 steps

Redundant

Current boron concentration is 959 ppm

INITIATING CUE:

You have just been informed by the Control Room SRO that the following rods are untrippable:

- F-10
- B-12

Perform a Shutdown Margin Calculation per OP/0/A/6100/006 (Reactivity Balance Calculation) Enclosure 4.3 and determine if adequate shutdown margin exists per Technical Specifications. Calculation verification is waived.

Need to be specific re accuracy required for full credit

JPM OVERALL STANDARD:

Candidate determines that shutdown margin is less than required.

K/A 2.1.25 (2.8/3.1)

TEP 1: Determines that Enclosure 4.3 is applicable from Initiating Cue. STANDARD: N/A. COMMENTS:	___SAT ___UNSAT
STEP 2: Limits and Precautions have been reviewed. STANDARD: Examinee reviews Limits and Precautions. COMMENTS:	___SAT ___UNSAT
STEP 3: Record data required in step 2.1. STANDARD: Operator determines the following using the initial conditions. Unit: 1 Date/Time: Present Date/Time Present Thermal Power, Best Estimate: 99% Present Cycle Burnup: 150 EFPD Present Control Bank Position: 198 SWD, Control Bank D Number of untrippable RCCA(s): 2 Untrippable RCCA(s) core location(s): F-10, B-12 COMMENTS:	___SAT ___UNSAT

STEP 4: Determine total available rod worth. STANDARD: Determine total available rod worth to be 4856 pcm per section 5.7 of R.O.D. Manual. COMMENTS: Exact value only. No allowance.	**CRITICAL STEP** ___SAT ___UNSAT
STEP 5: Determine there are multiple untrippable RCCA's. STANDARD: N/A steps 2.2.3 and 2.2.4. COMMENTS: It is critical that steps 2.2.3 and 2.2.4 not be performed. Whether both steps are actually marked "N/A" is not critical.	**CRITICAL STEP** ___SAT ___UNSAT
STEP 6: Determine location of highest reactivity worth RCCA and its reactivity worth penalty. STANDARD: Determines RCCA F-10 is highest worth. Rod worth is 738 pcm per section 5.8 of the R.O.D. Manual. COMMENTS: RCCA F-10 worth = 738 pcm RCCA B-12 worth = 40 pcm	**CRITICAL STEP** ___SAT ___UNSAT
STEP 7: Determine maximum stuck rod worth during cycle. STANDARD: Determines maximum stuck rod worth during cycle is 1106 pcm per section 5.7 of the R.O.D. Manual. COMMENTS: Exact value only. No allowance.	**CRITICAL STEP** ___SAT ___UNSAT

STEP 8: Calculate total untrippable RCCA reactivity worth penalty. TANDARD: Calculates a penalty at 1844 pcm. COMMENTS: (738 + 1106) = 1844 pcm.	**CRITICAL STEP** ___SAT ___UNSAT
EXAMINER NOTE: The candidate should read the note prior to step 2.2.10 and choose the conservative (highest reactivity worth) value.	
STEP 9: Calculate inserted reactivity worth of rods. STANDARD: Determines: Reactivity worth of HZP, No Xenon to be 59 pcm. Reactivity worth at HZP Peak Xenon to be 115 pcm. Calculates an inserted reactivity worth of 87 pcm. COMMENTS: $\frac{(59+115)}{2}$ = 87 pcm	**CRITICAL STEP** ___SAT ___UNSAT
STEP 10: Calculate available reactivity worth of trippable rods. STANDARD: Determines: Total available rod worth 4856 pcm Untrippable RCCA penalty 1844 pcm Inserted Rod Worth 87 pcm Calculates 2925 pcm available worth of trippable RCCA's COMMENTS: 4856 - 1844 - 87 = 2925	**CRITICAL STEP** ___SAT ___UNSAT
EXAMINER NOTE: The candidate should read the note prior to step 2.3 and choose the conservative (highest reactivity worth) value.	

STEP 10: Determine worst case power defect for present conditions. TANDARD: Determine: Power defect of 1742 pcm per section 5.9 of R.O.D. Manual Transient Flux Redistribution Allowance of 271 pcm per Section 5.7 of the R.O.D. Manual. Calculates worst case power defect of 2013 pcm. COMMENTS: 1742 + 271 = 2013 pcm	**CRITICAL STEP** ___SAT ___UNSAT
STEP 12: Calculate SDM for present conditions. STANDARD: Determines available worth of trippable RCA's 2925 pcm Worst Case Power Defect 2013 pcm Calculates present SDM of 912 pcm COMMENTS: 2925 - 2013 = 912 pcm	**CRITICAL STEP** ___SAT ___UNSAT
STEP 13: Determines that SDM is not adequate. STANDARD: Determine present SDM is less than 1300 pcm. COMMENTS: Compares present calculated SDM with limits specified in COLR (per TS 3.1.1).	**CRITICAL STEP** ___SAT ___UNSAT

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

You are the Unit 1 OATC. The Reactivity Computer (REACT) is out of-service.

Current plant conditions are as follows:

- Power levels = 99%
- Boron Concentration: 959 ppm
- Core burnup: 150 EFPD
- Control rod bank A: 226 steps
- Control rod bank B: 226 steps
- Control rod bank C: 226 steps
- Control rod bank D: 198 steps

Current boron concentration is 959 ppm.

INITIATING CUE:

You have just been informed by the Control Room SRO that the following rods are untrippable:

- F-10
- B-12

Perform a Shutdown Margin Calculation per OP/0/A/6100/006 (Reactivity Balance Calculation) Enclosure 4.3 and determine if adequate shutdown margin exists per Technical Specifications. Calculation verification is waived.

Shutdown Margin - Untrippable RCCA(S) - Modes 1 & 2

1. Initial Conditions

1.1 Limits and Precautions have been reviewed.

2. Procedure

NOTE:
1. In Modes 1 or 2 with all RCCA's trippable, shutdown margin is satisfied provided control banks are positioned above the Control Rod Insertion limits in Section 2.2 of the R.O.D. manual (and if Unit shutdown occurs, T-COLD remains above the Allowable Moderator Temperature limit of Section 2.6 of the R.O.D. manual.)
2. Assume all values are positive unless otherwise indicated by parentheses. **IF** parentheses precede the value [i.e. ( )_____ pcm], record the sign provided with data. The calculations account for these sign conventions.

2.1 Determine the following information:

Step	Description	Reference	Value
2.1.1	Unit	N/A	1
2.1.2	Date/Time	N/A	Current
2.1.3	Present Thermal Power, Best Estimate	P1385	99 %
2.1.4	Present cycle burnup	P1457 or Reactor Group Duty Engineer	150 EFPD
2.1.5	Present control bank position	N/A	198 SWD on Control Bank D
2.1.6	Number of untrippable RCCA(s)	N/A	2
2.1.7	Untrippable RCCA(s) core locations(s).	N/A	F-10, B-12

2.2 Determine available reactivity worth of trippable RCCA's for present conditions:

2.2.1 Determine Total Available Rod Worth (Section 5.7 of R.O.D. manual) 4856 pcm

2.2.2 **IF** there are multiple untrippable RCCA's, N/A steps 2.2.3 and 2.2.4

2.2.3 Determine reactivity worth penalty for untrippable RCCA core location of Step 2.1.7 (Section 5.8 of R.O.D. manual). N/A pcm

2.2.4 N/A steps 2.2.5 through 2.2.8.

2.2.5 Determine untrippable RCCA of Step 2.1.7 with the highest reactivity worth penalty(Section 5.8 of ROD Manual). Core Location 738

2.2.6 Record reactivity worth of the untrippable RCCA of Step 2.2.5 (Section 5.8 of ROD Manual). 738 pcm

2.2.7 Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). 1106 pcm

2.2.8 Calculate total untrippable RCCA reactivity worth penalty for multiple untrippable RCCA's per the table below.

Description	Reference	Value
A.Number of Untrippable RCCA's	Step 2.1.6	2
B.Additional Penalty (Max Stuck Rod)	Step 2.2.7	1106 pcm
C. Highest Penalty	Step 2.2.6	738 pcm
Total untrippable RCCA Worth Penalty for Multiple RCCA's	{ [(A) - 1] X (B) } + (C)	1844 **pcm**

2.2.9 Record Total Untrippable RCCA Penalty from Step 2.2.3 or Step 2.2.8, whichever is applicable. 1844 pcm

NOTE: Interpolation is not required in step 2.2.10. Reactivity worth may be determined by choosing the highest reactivity worth from Section 5.6 of the R.O.D Manual associated with rod positions that bound the present rod position.

2.2.10 Use present control bank position of Step 2.1.5 to look up specified data from Section 5.6 of ROD Manual and calculate inserted reactivity worth as follows:

(59 pcm + 115 pcm) x 0.5 = 87 pcm
(HZP, No Xenon) (HZP, Peak Xenon)

2.2.11 Calculate available reactivity worth of trippable RCCA's:

Description	Reference	Value
A. Total Available Rod Worth	Step 2.2.1	4856 pcm
B. Untrippable RCCA's Penalty	Step 2.2.9	1844 pcm
C. Inserted Worth of Present Position	Step 2.2.10	87 pcm
Available Worth of Trippable RCCA's	(A) - (B) - (C)	2925 **pcm**

Shutdown Margin - Untrippable RCCA(S) - Modes 1 & 2

NOTE: Interpolation of Power Defect is not required for step 2.3. Bounding burnups and power levels may be used to select the highest Power Defect from section 5.9 of the R.O.D. manual.

2.3 Determine worst case power defect for present conditions:

Description	Reference	Value
A. Total Power Defect at present thermal power (Step 2.1.3) and cycle burnup (Step 2.1.4)	Section 5.9 of R.O.D. manual	1742 Pcm
B. Transient Flux Redistribution Allowance	Section 5.7 of R.O.D. manual	271 Pcm
Worst case power defect for present conditions:	**(A) + (B)**	2013 **Pcm**

CAUTION: SDM shall be within the limits specified by the COLR per Tech Spec 3.1.1.

2.4 Calculate SDM for present conditions:

Description	Reference	Value
A. Available worth of Trippable RCCA's	Step 2.2.11	2925 pcm
B. Worst Case Power Defect	Step 2.3	2013 pcm
Present SDM	**(A) - (B)**	(+) 912 **pcm**

NOTE: Separate, independent calculation must be performed by the verifier.

2.5 Sign the appropriate space below. N/A the unsigned space.

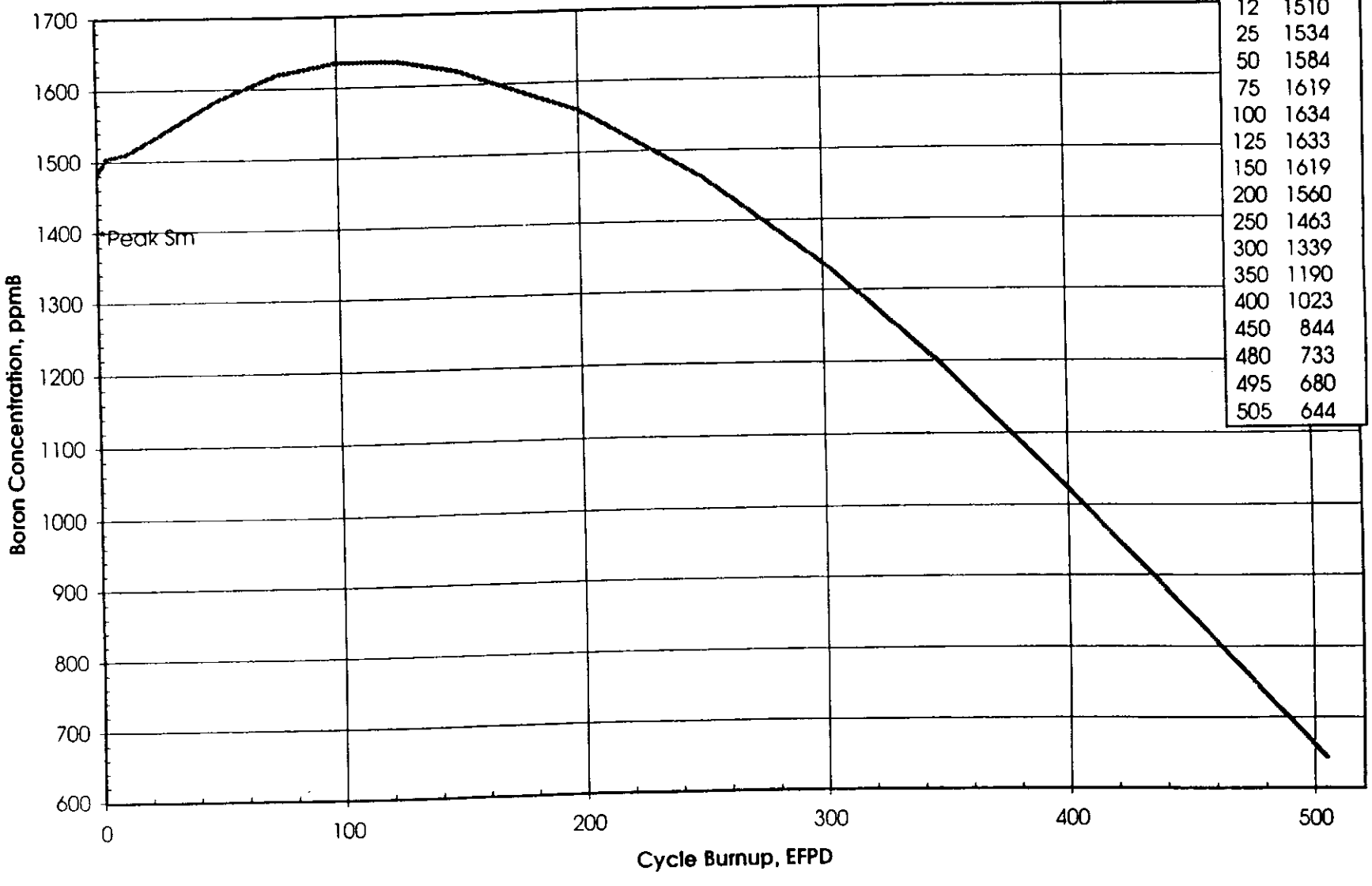
Performed By: _____ Date/Time: _____/_____

Verified By: _____ Date/Time: _____/_____

Source: CNEI-0400-26
Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

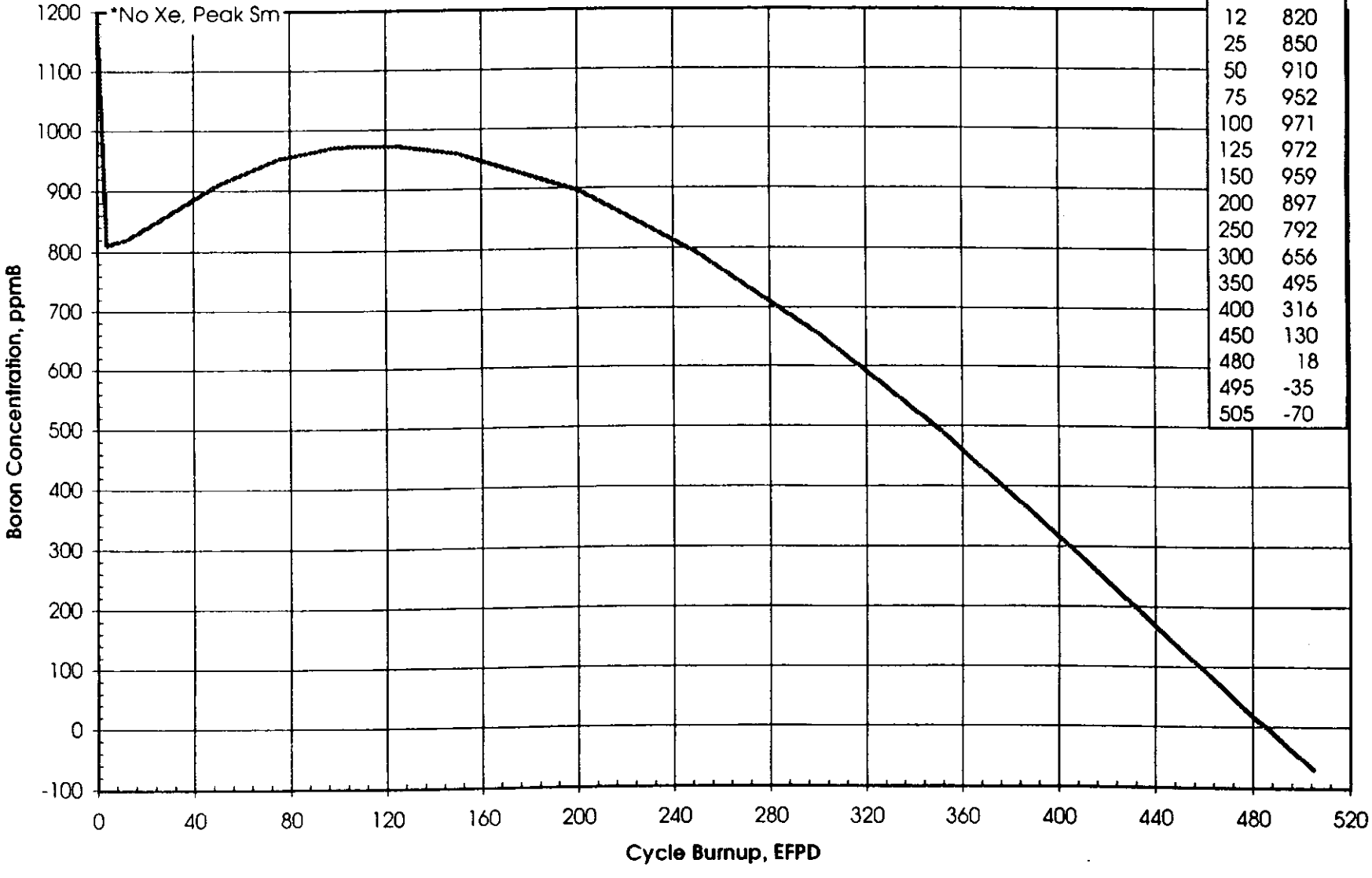
UNIT ONE
REACTOR OPERATING DATA
SECTION 5.1
HZP CRITICAL BORON CONCENTRATION
(ARO, NO XE, EQ SM)

EFPD	PPMB
0*	1481
4	1504
12	1510
25	1534
50	1584
75	1619
100	1634
125	1633
150	1619
200	1560
250	1463
300	1339
350	1190
400	1023
450	844
480	733
495	680
505	644



Source: CNEI-0400-26
Prepared by: MW Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.2
HFP CRITICAL BORON CONCENTRATION
(ARO, EQ XE, EQ SM)



EFPD	PPMB
0*	1196
4	811
12	820
25	850
50	910
75	952
100	971
125	972
150	959
200	897
250	792
300	656
350	495
400	316
450	130
480	18
495	-35
505	-70

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.3
ARI DIFFERENTIAL BORON WORTH

Source: CNEI-0400-26
Prepared By: M.W. Hawes
Revision Number: 306
Date: 11/16/00

BURNUP	TEMPERATURE (deg F)															
(EFPD)	68	100	150	200	250	300	350	400	450	500	510	520	530	540	550	557
0	-9.25	-9.20	-9.07	-8.91	-8.67	-8.43	-8.17	-7.91	-7.59	-7.26	-7.18	-7.10	-7.02	-6.94	-6.87	-6.81
20	-9.25	-9.20	-9.07	-8.91	-8.66	-8.41	-8.15	-7.89	-7.57	-7.24	-7.16	-7.08	-7.00	-6.92	-6.84	-6.78
40	-9.25	-9.20	-9.07	-8.91	-8.65	-8.39	-8.13	-7.87	-7.55	-7.22	-7.14	-7.06	-6.98	-6.90	-6.81	-6.76
60	-9.26	-9.21	-9.07	-8.91	-8.64	-8.38	-8.12	-7.86	-7.53	-7.20	-7.12	-7.04	-6.95	-6.87	-6.79	-6.73
80	-9.26	-9.21	-9.07	-8.91	-8.63	-8.36	-8.10	-7.84	-7.51	-7.18	-7.10	-7.01	-6.93	-6.85	-6.76	-6.71
100	-9.26	-9.21	-9.07	-8.91	-8.62	-8.34	-8.08	-7.82	-7.49	-7.16	-7.08	-6.99	-6.91	-6.82	-6.74	-6.68
120	-9.30	-9.25	-9.11	-8.95	-8.66	-8.37	-8.11	-7.85	-7.52	-7.18	-7.10	-7.02	-6.93	-6.85	-6.77	-6.71
140	-9.35	-9.30	-9.16	-8.99	-8.70	-8.40	-8.14	-7.88	-7.55	-7.21	-7.13	-7.04	-6.96	-6.88	-6.79	-6.74
160	-9.40	-9.35	-9.21	-9.04	-8.75	-8.45	-8.19	-7.93	-7.59	-7.25	-7.17	-7.08	-7.00	-6.92	-6.84	-6.78
180	-9.46	-9.41	-9.27	-9.09	-8.81	-8.52	-8.26	-7.99	-7.65	-7.31	-7.23	-7.14	-7.06	-6.98	-6.89	-6.83
200	-9.52	-9.46	-9.32	-9.15	-8.87	-8.59	-8.32	-8.06	-7.71	-7.37	-7.29	-7.20	-7.12	-7.03	-6.95	-6.89
220	-9.58	-9.52	-9.38	-9.21	-8.93	-8.65	-8.38	-8.12	-7.77	-7.43	-7.35	-7.26	-7.18	-7.09	-7.01	-6.95
240	-9.64	-9.58	-9.44	-9.26	-8.99	-8.72	-8.45	-8.18	-7.83	-7.49	-7.40	-7.32	-7.23	-7.15	-7.06	-7.00
260	-9.72	-9.66	-9.52	-9.34	-9.07	-8.80	-8.53	-8.26	-7.91	-7.57	-7.48	-7.39	-7.31	-7.22	-7.13	-7.07
280	-9.84	-9.77	-9.63	-9.45	-9.17	-8.90	-8.63	-8.35	-8.00	-7.65	-7.57	-7.48	-7.40	-7.31	-7.22	-7.16
300	-9.95	-9.88	-9.74	-9.55	-9.28	-9.00	-8.73	-8.45	-8.10	-7.75	-7.66	-7.57	-7.48	-7.40	-7.31	-7.25
320	-10.05	-10.00	-9.85	-9.66	-9.38	-9.10	-8.82	-8.55	-8.19	-7.83	-7.75	-7.66	-7.57	-7.49	-7.40	-7.34
340	-10.16	-10.11	-9.96	-9.77	-9.48	-9.20	-8.92	-8.64	-8.28	-7.92	-7.84	-7.75	-7.66	-7.57	-7.49	-7.43
360	-10.29	-10.23	-10.08	-9.89	-9.60	-9.32	-9.04	-8.75	-8.39	-8.03	-7.94	-7.86	-7.77	-7.68	-7.59	-7.53
380	-10.44	-10.38	-10.23	-10.03	-9.74	-9.45	-9.17	-8.88	-8.52	-8.16	-8.07	-7.98	-7.89	-7.80	-7.71	-7.65
400	-10.59	-10.52	-10.37	-10.18	-9.88	-9.59	-9.30	-9.01	-8.65	-8.28	-8.19	-8.10	-8.01	-7.92	-7.83	-7.76
420	-10.73	-10.67	-10.52	-10.32	-10.02	-9.73	-9.44	-9.15	-8.77	-8.40	-8.31	-8.22	-8.13	-8.04	-7.95	-7.88
440	-10.88	-10.82	-10.66	-10.46	-10.16	-9.86	-9.57	-9.27	-8.90	-8.53	-8.44	-8.34	-8.25	-8.16	-8.07	-8.00
460	-11.04	-10.98	-10.82	-10.61	-10.33	-10.06	-9.74	-9.42	-9.04	-8.67	-8.57	-8.47	-8.37	-8.27	-8.18	-8.11
480	-11.21	-11.15	-10.98	-10.78	-10.54	-10.31	-9.94	-9.57	-9.19	-8.82	-8.71	-8.60	-8.49	-8.39	-8.28	-8.20
495	-11.33	-11.27	-11.11	-10.91	-10.70	-10.49	-10.09	-9.68	-9.31	-8.93	-8.82	-8.70	-8.59	-8.47	-8.35	-8.27
505	-11.42	-11.36	-11.19	-10.99	-10.80	-10.62	-10.19	-9.76	-9.38	-9.01	-8.89	-8.77	-8.65	-8.53	-8.40	-8.32

Note: Calculated at the ARI critical boron concentration for each temperature and burnup.

Source: CNEI-0400-26, C1C13 SOR
Prepared by: MW Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.4
HZP DIFFERENTIAL BORON WORTH

Cycle Burnup (EFPD)	Critical Boron Concentration (PPMB)	Differential Boron Worth (PCM/PPMB)
0*	1481	-6.41
4	1504	-6.41
12	1510	-6.40
25	1534	-6.39
50	1584	-6.37
75	1619	-6.38
100	1634	-6.40
125	1633	-6.43
150	1619	-6.47
200	1560	-6.58
250	1463	-6.72
300	1339	-6.88
350	1190	-7.07
400	1023	-7.29
450	844	-7.53
480	733	-7.69
495	680	-7.76
505	644	-7.79

*Peak Samarium

Source: CNEI-0400-26, C1C13 SOR
Prepared By: MW Hawes
Revision Number 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.5
HFP DIFFERENTIAL BORON WORTH

(HFP, ARO, Eq Xe, Eq Sm)

Cycle Burnup (EFPD)	Critical Boron Concentration (PPMB)	Differential Boron Worth (PCM/PPMB)	ITC (PCM/°F)
0*	1196	-6.15	-17.45
4	811	-6.15	-20.40
12	820	-6.15	-20.25
25	850	-6.13	-19.84
50	910	-6.11	-19.20
75	952	-6.12	-18.96
100	971	-6.14	-19.07
125	972	-6.18	-19.44
150	959	-6.23	-19.99
200	897	-6.35	-21.56
250	792	-6.51	-23.71
300	656	-6.67	-26.27
350	495	-6.88	-29.18
400	316	-7.15	-32.37
450	130	-7.45	-35.68
480	18	-7.65	-37.74
495	-35	-7.74	-38.44
505	-70	-7.78	-38.64

* No Xenon, Peak Samarium

Source: CNEI-0400-26
Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, No Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
				IRW	IRW	IRW	IRW	IRW
Bk A	Bk B	Bk C	Bk D	(PCM)	(PCM)	(PCM)	(PCM)	(PCM)
226	226	226	226	0	0	0	0	0
226	226	226	225	1	1	1	3	4
226	226	226	220	6	6	9	15	24
226	226	226	215	11	10	16	28	44
226	226	226	210	16	15	24	41	64
226	226	226	205	31	30	46	71	101
226	226	226	200	46	45	67	101	139
226	226	226	195	61	59	89	131	177
226	226	226	190	75	74	111	161	214
226	226	226	185	95	94	135	190	245
226	226	226	180	115	114	160	220	276
226	226	226	175	135	134	185	249	307
226	226	226	170	155	154	210	278	338
226	226	226	165	177	175	231	300	359
226	226	226	160	198	195	253	322	379
226	226	226	155	220	216	275	344	400
226	226	226	150	241	236	297	366	420
226	226	226	145	264	256	315	382	435
226	226	226	140	286	276	333	399	450
226	226	226	135	308	296	351	415	465
226	226	226	130	330	316	369	432	480
226	226	226	125	352	335	384	443	489
226	226	226	120	373	353	399	455	498
226	226	226	116	391	368	411	464	505
226	226	226	110	416	390	429	478	515
226	226	221	105	440	411	449	501	546
226	226	216	100	464	432	468	524	576
226	226	211	95	494	461	504	574	643
226	226	206	90	525	490	539	625	709
226	226	201	85	555	519	575	675	776

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, No Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	226	196	80	586	547	610	726	842
226	226	191	75	622	583	654	783	909
226	226	186	70	658	619	698	841	975
226	226	181	65	694	655	742	899	1041
226	226	176	60	730	691	785	956	1108
226	226	171	55	768	730	828	1004	1156
226	226	166	50	806	769	870	1051	1205
226	226	161	45	844	808	912	1099	1254
226	226	156	40	882	847	954	1146	1302
226	226	151	35	921	886	994	1187	1341
226	226	146	30	959	924	1035	1228	1381
226	226	141	25	998	963	1075	1269	1420
226	226	136	20	1036	1002	1116	1309	1459
226	226	131	15	1077	1043	1154	1345	1490
226	226	126	10	1119	1084	1193	1382	1521
226	226	121	5	1160	1125	1232	1418	1552
226	226	116	0	1201	1166	1270	1454	1583
226	226	110	0	1226	1191	1294	1476	1601
226	221	105	0	1260	1225	1324	1504	1631
226	216	100	0	1294	1258	1354	1532	1661
226	211	95	0	1333	1298	1391	1573	1711
226	206	90	0	1373	1338	1429	1613	1762
226	201	85	0	1412	1378	1467	1653	1812
226	196	80	0	1452	1418	1504	1694	1862
226	191	75	0	1496	1464	1550	1740	1915
226	186	70	0	1540	1510	1597	1787	1968
226	181	65	0	1585	1555	1643	1834	2021
226	176	60	0	1629	1601	1689	1881	2074
226	171	55	0	1674	1649	1738	1928	2117
226	166	50	0	1719	1697	1787	1975	2160

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, No Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	161	45	0	1764	1744	1836	2022	2203
226	156	40	0	1810	1792	1885	2069	2246
226	151	35	0	1854	1834	1929	2107	2275
226	146	30	0	1898	1876	1972	2144	2305
226	141	25	0	1943	1919	2016	2182	2334
226	136	20	0	1987	1961	2060	2219	2363
226	131	15	0	2024	1997	2090	2242	2381
226	126	10	0	2061	2032	2121	2266	2399
226	121	5	0	2097	2068	2151	2289	2416
226	116	0	0	2134	2104	2182	2312	2434
226	110	0	0	2156	2125	2200	2326	2445
221	105	0	0	2186	2151	2223	2349	2473
216	100	0	0	2215	2176	2245	2372	2501
211	95	0	0	2250	2208	2276	2411	2550
206	90	0	0	2285	2239	2307	2451	2600
201	85	0	0	2319	2270	2337	2490	2649
196	80	0	0	2354	2301	2368	2529	2698
191	75	0	0	2392	2337	2404	2571	2744
186	70	0	0	2431	2373	2441	2613	2790
181	65	0	0	2469	2409	2477	2655	2835
176	60	0	0	2507	2445	2513	2697	2881
171	55	0	0	2546	2482	2550	2733	2914
166	50	0	0	2584	2518	2588	2770	2947
161	45	0	0	2623	2555	2625	2806	2980
156	40	0	0	2662	2591	2662	2843	3014
151	35	0	0	2697	2624	2694	2871	3035
146	30	0	0	2733	2657	2727	2899	3057
141	25	0	0	2768	2690	2759	2927	3079
136	20	0	0	2803	2723	2791	2955	3101
131	15	0	0	2831	2751	2817	2975	3115

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, No Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
				IRW	IRW	IRW	IRW	IRW
Bk A	Bk B	Bk C	Bk D	(PCM)	(PCM)	(PCM)	(PCM)	(PCM)
126	10	0	0	2859	2779	2843	2995	3129
121	5	0	0	2887	2808	2868	3015	3143
116	0	0	0	2914	2836	2894	3034	3156
110	0	0	0	2931	2853	2910	3046	3165
105	0	0	0	2950	2872	2926	3057	3171
100	0	0	0	2969	2892	2942	3067	3177
95	0	0	0	2987	2910	2956	3074	3181
90	0	0	0	3005	2929	2970	3082	3186
85	0	0	0	3023	2948	2984	3089	3190
80	0	0	0	3041	2967	2998	3097	3195
75	0	0	0	3056	2982	3009	3101	3196
70	0	0	0	3070	2997	3020	3105	3198
65	0	0	0	3084	3012	3031	3109	3200
60	0	0	0	3099	3027	3042	3114	3202
55	0	0	0	3108	3037	3048	3116	3202
50	0	0	0	3118	3047	3055	3118	3203
45	0	0	0	3127	3058	3062	3120	3203
40	0	0	0	3137	3068	3069	3121	3203
35	0	0	0	3142	3073	3072	3123	3204
30	0	0	0	3147	3078	3076	3125	3205
25	0	0	0	3152	3083	3079	3126	3205
20	0	0	0	3156	3088	3082	3128	3206
15	0	0	0	3158	3090	3083	3128	3206
10	0	0	0	3160	3092	3085	3128	3206
5	0	0	0	3162	3094	3086	3128	3206
0	0	0	0	3164	3096	3087	3128	3206

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Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, No Xenon

Control Bank Position	Shutdown Bank Position Steps Withdrawn					50 EFPD 0 - 100 EFPD IRW (PCM)	150 EFPD 101 - 200 EFPD IRW (PCM)	250 EFPD 201 - 300 EFPD IRW (PCM)	350 EFPD 301 - 400 EFPD IRW (PCM)	450 EFPD 401 - 505 EFPD IRW (PCM)
	SD E	SD D	SD C	SD B	SD A					
226	226	226	226	226	226	0	0	0	0	0
0	226	226	226	226	226	3164	3096	3087	3128	3206
0	0	226	226	226	226	3930	3955	3988	4040	4099
0	0	0	226	226	226	4636	4572	4565	4617	4710
0	0	0	0	226	226	5520	5275	5202	5258	5390
0	0	0	0	0	226	6694	6324	6196	6246	6391
0	0	0	0	0	0	6882	6488	6350	6412	6589

Source: CNEI-0400-26
Prepared by: M.W. Hawes
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UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, Peak Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
				IRW	IRW	IRW	IRW	IRW
Bk A	Bk B	Bk C	Bk D	(PCM)	(PCM)	(PCM)	(PCM)	(PCM)
226	226	226	226	0	0	0	0	0
226	226	226	225	2	2	3	4	5
226	226	226	220	12	12	16	22	29
226	226	226	215	23	22	29	40	53
226	226	226	210	33	32	42	58	77
226	226	226	205	61	60	74	94	118
226	226	226	200	88	88	105	131	160
226	226	226	195	116	115	136	167	201
226	226	226	190	144	143	168	204	243
226	226	226	185	173	172	198	236	274
226	226	226	180	203	201	229	267	306
226	226	226	175	232	230	260	299	338
226	226	226	170	262	259	290	331	370
226	226	226	165	287	282	313	353	391
226	226	226	160	311	306	337	375	412
226	226	226	155	336	329	360	397	433
226	226	226	150	361	353	383	419	454
226	226	226	145	381	372	401	436	469
226	226	226	140	402	391	419	453	485
226	226	226	135	423	411	436	470	500
226	226	226	130	443	430	454	486	516
226	226	226	125	461	445	467	497	525
226	226	226	120	478	460	480	508	535
226	226	226	116	491	473	491	516	542
226	226	226	110	512	491	506	529	554
226	226	221	105	535	513	529	556	588
226	226	216	100	558	534	552	583	622
226	226	211	95	596	575	601	643	692
226	226	206	90	635	616	651	704	763
226	226	201	85	674	656	700	764	833

Source: CNEI-0400-26
Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, Peak Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	226	196	80	713	697	749	824	904
226	226	191	75	757	744	805	887	970
226	226	186	70	802	792	861	950	1037
226	226	181	65	847	839	917	1013	1103
226	226	176	60	892	887	973	1075	1170
226	226	171	55	934	930	1019	1123	1217
226	226	166	50	976	973	1066	1171	1264
226	226	161	45	1018	1017	1112	1218	1311
226	226	156	40	1061	1060	1159	1266	1358
226	226	151	35	1101	1100	1200	1306	1396
226	226	146	30	1142	1140	1240	1346	1434
226	226	141	25	1182	1180	1281	1387	1473
226	226	136	20	1223	1220	1322	1427	1511
226	226	131	15	1259	1257	1358	1459	1540
226	226	126	10	1296	1294	1393	1492	1568
226	226	121	5	1332	1331	1429	1525	1597
226	226	116	0	1368	1368	1465	1557	1625
226	226	110	0	1390	1390	1486	1577	1642
226	221	105	0	1420	1419	1515	1608	1676
226	216	100	0	1449	1447	1544	1638	1710
226	211	95	0	1486	1485	1586	1689	1773
226	206	90	0	1523	1523	1629	1740	1835
226	201	85	0	1560	1560	1671	1791	1898
226	196	80	0	1597	1598	1713	1842	1960
226	191	75	0	1642	1644	1762	1897	2022
226	186	70	0	1688	1690	1812	1953	2083
226	181	65	0	1733	1736	1861	2008	2145
226	176	60	0	1779	1783	1910	2063	2206
226	171	55	0	1829	1834	1960	2110	2252
226	166	50	0	1880	1885	2009	2158	2298

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, Peak Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
				IRW	IRW	IRW	IRW	IRW
Bk A	Bk B	Bk C	Bk D	(PCM)	(PCM)	(PCM)	(PCM)	(PCM)
226	161	45	0	1931	1936	2059	2205	2345
226	156	40	0	1981	1987	2108	2252	2391
226	151	35	0	2030	2036	2151	2288	2423
226	146	30	0	2079	2084	2194	2323	2455
226	141	25	0	2127	2132	2237	2359	2487
226	136	20	0	2176	2181	2280	2394	2519
226	131	15	0	2213	2216	2309	2419	2541
226	126	10	0	2250	2250	2338	2443	2562
226	121	5	0	2286	2285	2367	2467	2584
226	116	0	0	2323	2320	2396	2491	2605
226	110	0	0	2346	2341	2414	2506	2618
221	105	0	0	2373	2367	2439	2533	2650
216	100	0	0	2401	2392	2464	2560	2681
211	95	0	0	2435	2426	2502	2605	2732
206	90	0	0	2469	2460	2540	2649	2782
201	85	0	0	2503	2493	2578	2693	2832
196	80	0	0	2537	2527	2616	2738	2883
191	75	0	0	2576	2566	2657	2781	2926
186	70	0	0	2616	2604	2698	2825	2970
181	65	0	0	2655	2643	2739	2868	3014
176	60	0	0	2695	2682	2779	2912	3057
171	55	0	0	2736	2722	2816	2946	3087
166	50	0	0	2777	2761	2853	2979	3116
161	45	0	0	2818	2801	2890	3013	3146
156	40	0	0	2859	2841	2927	3047	3176
151	35	0	0	2894	2874	2955	3069	3194
146	30	0	0	2930	2908	2983	3091	3212
141	25	0	0	2965	2942	3011	3114	3230
136	20	0	0	3000	2975	3039	3136	3248
131	15	0	0	3024	2998	3059	3151	3260

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, Peak Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
126	10	0	0	3047	3021	3078	3166	3273
121	5	0	0	3071	3044	3097	3182	3286
116	0	0	0	3095	3067	3117	3197	3298
110	0	0	0	3109	3080	3128	3206	3306
105	0	0	0	3122	3093	3138	3213	3311
100	0	0	0	3134	3105	3148	3219	3316
95	0	0	0	3145	3116	3155	3224	3319
90	0	0	0	3155	3126	3162	3228	3322
85	0	0	0	3166	3136	3169	3233	3325
80	0	0	0	3177	3146	3176	3237	3328
75	0	0	0	3185	3154	3180	3240	3330
70	0	0	0	3193	3161	3184	3243	3332
65	0	0	0	3201	3169	3188	3246	3334
60	0	0	0	3209	3176	3193	3248	3336
55	0	0	0	3214	3181	3195	3249	3336
50	0	0	0	3219	3185	3197	3250	3336
45	0	0	0	3224	3190	3199	3251	3337
40	0	0	0	3229	3195	3201	3252	3337
35	0	0	0	3232	3197	3203	3253	3337
30	0	0	0	3235	3199	3204	3254	3337
25	0	0	0	3238	3201	3206	3254	3337
20	0	0	0	3240	3204	3208	3255	3337
15	0	0	0	3241	3204	3208	3255	3337
10	0	0	0	3242	3205	3208	3255	3337
5	0	0	0	3243	3206	3208	3255	3337
0	0	0	0	3244	3207	3209	3255	3337

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HZP, Peak Xenon

Control Bank Position	Shutdown Bank Position Steps Withdrawn					50 EFPD 0 - 100 EFPD IRW (PCM)	150 EFPD 101 - 200 EFPD IRW (PCM)	250 EFPD 201 - 300 EFPD IRW (PCM)	350 EFPD 301 - 400 EFPD IRW (PCM)	450 EFPD 401 - 505 EFP IRW (PCM)
	SD E	SD D	SD C	SD B	SD A					
226	226	226	226	226	226	0	0	0	0	0
0	226	226	226	226	226	3244	3207	3209	3255	3337
0	0	226	226	226	226	3984	4012	4040	4084	4141
0	0	0	226	226	226	4713	4676	4678	4728	4816
0	0	0	0	226	226	5630	5451	5403	5461	5596
0	0	0	0	0	226	6833	6548	6450	6493	6628
0	0	0	0	0	0	7069	6767	6668	6733	6922

Source: CNEI-0400-26
Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HFP, Equilibrium Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	226	226	226	0	0	0	0	0
226	226	226	225	1	1	1	2	3
226	226	226	220	7	7	9	12	16
226	226	226	215	13	13	16	22	30
226	226	226	210	18	18	23	32	44
226	226	226	205	32	32	39	52	68
226	226	226	200	45	45	55	72	91
226	226	226	195	58	58	70	92	115
226	226	226	190	72	72	86	112	139
226	226	226	185	89	88	104	133	161
226	226	226	180	106	105	123	153	184
226	226	226	175	122	122	141	174	207
226	226	226	170	139	139	160	195	230
226	226	226	165	158	156	178	213	249
226	226	226	160	177	174	196	232	269
226	226	226	155	196	191	215	250	289
226	226	226	150	215	209	233	269	308
226	226	226	145	234	227	251	287	327
226	226	226	140	254	246	269	304	346
226	226	226	135	273	264	286	322	364
226	226	226	130	293	282	304	340	383
226	226	226	125	314	301	321	357	400
226	226	226	120	334	320	338	374	417
226	226	226	116	351	335	352	387	430
226	226	226	110	376	358	373	407	450
226	226	221	105	400	381	396	432	480
226	226	216	100	425	403	418	458	510
226	226	211	95	459	436	453	497	556
226	226	206	90	493	469	488	537	601
226	226	201	85	526	502	522	576	647

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Prepared by: M.W. Hawes
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UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HFP, Equilibrium Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	226	196	80	560	534	557	615	692
226	226	191	75	601	575	599	661	741
226	226	186	70	642	615	642	706	789
226	226	181	65	683	656	684	751	837
226	226	176	60	724	696	726	797	886
226	226	171	55	768	739	770	842	931
226	226	166	50	813	783	815	887	977
226	226	161	45	857	826	859	932	1022
226	226	156	40	901	870	903	977	1068
226	226	151	35	946	914	948	1023	1114
226	226	146	30	991	959	993	1068	1160
226	226	141	25	1036	1003	1038	1114	1206
226	226	136	20	1081	1048	1083	1159	1251
226	226	131	15	1125	1091	1125	1202	1294
226	226	126	10	1169	1134	1168	1244	1338
226	226	121	5	1213	1177	1210	1287	1381
226	226	116	0	1257	1220	1253	1329	1424
226	226	110	0	1283	1246	1278	1354	1449
226	221	105	0	1319	1281	1312	1388	1485
226	216	100	0	1355	1316	1346	1422	1521
226	211	95	0	1397	1358	1389	1466	1570
226	206	90	0	1438	1400	1432	1510	1619
226	201	85	0	1479	1441	1475	1555	1667
226	196	80	0	1520	1483	1518	1599	1716
226	191	75	0	1569	1532	1567	1650	1769
226	186	70	0	1617	1582	1616	1701	1823
226	181	65	0	1666	1631	1665	1752	1876
226	176	60	0	1714	1680	1714	1803	1929
226	171	55	0	1766	1734	1768	1858	1983
226	166	50	0	1819	1787	1822	1912	2037

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UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HFP, Equilibrium Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
226	161	45	0	1871	1841	1876	1966	2091
226	156	40	0	1923	1894	1930	2020	2145
226	151	35	0	1974	1946	1984	2075	2200
226	146	30	0	2026	1998	2038	2130	2255
226	141	25	0	2077	2050	2092	2185	2310
226	136	20	0	2128	2103	2146	2240	2365
226	131	15	0	2172	2145	2189	2284	2411
226	126	10	0	2216	2188	2231	2327	2457
226	121	5	0	2260	2231	2274	2371	2502
226	116	0	0	2304	2274	2316	2415	2548
226	110	0	0	2331	2300	2342	2441	2575
221	105	0	0	2362	2330	2372	2471	2609
216	100	0	0	2394	2360	2401	2502	2643
211	95	0	0	2432	2396	2437	2541	2686
206	90	0	0	2470	2433	2473	2580	2729
201	85	0	0	2509	2469	2509	2619	2772
196	80	0	0	2547	2506	2545	2658	2815
191	75	0	0	2591	2549	2587	2701	2862
186	70	0	0	2634	2592	2630	2745	2908
181	65	0	0	2678	2634	2672	2789	2954
176	60	0	0	2722	2677	2715	2833	3001
171	55	0	0	2767	2723	2761	2879	3049
166	50	0	0	2813	2768	2807	2926	3096
161	45	0	0	2859	2814	2853	2973	3144
156	40	0	0	2904	2860	2900	3020	3192
151	35	0	0	2947	2903	2944	3067	3241
146	30	0	0	2990	2946	2989	3114	3289
141	25	0	0	3032	2989	3034	3161	3338
136	20	0	0	3075	3033	3079	3208	3387
131	15	0	0	3108	3065	3112	3242	3422

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Prepared by: M.W. Hawes
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UNIT ONE
REACTOR OPERATING DATA
SECTION 5.6
INTEGRAL ROD WORTH IN OVERLAP

Integral Rod Worth in Overlap
HFP, Equilibrium Xenon

Control Bank Position Steps Withdrawn				50 EFPD	150 EFPD	250 EFPD	350 EFPD	450 EFPD
				0 - 100 EFPD	101 - 200 EFPD	201 - 300 EFPD	301 - 400 EFPD	401 - 505 EFPD
Bk A	Bk B	Bk C	Bk D	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)	IRW (PCM)
126	10	0	0	3141	3097	3145	3276	3457
121	5	0	0	3174	3130	3177	3309	3492
116	0	0	0	3207	3162	3210	3343	3527
110	0	0	0	3226	3182	3230	3363	3548
105	0	0	0	3246	3200	3247	3379	3563
100	0	0	0	3265	3219	3264	3395	3578
95	0	0	0	3283	3237	3281	3410	3592
90	0	0	0	3302	3256	3298	3425	3606
85	0	0	0	3320	3274	3315	3441	3620
80	0	0	0	3339	3293	3332	3456	3634
75	0	0	0	3357	3311	3349	3471	3647
70	0	0	0	3375	3329	3366	3486	3661
65	0	0	0	3393	3347	3382	3501	3674
60	0	0	0	3411	3365	3399	3515	3687
55	0	0	0	3428	3382	3416	3531	3700
50	0	0	0	3445	3400	3433	3546	3713
45	0	0	0	3462	3417	3450	3561	3726
40	0	0	0	3479	3435	3467	3576	3739
35	0	0	0	3493	3449	3481	3589	3751
30	0	0	0	3507	3463	3496	3603	3763
25	0	0	0	3522	3477	3510	3617	3775
20	0	0	0	3536	3492	3525	3631	3787
15	0	0	0	3543	3499	3532	3638	3794
10	0	0	0	3550	3506	3540	3645	3800
5	0	0	0	3557	3513	3547	3653	3807
0	0	0	0	3564	3520	3554	3660	3814

Source: CNEI-0400-26
Prepared by: M.W. Hawes
Revision Number: 306
Date: 11/16/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.7
TOTAL AVAILABLE ROD WORTH

STEP 1.	Minimum total rod worth available during cycle (HZP, equilibrium xenon):	6502 PCM
STEP 2.	Maximum stuck rod worth during cycle:	1106 PCM
STEP 3.	Total rod worth with highest stuck rod (step 1 – step 2):	5396 PCM
STEP 4.	Less 10% uncertainty (step 3 x 0.9):	4856 PCM

TOTAL AVAILABLE ROD WORTH = 4856 PCM

TRANSIENT FLUX REDISTRIBUTION ALLOWANCE = 271 PCM

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Prepared by: M.W. Hawes
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UNIT ONE
REACTOR OPERATING DATA
SECTION 5.8
INOPERABLE RCCA WORTHS

CRDM NUMBER	CRDM LOCATION	WORTH (PCM)	CRDM NUMBER	CRDM LOCATION	WORTH (PCM)
SA2-1	B-4	40	CA1-2	H-10	819
CB2-1	B-6	191	SE1-3	H-12	446
CC1-2	B-8	38	CC1-3	H-14	38
CB1-2	B-10	191	SB2-4	J-3	250
SA1-2	B-12	40	SB1-3	J-13	250
SD1-1	C-5	863	CB2-4	K-2	191
SB2-1	C-7	250	CC2-4	K-6	738
SB1-2	C-9	250	CA2-2	K-8	819
SC1-2	C-11	863	CC2-3	K-10	738
SA1-1	D-2	40	CB1-3	K-14	191
CD1-1	D-4	863	SD1-4	L-3	863
SE1-2	D-8	446	SC1-3	L-13	863
CD2-1	D-12	863	SA2-4	M-2	40
SA2-2	D-14	40	CD2-2	M-4	863
SC1-1	E-3	863	SE1-4	M-8	446
SD1-2	E-13	863	CD1-2	M-12	863
CB1-1	F-2	191	SA1-3	M-14	40
CC2-1	F-6	738	SC1-4	N-5	863
CA2-1	F-8	819	SB1-4	N-7	250
CC2-2	F-10	738	SB2-3	N-9	250
CB2-2	F-14	191	SD1-3	N-11	863
SB1-1	G-3	250	SA1-4	P-4	40
SB2-2	G-13	250	CB1-4	P-6	191
CC1-1	H-2	38	CC1-4	P-8	38
SE1-1	H-4	446	CB2-3	P-10	191
CA1-1	H-6	819	SA2-3	P-12	40
CD2-3	H-8	819			

NOTE: If more than 1 inoperable rod is known to exist then use the worth of the highest worth inoperable rod from the table above and add **1106 pcm** for each additional known inoperable rod.

Total Power Defect (PCM) as a Function of Power and Cycle Burnup

from 0 - 50% FP

POWER (%FP)

BURNUP (EFPD)	0	5	10	15	20	25	30	35	40	45	50
0	0	93	186	279	371	464	550	636	722	808	894
20	0	91	181	272	363	453	538	622	706	791	875
40	0	89	178	267	356	446	529	612	695	778	861
60	0	88	175	263	351	439	521	603	685	767	849
80	0	86	173	259	346	432	513	594	675	756	838
100	0	85	170	255	340	425	505	585	665	745	826
120	0	86	172	258	343	429	510	591	671	752	833
140	0	87	173	260	347	433	515	596	677	758	840
160	0	88	177	265	354	442	524	607	689	772	854
180	0	91	182	273	364	455	539	623	707	792	876
200	0	94	187	281	374	468	554	640	726	812	898
220	0	96	192	288	384	480	568	656	744	832	919
240	0	99	197	296	394	493	583	672	762	851	941
260	0	102	203	305	407	509	600	692	784	876	968
280	0	105	211	316	421	527	622	716	811	906	1001
300	0	109	218	327	436	545	643	740	838	936	1033
320	0	113	225	338	450	563	664	764	865	965	1066
340	0	116	232	349	465	581	685	788	891	995	1098
360	0	120	239	359	479	598	705	811	918	1024	1131
380	0	123	246	369	492	615	724	834	944	1053	1163
400	0	126	253	379	505	631	744	857	970	1082	1195
420	0	130	259	389	518	648	764	880	996	1112	1227
440	0	133	266	399	531	664	783	902	1022	1141	1260
460	0	136	271	407	543	678	800	922	1044	1166	1288
480	0	138	276	414	552	690	815	939	1064	1188	1313
495	0	140	280	420	559	699	826	952	1078	1205	1331
505	0	141	282	423	564	705	833	960	1088	1216	1343

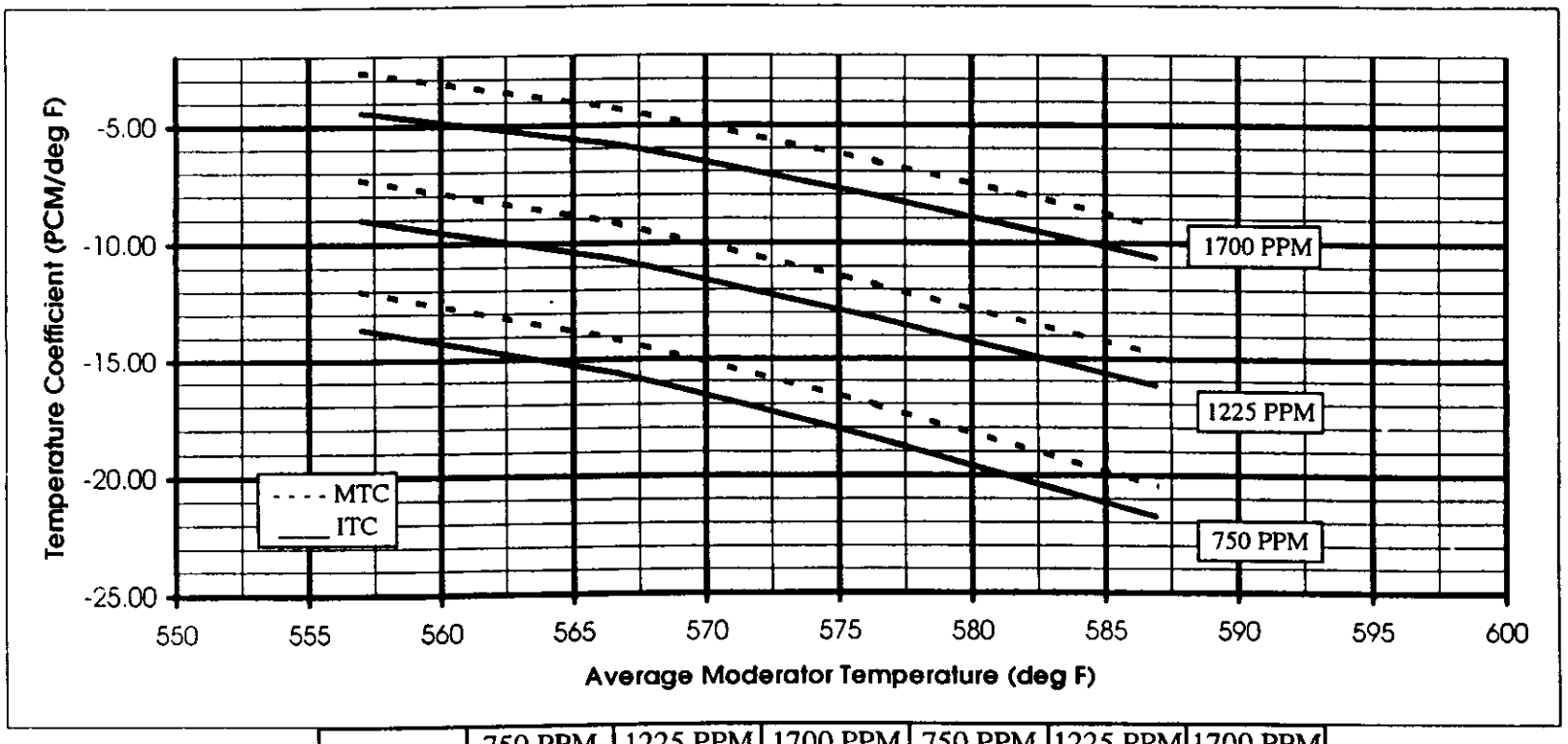
Total Power Defect (PCM) as a Function of Power and Cycle Burnup from 55 - 100% FP

POWER (%FP)

BURNUP (EFPD)	55	60	65	70	75	80	85	90	95	100
0	981	1068	1155	1242	1329	1424	1518	1613	1708	1802
20	960	1046	1131	1216	1302	1394	1487	1580	1673	1766
40	946	1030	1114	1198	1282	1374	1466	1558	1649	1741
60	933	1016	1099	1182	1266	1357	1448	1539	1630	1721
80	920	1002	1084	1167	1249	1339	1430	1520	1611	1701
100	907	988	1070	1151	1233	1322	1412	1501	1591	1681
120	915	997	1079	1161	1243	1334	1425	1515	1606	1697
140	922	1005	1088	1171	1254	1346	1438	1529	1621	1713
160	938	1022	1107	1191	1275	1368	1462	1555	1648	1742
180	962	1048	1134	1220	1306	1401	1497	1592	1688	1783
200	985	1073	1161	1249	1337	1434	1532	1630	1727	1825
220	1009	1099	1188	1278	1368	1467	1567	1667	1767	1867
240	1033	1124	1216	1307	1398	1500	1602	1704	1806	1908
260	1062	1156	1249	1343	1437	1541	1646	1750	1855	1959
280	1097	1193	1290	1386	1483	1590	1698	1805	1913	2021
300	1132	1231	1330	1429	1528	1639	1750	1860	1971	2082
320	1168	1269	1371	1472	1574	1688	1802	1915	2029	2143
340	1203	1307	1411	1516	1620	1737	1853	1970	2087	2204
360	1238	1345	1452	1559	1666	1787	1907	2027	2147	2268
380	1273	1383	1494	1604	1714	1838	1962	2086	2210	2334
400	1309	1422	1535	1648	1762	1889	2017	2145	2272	2400
420	1344	1460	1577	1693	1809	1941	2072	2203	2335	2466
440	1379	1499	1618	1737	1857	1992	2127	2262	2397	2532
460	1410	1533	1655	1777	1899	2038	2176	2315	2453	2592
480	1438	1562	1687	1812	1937	2078	2220	2362	2503	2645
495	1458	1585	1711	1838	1965	2109	2253	2397	2541	2684
505	1471	1600	1728	1856	1984	2129	2275	2420	2565	2711

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.10
MODERATOR AND ISOTHERMAL TEMPERATURE COEFFICIENTS

Source: CNEI-0400-26
Prepared By: M W Hawes
Revision Number: 306
Date: 11/16/00



Temp.	750 PPM ITC	1225 PPM ITC	1700 PPM ITC	750 PPM MTC	1225 PPM MTC	1700 PPM MTC
557	-13.64	-8.99	-4.41	-12.00	-7.29	-2.68
566.6	-15.61	-10.67	-5.82	-14.11	-9.14	-4.25
576.4	-18.48	-13.22	-8.03	-17.06	-11.78	-6.58
586.9	-21.76	-16.16	-10.63	-20.42	-14.79	-9.25

Source: CNEI-0400-26, C1C13 SOR
Prepared By: MW Hawes
Revision Number: 304
Date: 11/2/00

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.11
MINIMUM SHUTDOWN MARGIN BORON

Required Boron Concentration for 1.0% Shutdown Margin as a Function of Temperature and Burnup

CORE AVERAGE TEMPERATURE (°F)

BURNUP (EFPD)	33	68	70	80	90	100	110	120	130	140	150	160	170	180	190	200
0	1324	1313	1312	1310	1307	1305	1303	1301	1298	1296	1294	1292	1290	1287	1285	1282
20	1357	1348	1347	1345	1343	1340	1338	1336	1333	1331	1328	1326	1323	1320	1317	1314
40	1383	1376	1375	1373	1371	1369	1366	1364	1361	1359	1356	1353	1350	1347	1344	1341
60	1404	1397	1397	1394	1392	1390	1388	1385	1383	1380	1378	1375	1372	1369	1366	1363
80	1420	1412	1412	1409	1407	1405	1403	1400	1398	1396	1393	1391	1388	1385	1382	1379
100	1430	1421	1421	1418	1416	1414	1412	1410	1408	1405	1403	1401	1399	1396	1394	1391
120	1434	1424	1424	1422	1420	1417	1415	1414	1412	1410	1408	1406	1404	1402	1400	1398
140	1433	1423	1422	1420	1418	1416	1414	1412	1411	1409	1407	1406	1404	1403	1401	1399
160	1427	1416	1416	1413	1411	1409	1408	1406	1405	1403	1402	1401	1400	1398	1397	1395
180	1416	1406	1405	1403	1401	1399	1398	1396	13^5	1394	1392	1391	1390	1389	1388	1386
200	1400	1391	1390	1388	1387	1385	1383	1382	1380	1379	1378	1377	1376	1375	1373	1372
220	1379	1372	1372	1370	1368	1366	1365	1363	1362	1361	1359	1358	1357	1356	1355	1353
240	1355	1349	1349	1347	1345	1344	1342	1341	1339	1338	1336	1335	1334	1333	1331	1330
260	1327	1322	1322	1320	1319	1317	1315	1314	1312	1311	1309	1308	1306	1305	1304	1303
280	1296	1291	1291	1289	1288	1286	1285	1283	1281	1280	1278	1276	1275	1274	1272	1271
300	1262	1257	1257	1255	1254	1252	1250	1248	1247	1245	1243	1242	1240	1239	1237	1236
320	1225	1220	1219	1218	1216	1214	1212	1210	1209	1207	1205	1203	1202	1200	1198	1197
340	1184	1179	1179	1177	1175	1173	1172	1170	1168	1166	1164	1162	1160	1158	1157	1155
360	1141	1135	1135	1133	1131	1129	1127	1125	1123	1121	1119	1117	1115	1113	1111	1110
380	1095	1089	1088	1086	1084	1082	1080	1078	1076	1074	1071	1069	1067	1065	1063	1061
400	1047	1040	1040	1037	1035	1033	1031	1029	1026	1024	1022	1020	1017	1015	1013	1011
420	998	990	989	987	985	982	980	978	975	973	971	968	966	963	961	959
440	947	939	938	936	933	931	928	926	923	921	918	916	913	910	908	905
460	895	887	887	884	882	879	876	874	871	868	865	862	859	857	854	851
480	843	836	835	833	830	827	824	821	818	815	812	809	806	802	799	796
495	804	797	797	794	791	788	785	782	779	775	772	769	765	762	758	755
505	778	772	772	769	766	763	760	756	753	749	746	742	738	735	731	728

NOTE: 1) Tech Spec Refueling boron concentration is 2700 ppmB (per C1C13 COLR)

2) Fill and Vent Boron concentration is 1587 ppmB.

UNIT ONE
REACTOR OPERATING DATA
SECTION 5.11
MINIMUM SHUTDOWN MARGIN BORON

Required Boron Concentration for 1.3% Shutdown Margin as a Function of Temperature and Burnup

CORE AVERAGE TEMPERATURE (°F)

BURNUP (EFPD)	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	557
0	1315	1309	1301	1293	1283	1271	1257	1239	1219	1198	1171	1138	1096	1044	980	960
20	1348	1341	1334	1326	1317	1306	1293	1277	1259	1239	1214	1182	1143	1093	1033	1014
40	1375	1368	1362	1354	1346	1336	1324	1310	1292	1274	1250	1220	1182	1136	1078	1060
60	1397	1391	1385	1378	1371	1362	1351	1337	1321	1303	1280	1252	1216	1170	1115	1097
80	1414	1408	1403	1397	1390	1382	1371	1359	1343	1326	1305	1277	1242	1198	1143	1126
100	1425	1421	1417	1411	1405	1397	1387	1374	1359	1343	1322	1295	1261	1218	1164	1147
120	1431	1428	1425	1420	1414	1407	1397	1384	1369	1354	1333	1307	1273	1230	1177	1160
140	1432	1431	1428	1424	1418	1411	1401	1388	1373	1358	1338	1312	1278	1235	1182	1165
160	1428	1427	1425	1421	1416	1408	1398	1386	1371	1355	1335	1309	1275	1232	1178	1161
180	1419	1418	1416	1412	1407	1399	1389	1377	1361	1345	1325	1299	1264	1221	1166	1149
200	1405	1404	1402	1398	1392	1384	1374	1361	1345	1329	1308	1281	1246	1202	1147	1129
220	1386	1384	1382	1378	1372	1364	1354	1340	1324	1307	1285	1257	1222	1176	1120	1103
240	1362	1361	1358	1353	1347	1339	1328	1314	1297	1280	1257	1228	1191	1145	1088	1070
260	1335	1332	1329	1324	1318	1309	1298	1283	1266	1247	1224	1194	1156	1108	1050	1031
280	1303	1300	1297	1291	1284	1275	1263	1248	1230	1211	1186	1155	1116	1067	1007	988
300	1267	1264	1260	1255	1247	1237	1224	1209	1190	1170	1144	1112	1072	1021	959	939
320	1228	1225	1220	1214	1206	1195	1182	1165	1146	1125	1099	1065	1023	971	907	887
340	1185	1182	1177	1170	1161	1150	1136	1119	1098	1076	1049	1015	971	917	851	830
360	1140	1136	1130	1123	1114	1102	1087	1069	1047	1025	996	961	916	859	790	768
380	1091	1087	1081	1073	1063	1050	1035	1016	993	970	941	904	857	798	725	702
400	1040	1035	1029	1021	1010	997	980	961	937	913	883	845	796	734	659	635
420	988	982	975	966	955	941	924	903	879	854	823	783	733	670	593	568
440	934	928	920	911	899	884	866	845	819	793	760	720	668	605	528	504
460	880	873	864	854	841	826	807	785	759	731	696	655	603	541	467	443
480	825	816	807	796	783	767	747	725	697	667	631	589	538	479	410	389
495	783	774	764	752	738	722	702	679	652	619	582	539	489	434	371	352
505	756	746	735	723	709	692	672	649	621	587	548	505	457	404	347	330

NOTE: 1) Tech Spec Refueling boron concentration is 2700 ppmB (per C1C13 COLR)

2) Fill and Vent Boron concentration is 1587 ppmB.

Boron Concentration (PPMB) for K-eff = 0.99 as a function of
Temperature and Burnup with *Control Banks Only Inserted*

Bounds ARI cases with Highest Worth Bank Withdrawn

NC SYSTEM AVERAGE TEMPERATURE (°F)

BURNUP (EFPD)	325	350	375	400	425	450	475	500	525	550	557
0	1456	1446	1437	1422	1404	1384	1366	1335	1299	1251	1235
20	1483	1475	1467	1454	1438	1419	1403	1374	1340	1295	1281
40	1508	1501	1494	1482	1467	1450	1435	1408	1377	1334	1320
60	1530	1523	1517	1506	1492	1476	1462	1437	1407	1366	1353
80	1554	1548	1542	1531	1519	1504	1491	1467	1438	1398	1384
100	1563	1557	1552	1542	1530	1516	1503	1480	1452	1412	1399
120	1565	1560	1554	1545	1533	1519	1507	1484	1456	1417	1404
140	1559	1553	1548	1538	1527	1513	1501	1478	1449	1410	1397
160	1549	1544	1538	1528	1516	1502	1491	1467	1438	1398	1385
180	1534	1529	1523	1513	1501	1486	1475	1450	1420	1380	1367
200	1514	1509	1502	1492	1479	1464	1452	1427	1396	1355	1342
220	1486	1480	1473	1462	1449	1433	1419	1393	1362	1318	1304
240	1458	1451	1444	1432	1418	1401	1387	1360	1328	1283	1268
260	1426	1419	1411	1399	1384	1366	1351	1323	1289	1242	1227
280	1391	1383	1374	1361	1345	1326	1310	1281	1246	1197	1181
300	1351	1343	1333	1319	1302	1283	1266	1235	1198	1148	1131
320	1305	1295	1285	1270	1252	1231	1213	1180	1141	1088	1071
340	1259	1249	1238	1222	1203	1181	1162	1128	1086	1032	1014
360	1211	1200	1188	1171	1151	1128	1108	1072	1029	972	954
380	1160	1148	1136	1118	1097	1072	1051	1013	969	909	890
400	1107	1094	1081	1062	1039	1013	990	951	905	844	824
420	1046	1033	1018	998	974	947	922	881	833	770	749
440	990	976	960	939	914	885	859	817	767	702	681
460	933	917	901	879	853	823	795	751	700	633	611
480	875	858	841	818	790	759	730	685	633	563	541
495	830	813	796	771	743	711	681	635	581	511	488
505	800	783	765	740	711	679	648	601	547	475	452

UNIT ONE REACTOR OPERATING DATA
SECTION 5.12
MODE 3, 4, AND 5 BORON CONCENTRATION

SOURCE CNEI-0400-26
PREPARED BY M.W.Hawes
REVISION 306
DATE 11/16/00

Boron Concentration (PPMB) for K-eff = 0.99 as a function of
Temperature and Burnup with *Control Banks Only Inserted*

Bounds ARI cases with Highest Worth Bank Withdrawn

NC SYSTEM AVERAGE TEMPERATURE (°F)

BURNUP (EFPD)	68	75	100	125	150	175	200	225	250	275	300
0	1506	1505	1501	1497	1493	1488	1484	1479	1474	1471	1464
20	1526	1524	1520	1517	1513	1510	1507	1503	1499	1497	1491
40	1543	1541	1538	1534	1532	1529	1527	1524	1521	1519	1514
60	1557	1556	1552	1550	1548	1545	1544	1542	1540	1539	1535
80	1574	1573	1570	1567	1566	1564	1563	1561	1560	1561	1558
100	1579	1578	1575	1573	1572	1570	1569	1568	1567	1570	1567
120	1578	1577	1574	1572	1571	1570	1569	1568	1568	1571	1569
140	1571	1570	1567	1565	1564	1563	1562	1561	1561	1564	1562
160	1560	1559	1556	1554	1554	1553	1551	1551	1551	1555	1553
180	1545	1544	1541	1539	1539	1538	1537	1536	1536	1540	1538
200	1526	1525	1522	1520	1520	1519	1517	1517	1517	1521	1518
220	1500	1499	1497	1494	1494	1492	1491	1491	1490	1494	1491
240	1474	1473	1470	1468	1467	1466	1465	1464	1463	1466	1463
260	1445	1444	1441	1439	1437	1436	1435	1433	1433	1435	1432
280	1412	1411	1408	1406	1404	1402	1401	1400	1398	1401	1397
300	1376	1375	1372	1369	1367	1366	1364	1362	1361	1362	1358
320	1335	1334	1330	1327	1325	1323	1321	1319	1317	1317	1312
340	1294	1292	1289	1285	1283	1281	1278	1276	1273	1273	1267
360	1250	1249	1245	1241	1239	1236	1233	1230	1227	1227	1220
380	1204	1202	1198	1195	1192	1188	1185	1182	1178	1177	1170
400	1155	1154	1150	1146	1142	1139	1135	1131	1127	1125	1117
420	1100	1099	1094	1090	1086	1082	1078	1073	1068	1066	1058
440	1049	1048	1043	1038	1034	1030	1025	1020	1014	1012	1002
460	997	995	991	986	981	976	971	965	959	956	946
480	944	942	938	933	928	922	916	910	903	899	888
495	903	902	897	892	887	881	875	868	861	856	844
505	876	875	870	865	859	853	847	840	832	827	815

SOURCE CNEI-0400-26
PREPARED BY M.W.Hawes
REVISION 306
DATE 11/16/00

UNIT ONE REACTOR OPERATING DATA
SECTION 5.13
SHUTDOWN FISSION PRODUCT CORRECTION

Time (hours)	Time (days)	Correction (ppm)	Time (hours)	Time (days)	Correction (ppm)	Time (hours)	Time (days)	Correction (ppm)
0	0.00	0.0	240	10.00	49.0	1056	44.00	55.3
6	0.25	2.7	246	10.25	49.0	1080	45.00	55.4
12	0.50	5.5	252	10.50	49.1	1104	46.00	55.6
18	0.75	9.3	258	10.75	49.2	1128	47.00	55.7
24	1.00	13.0	264	11.00	49.2	1152	48.00	55.8
30	1.25	15.7	270	11.25	49.3	1176	49.00	55.9
36	1.50	18.4	276	11.50	49.3	1200	50.00	56.1
42	1.75	21.1	282	11.75	49.4	1224	51.00	56.2
48	2.00	23.7	288	12.00	49.4	1248	52.00	56.3
54	2.25	26.3	312	13.00	49.7	1272	53.00	56.5
60	2.50	28.9	336	14.00	49.9	1296	54.00	56.6
66	2.75	31.6	360	15.00	50.1	1320	55.00	56.7
72	3.00	34.2	384	16.00	50.3	1344	56.00	56.8
78	3.25	35.1	408	17.00	50.6	1368	57.00	57.0
84	3.50	36.1	432	18.00	50.8	1392	58.00	57.1
90	3.75	37.1	456	19.00	51.0	1416	59.00	57.2
96	4.00	38.0	480	20.00	51.2	1440	60.00	57.4
102	4.25	39.0	504	21.00	51.5	1464	61.00	57.3
108	4.50	39.9	528	22.00	51.7	1488	62.00	57.3
114	4.75	40.8	552	23.00	51.9	1512	63.00	57.2
120	5.00	41.7	576	24.00	52.2	1536	64.00	57.2
126	5.25	42.1	600	25.00	52.4	1560	65.00	57.2
132	5.50	42.5	624	26.00	52.6	1680	70.00	57.0
138	5.75	42.8	648	27.00	52.8	1800	75.00	56.8
144	6.00	43.2	672	28.00	53.1	1920	80.00	56.7
150	6.25	43.6	696	29.00	53.3	2040	85.00	56.5
156	6.50	43.9	720	30.00	53.5	2160	90.00	56.3
162	6.75	44.3	744	31.00	53.6	2280	95.00	56.2
168	7.00	44.6	768	32.00	53.8	2400	100.00	56.0
174	7.25	45.0	792	33.00	53.9	2520	105.00	55.8
180	7.50	45.4	816	34.00	54.0	2640	110.00	55.6
186	7.75	45.7	840	35.00	54.2	2760	115.00	55.5
192	8.00	46.1	864	36.00	54.3	2880	120.00	55.3
198	8.25	46.5	888	37.00	54.4	3000	125.00	55.1
204	8.50	46.8	912	38.00	54.5	3120	130.00	54.9
210	8.75	47.2	936	39.00	54.7	3240	135.00	54.7
216	9.00	47.5	960	40.00	54.8	3360	140.00	54.5
222	9.25	47.9	984	41.00	54.9	3480	145.00	54.3
228	9.50	48.3	1008	42.00	55.0	3600	150.00	54.1
234	9.75	48.6	1032	43.00	55.2			

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM 3R/ADMIN

Perform a Review of a R&R Procedure

CANDIDATE _____

EXAMINER _____

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Perform a review of a R&R procedure.

Alternate Path:

N/A

Facility JPM #:

N/A)

K/A Rating(s):

GKA 2.2.13 (3.6/3.8)

Task Standard:

The R&R is reviewed for technical correctness. The candidate corrects the sequence.

Preferred Evaluation Location:

Simulator ____ In-Plant __X___

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

OMP 2-18 (Tagout Removal and Restoration Procedure)
CN-1570-01 (Flow Diagram of the KF System)

Validation Time: 8 min **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Simulator Setup

N/A.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is operating at 100% power
1A KF Pump indicates no flow with the pump running
An NLO has been directed to tag out the pump for maintenance to investigate.

INITIATING CUE:

You are directed to review the R&R that will be used to tag out the "1A" KF pump. The pump has been removed from service and "1B" KF pump has been placed in service.

JPM OVERALL STANDARD:

The R&R is reviewed for technical correctness and placed in the correct sequence.

STEP 1: Verify all required blanks for Removal on page 1 of the R&R are completed. STANDARD: Component tagged, Applicable procedure, Reason for Removal, Supervisor responsible for work, Applicable work orders are entered. COMMENTS:	___SAT ___UNSAT
STEP 2 Verify all required blanks for R&R on additional pages of the R&R are completed. STANDARD: Equip/Nomenclature, Seq #, Removed position, I/V required, SW LBL sections filled in. COMMENTS:	___SAT ___UNSAT
STEP 3: Component verified to be completely isolated and that all components are tagged in the proper position STANDARD: The pump is verified to be completely isolated. The candidate recognizes that the motor breaker for the 2A KF Pump is to be racked out and tagged and corrects R&R to rackout and tag 1A KF Pump motor breaker. COMMENTS: After applicant identifies an error with the R&R: Examiner Cue: Identify and correct this and any other errors that may be present such that the R&R may be properly issued.	**CRITICAL STEP** ___SAT ___UNSAT

STEP 4; Verify proper sequence. STANDARD: Candidate determines that the sequence is incorrect and should be re-ordered as follows • Pump Breaker racked out • Isolation valves closed • Vents and drains opened. COMMENTS:	**CRITICAL STEP** ___SAT ___UNSAT
STEP 5: Sign the "Reviewed By" blank. STANDARD Candidate signs "Reviewed By". COMMENTS:	___SAT ___UNSAT
STEP 6: Log the R&R in the Unit 1 RO Logbook. STANDARD: Log entry correctly made. **** EXAMINER CUE: The R&R has been entered in the Unit 1 RO Logbook.** COMMENTS:	___SAT ___UNSAT

STEP 7: Return the R&R to the NLO for Tech Spec Verification and approval. TANDARD: N/A **** EXAMINER CUE: NLO will take the R&R to the Control Room SRO for completion.** COMMENTS:	___SAT ___UNSAT

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

Unit 1 is operating at 100% power
1A KF Pump indicates no flow with the pump running
An NLO has been directed to tag out the pump for maintenance to investigate.

INITIATING CUE:

You are directed to review the R&R that will be used to tag out the "1A" KF pump. The pump has been removed from service and "1B" KF pump has been placed in service.

Duke Power Co. Catawba Nuclear Station | 01/28/2001 | Page 1 of 3

Unit 1 | Tagout ID: O-1-1-0243

[redacted]

Removal

System Tagged:	Reason for Removal:
KF - SPENT FUEL COOLING SYSTEM	INSPECT Pump

Applicable Work Orders:
98014758-01

Affected Procedures:
OP/1/A/6200/005 Spent Fuel Cooling System Chg #67

Supervisor Responsible and/or Crew:	Modification:
Maintenance Crew 269	

Prepared By:	Date/Time:	Reviewed By:	Date/Time:	Approved By:	Date/Time
E.L. Seeggs					

Technical Specifications / SLC Unit 1 / Unit 2	ORAM/Sentinel Evaluation	Mode Req'd By	Fire Impair	SSF Degrade	Containment Closure:

Pre Job Briefing:	Ctrl Rm SRO Ack	Ctrl Rm Ack Unit 1 / Unit 2	1.47 Panel Unit 1 / Unit 2	Ctrl Rm Log Unit 1 / Unit 2

Copies Filed By:	R&R Filed By:	Computer Updated By:	OAC Points Removed From Service

Remarks:

[redacted] Unit 1 Tagout ID: O-1-1-0243

Removal [redacted]

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
1	2ETA 15	Racked Out		
Red Tag ID 10561	Equipment Description: 2A KF Pump Motor		Removed By:	Date / Time:
	Location: Aux 577 ~~469~~ 498 AA49		IV Req'd?: Yes	IV By:
Special Info:			LBL 1	OCG: OPS

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
3	1KF-4	Closed		
Red Tag ID 10562	Equipment Description: 1A KF Pump Disch Isol		Removed By:	Date / Time:
	Location: Aux 588 418 QQ52		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
2	1KF-2	Closed		
Red Tag ID 10563	Equipment Description: 1A KF Pump Suction Isol		Removed By:	Date / Time:
	Location: Aux 581 418 QQ52		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq# ~~4~~ 10564	Equipment ID	Position	Part Approval:	Date / Time:
	1KF-121	OPEN		
Red Tag ID	Equipment Description: 1A KF Pump Drain		Removed By:	Date / Time:
	Location: Aux 581 418 QQ51		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq# 4	Equipment ID	Position	Part Approval:	Date / Time:
	1KF-9	OPEN		
Red Tag ID 10564	Equipment Description: 1A KF Pump Vent		Removed By:	Date / Time:
	Location: Aux 580 418 QQ52		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG:

[redacted]

Unit 1 | Tagout ID: O-1-1-0243

[redacted]

Removal

Seq# 4	Equipment ID 1KF-13	Position OPEN	Part Approval:	Date / Time:
Red Tag ID ~~10565~~	Equipment Description 1A KF Pump Drain to WEFT		Removed By:	Date / Time:
	Location: Aux 578 418 QQ51		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq# 4	Equipment ID 1KF-12	Position OPEN	Part Approval:	Date / Time:
Red Tag ID	Equipment Description 1A KF Pump Drain		Removed By:	Date / Time:
	Location: Aux 578 418 QQ52		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq# 4	Equipment ID 1KF-10	Position OPEN	Part Approval:	Date / Time:
Red Tag ID	Equipment Description 1A KF Pump Vent to WEFT		Removed By:	Date / Time:
	Location: Aux 580 418 QQ52		IV Req'd?: NO	IV By:
Special Info:			LBL 0	OCG: OPS

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Removed By:	Date / Time:
	Location:		IV Req'd?:	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Removed By:	Date / Time:
	Location:		IV Req'd?:	IV By:
Special Info:			LBL	OCG:

Duke Power Co. Catawba Nuclear Station	01/28/2001	
[redacted]	Unit 1	Tagout ID: O-1-1-0243
Removal	[redacted]	

Equipment Removed From Service

Reason for Removal:

[illegible]	Equipment Tag	Position	Tag Type	[illegible]

Key

Duke Power Co. Catawba Nuclear Station | 01/28/2001 | Page 1 of 3

Unit 1 | Tagout ID: O-1-1-0243

Removal [redacted]

System Tagged:	Reason for Removal:
KF - SPENT FUEL COOLING SYSTEM	INSPECT PUMP

Applicable Work Orders:
98014758-01

Affected Procedures:
OP/1/A/6200/005 Spent Fuel Cooling System Chg #167

Supervisor Responsible and/or Crew:	Modification:
Maintenance Crew 269	

Prepared By:	Date/Time:	Reviewed By:	Date/Time:	Approved By:	Date/Time
E L Scruggs	Current	Candidate			

Technical Specifications / SLC Unit 1	Unit 2	ORAM/Sentinel Evaluation	Mode Req'd By	Fire Impair	SSF Degrade	Containment Closure:

Pre Job Briefing:	Ctrl Rm SRO Ack	Ctrl Rm Ack Unit 1	Unit 2	1.47 Panel Unit 1	Unit 2	Ctrl Rm Log Unit 1	Unit 2

Copies Filed By:	R&R Filed By:	Computer Updated By:	OAC Points Removed From Service

Remarks:

Unit 1 Tagout ID: O-1-1-0243

Removal [redacted]

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
1	1ETA 15	Racked Out		
Red Tag ID 10561	Equipment Description 1A KF Pump Motor		Removed By:	Date / Time:
	Location: Aux 577 ~~469~~ 498 1149		IV Req'd?: Yes	IV By:
Special Info:			LBL 1	OCG: O,S

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
2	1KF-4	Closed		
Red Tag ID 10562	Equipment Description 1A KF Pump Disch Isol		Removed By:	Date / Time:
	Location: Aux 588 418 Q052		IV Req'd?: no	IV By:
Special Info:			LBL 0	OCG: O/S

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
3	1KF-2	Closed		
Red Tag ID 10563	Equipment Description 1A KF Pump Suction Isol		Removed By:	Date / Time:
	Location: Aux 581 418 Q052		IV Req'd?: no	IV By:
Special Info:			LBL 0	OCG: O/S

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
~~4~~ 4	1KF-121	OPEN		
Red Tag ID	Equipment Description 1A KF Pump Drain		Removed By:	Date / Time:
	Location: Aux 581 418 Q051		IV Req'd?: no	IV By:
Special Info:			LBL 0	OCG: O/S

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
4	1KF-9	OPEN		
Red Tag ID 10564	Equipment Description 1A KF Pump Vent		Removed By:	Date / Time:
	Location: Aux 580 418 Q052		IV Req'd?: no	IV By:
Special Info:			LBL 0	OCG:

Unit 1 Tagout ID: O-1-1-0243

Removal [redacted]

Seq# 4	Equipment ID 1KF-13	Position OPEN	Part Approval:	Date / Time:
Red Tag ID [redacted]	Equipment Description 1A KF Pump Drain to WEFT		Removed By:	Date / Time:
	Location: Aux 578 418 QQ51		IV Req'd?: No	IV By:
Special Info:			LBL C	OCG: OPS

Seq# 4	Equipment ID 1KF-12	Position OPEN	Part Approval:	Date / Time:
Red Tag ID	Equipment Description 1A KF Pump Drain		Removed By:	Date / Time:
	Location: Aux 578 418 QQ52		IV Req'd?: No	IV By:
Special Info:			LBL C	OCG: OPS

Seq# 4	Equipment ID 1KF-10	Position OPEN	Part Approval:	Date / Time:
Red Tag ID	Equipment Description 1A KF Pump Vent to WEFT		Removed By:	Date / Time:
	Location: Aux 580 418 QQ52		IV Req'd?: No	IV By:
Special Info:			LBL C	OCG: OPS

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Removed By:	Date / Time:
	Location:		IV Req'd?:	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Removed By:	Date / Time:
	Location:		IV Req'd?:	IV By:
Special Info:			LBL	OCG:

Operations Management Procedure 2-18 (Tag Crew)

Approval R. Michael Glover (OPS)

Approval _____ (CHEM)

Rev 56 Date 10/4/00

DUKE POWER COMPANY

CATAWBA NUCLEAR STATION

TAGOUT REMOVAL AND RESTORATION PROCEDURE

1. Purpose

1.1. To describe management's policy concerning the development and execution of tagouts.

1.2. The Tag Out Program is used to control equipment removal and restoration to service, to protect workers during maintenance activities, to provide necessary administrative steps to maintain the status and integrity of plant components and systems, and provide for adequate documentation.

1.3. To explain how the Removal/Removal Addendum and Restoration/ Restoration Addendum Record Sheets shall be used to remove and restore equipment to service.

1.4. To explain how the Venting Restoration Sheet shall be used to properly vent equipment prior to returning it to service.

1.5. To explain how the Safety Tag Stickers are to be used.

1.6. To explain how the TLFT Checklist and TLFT Sequencing Sheets shall be used.

1.7. To provide guidelines for the draining of plant equipment.

1.8. To provide a mechanism for identifying the functional requirements when safety tags are returned to the Operational Control Group (OCG).

1.9. To provide guidelines for the use of **CAUTION** placards and zones.

1.10. To provide guidance in the implementation of Block Tag Outs (BTOs).

2. References

2.1. Nuclear System Directive 500, Red Tags/Configuration Control Tags

2.2. Site Directive 3.0.22, Block Tag Outs

2.3. Operations Management Procedure 1-5, Verification Methods

2.4. Site Directive 3.10.1, Operational Control of Systems and Components

3. Description

3.1. Philosophy Statements

A. Methodology

This document describes management's philosophy concerning the development and execution of tagouts. These statements are intended to be a guide for researching tagging boundaries in order to prepare, review, approve or execute a tagout for the purposes of removal or restoration.

B. Scope of Work Determination

In order to determine proper tagging boundaries, the scope of work to be performed must be understood. At a minimum, the following resources need to be considered:

- WMS Screens R210, R212 and R362
- Maintenance Planning
- Engineering
- Work crews assigned to perform the work
- Job location

Only when scope of work is understood, can tagging boundaries be developed

C. Tagging Boundary Determination

Once the scope of work is determined, safe tagging boundaries must be developed to protect the work crew(s). At a minimum, the following references need to be considered:

- Flow Diagrams
- Electrical Load Reports
- CNEEs
- CNLTs
- Procedures
- I&C Diagrams
- EDB
- Engineering
- Maintenance Planning
- Work Crew
- Job Location
- Operating Experience Tagging Reference

The references listed above may require SRO evaluation due to plant conditions. It may require other work groups to supplement or clarify information in documents referenced. Only when safe tagging boundaries have been identified, can a determination be made as to whether plant systems and components can be configured to allow work.

D. Configuration Control

Determining safe work boundaries is a paramount concern, but it is equally important to establish whether plant systems and components can be configured properly to allow work to begin based on current plant conditions or system alignments. There are potential adverse consequences to tagging components if overall plant impact is not considered. Among these impacts are:

- Operability of specific components
- Potential plant transient
- Regulatory commitments (NRC, EPA, DHEC, etc.)
- Operating Procedures
- Operating Experience Tagging Reference

If the plant can not be configured to allow work on a component to begin based on current mode or plant condition, then work must be deferred until the plant can be properly configured to allow work to proceed.

If the component can be removed from service and a procedure exists for the component, the procedure shall be used to remove the component from service.

E. Editorial Comments

These are intended as a means to convey additional information that may be necessary to isolate a component for tagging. Among these enhancements are:

- Procedures required to remove a component from service.
- Previous operating experience in isolating a component.
- Information that needs to be conveyed to other work groups as a consequence of the tagout.

F. Tagout Execution

The execution of a tagout requires that person(s) responsible for removing a component from service for tagging understand what is to be accomplished in the tagout. The responsible person(s) can not proceed without this information. They must understand the boundaries and the expected results. In all cases, the component must be isolated and tagged so that work can be performed safely. If the component can not be isolated based on the tagout instructions, then the tagout must be re-evaluated. Only if the component is successfully isolated can work begin.

G. Restoration

Prior to returning a component to service, all work order tasks must be verified complete to ensure the safety of the work crew. If all work order tasks are complete, the restoration process can begin. The return positions for components will be governed by operating procedures based on plant conditions and system alignments. Return positions must take into account the operability of a component (not just functionality). The person responsible for performing the restoration must understand what is to be accomplished when the restoration is performed. This may require a supervisor to provide additional guidance for returning a component to service. This may include researching the most effective means to fill and vent a component or the best method to restore power to a component.

If work orders are not complete and it is necessary to clear the tagout, the OCG must contact the work crew to determine if the tagout can be cleared. An SRO or OCG Staff will determine how the tagout will be cleared.

H. Operating Experience Tagging Reference

This is a document maintained by the OWPM to aid personnel preparing, reviewing approving and executing tagouts. This information is contained in the Operations Info Library under the OWPM folder on the LAN.

3.2. Additional Guidance

A. Tag outs are used to document a component being in an "Out of Normal" position. Shall be utilized when the configuration will extend beyond the current shift duty time.

B. Tag outs are NOT to be utilized for alignments outside the original system design where a procedure change is more appropriate. Ex: Changing a valve from OPEN to CLOSED. Evaluate use of a procedure change on an in-service system or component in lieu of an R&R.

C. Numbered tags shall be used for isolation purposes. N/A tags are appropriate for non-isolation purposes only like vents or drains.

D. Operating Procedures shall be used in conjunction with a tag out to remove equipment from service when available.

E. Operating Experience Tagging Reference shall be utilized in the creation of a tag out.

F. Tag outs are made for specific work and can only be used for those specific work orders/work requests. Once signed, dated and returned to the Operational Control Group (OCG), tag stubs can not be used for any other work orders/work requests.

G. If a tagout is to be hung in containment or in a contaminated area, the tag stubs may be removed and left with the OCG prior to the entry. Notify the WCCSRO or OCG Staff after the tags have been placed, this may allow the WCCSRO or OCG Staff to be able to release work in a timely fashion.

3.3. Purpose of Removal/Removal Addendum and Partial Restoration/Restoration Record Sheets (Attachment 9.1 and 9.2)

A. Provide a mechanism to record equipment which is placed in an "Out of Normal" position and to ensure it is restored to normal. This information will be documented with the procedure or system primarily affected by the tag out

B. To allow the removal and restoration of equipment to be accomplished in a specific sequence.

C. Provide a mechanism to list the appropriate information necessary to safely perform any work on equipment. All equipment, safety tags, etc. required for a particular job and work supervisor will be listed together.

D. To ensure administrative controls, i.e. double verification, are properly accomplished and documented.

3.4. Purpose of the Venting Restoration Sheet (Attachment 9.3)

A. To properly fill and vent a component and/or system and document the process. Operating Procedures shall be used in conjunction when available.

B. To ensure administrative controls are properly accomplished and documented

3.5. Purpose of Safety Tag Stickers

A. To provide a means to tag control panel switches and other devices where a tag would obscure indications or controls.

3.6. Purpose of the TLFT Checklist and TLFT Sequencing Sheets (Attachment 9.10 and 9.11)

A. To provide a mechanism to temporarily lift tags for testing per NSD500, Red Tags/Configuration Control Tags.

3.7. Purpose of Operations Guidelines For Draining Plant Equipment (Attachment 9.8)

A. To provide guidelines to ensure the proper steps are taken when draining plant equipment.

3.8. Purpose of Safety Tag Return/Functional Request Form (Attachment 9.9)

A. To identify any functional requirements necessary when a tag out is returned to the OCG.

3.9. Purpose of **CAUTION** Placard and Zones

A. To identify redundant equipment critical for safe unit operation when critical equipment, i.e. an RN Pump, is tagged out.

4. Responsibilities

4.1. The Superintendent of Operations will determine the controlling group for equipment and systems, that is the Operational Control Group (OCG).

4.2. The Operations Shift Manager (OSM), Nuclear Shift Supervisor (SS) or Chemistry Staff shall be responsible for the proper utilization of the Removal/Restoration Record Sheets, Venting Restoration Sheets, Safety Tag Stickers and TLFT Checklist and TLFT Sequencing Sheets.

4.3. The Operations Work Process Manager (OWPM), OSM or Chemistry Staff is responsible for developing a tag out per NSD500, Site Directive 3.0.22 and/or this OMP.

4.4. The person preparing a Removal/Removal Addendum Record sheet must be qualified to the tagout program and is responsible for the correctness of and utilization of the Operations Experience Tagging Reference. The person preparing a Partial Restoration/Restoration Record sheet must be qualified to the tagout program and is responsible for utilizing operating procedures and other R&Rs in the preparation. This person will normally be an NLO or Chem Tech.

4.5. The person reviewing a Removal/Removal Addendum Record sheet must be qualified to the tagout program and is responsible for checking the correctness of the tag out for the execution of the work activity. The OPS reviewer must be an SRO or knowledgeable staff personnel. The Chemistry reviewer must be a Chemistry Staff or an SRO. The review should be separate and independent from the preparer. The person reviewing a Partial Restoration/Restoration Record sheet must be qualified to the tagout program and is responsible for the correctness of the restoration.

4.6. The person approving a Removal/Removal Addendum Record sheet must be qualified to the tagout program and is responsible for the correctness of the tag out for the execution of the work activity and the compatibility of the tag out with overall plant conditions. The approver must be an on-shift SRO for Ops tags and a Chemistry Staff for CHM tags. The approval must be separate and independent from the reviewer. The person approving a Partial Restoration/Restoration Record sheet must be qualified to the tagout program and is responsible for the correct restoration of the system or component to service or standby. The approver must be an on-shift SRO for OPS tags and a Chemistry Staff for CHM tags.

4.7. The person executing the tag out is responsible for checking the procedures affected and any other outstanding tag outs associated with that procedure/system for any adverse affects. When IV is required, the IVer shall also verify the removal position. When tag outs are turned over to a new shift, the new shift does <u>not</u> have to re-verify the removal positions if already approved by a supervisor. However, a pre-job brief shall be conducted with the new shift to cover the details of the job. If the person executing the tagout discovers an inadequate boundary isolation during the hanging of the tagout, that person shall stop, involve his supervision in resolving the problem, and write a PIP.

4.8. The Operational Control Group is responsible for installing the locking device(s) on electrical panelboard breakers. If the enclosure door will not shut due to the locking device, the door should be secured as closed as possible for seismic concerns.

4.9. The OSM, SS, Chemistry Staff or designee shall ensure that a Fire Impairment Report Form per NSD 316 (Fire Protection Impairment and Surveillance) is filled out when a tag out impairs the Fire Protection System.

4.10. The OSM, SS, Work Control Center SRO (WCC SRO) or Chemistry Staff shall be responsible for coordinating functional/testing with the maintenance crew/testing group when realigning or restoring a component or system. Maintenance crews shall be readily available when the component/system has a hazardous substance that could leak from the system.

4.11. The person performing the restoration shall ensure the returned position listed is correct. When IV is required, the IVer shall also verify the returned position. When tag outs are turned over to a new shift, the new shift does not have to re-verify the returned positions if already approved by a supervisor. However, a pre-job brief shall be conducted with the new shift to cover the details of the job.

4.12. The person preparing a Venting Restoration Sheet is responsible for ensuring a sufficient number of vents in the proper sequence have been utilized. Isometrics or a system walk down should be used when required. On closed loop systems such as KC ensure adjacent components to a de-pressurized portion of a system are vented to ensure inadvertently drained portions of a system are properly vented.

4.13. An Operations supervisor is responsible for providing an oversight review of Chemistry tag outs to ensure an understanding of the effects of the tag out on plant operations. Systems under Chemistry control per Site Directive 3.10.1 do not require Operations supervisor oversight (WT, YT, WC, CT, AM).

5. Reporting Requirements

5.1. The OSM, SS or Chemistry Staff shall complete TAG OCCURRENCE REPORT FORMS per NSD500 as necessary.

5.2. An audit of the tag out program shall be performed in accordance with OMP 2-1 (Audit of Safety Tags and Tagouts).

5.3. Tag Out records should be sent to the Document Management Group for retention as specified in the NGD Retention Schedule.

6. Procedure

Tag outs are generated to correctly administer the removal and restoration of equipment or systems from service for maintenance, testing or configuration control. Operating procedures shall be utilized when available for the isolating, draining, filling and venting of components and/or systems. All tag outs shall include at least one drain and/or vent tagged open if possible to prevent re-pressurization per NSD 500.

When multiple OCGs are involved in a tagout, the lead group will use the Removal/Removal Addendum and Restoration sheets and the support group will use the Removal Addendum and Partial Restoration sheets. Each group will follow the normal procedure for their respective record sheets. The support group should not hang or remove their portion of the tagout without direction from the lead group.

SD 3.10.1 makes it permissible for an OCG to tag another OCG's equipment with that group's prior consent. The OCG is still responsible for signing the tags in the OCG space.

Tag outs shall normally be made using the Safety Tag Computer Program. Contact OPS Tag Team for the specifics of the program. In the event the program is inaccessible, the tag outs shall be hand generated using the appropriate copy of the Removal and/or Restoration attachment from this OMP. Blank tags are available in the tagout room to use for handwritten tags. Hand generated tag outs should be replaced with a computerized version when the program is accessible. Any handwritten tagouts (including any handwritten changes to a tagout) should be filed with the OCG's R&R Logbook and copy routed to the Tag Team (OPS) or Chemistry Staff for update to the Safety Tag Computer Program when the program becomes accessible.

The Removal and Restoration Sheets will support color printing if utilized. Special Instruction Info will be printed in red and Tag out Removal/Restoration Remarks will print in blue. The Unit will print in color based on facility and unit. The color scheme for Catawba is Black, Green and Orange for Unit 0, 1 and 2 respectively.

6.1. TLFT Checklist (Attachment 9.10) and TLFT Sequencing Sheet (Attachment 9.11)

NOTE: Tags may be lifted for testing per NSD 500 and Site Directive 3.0.22. If tags are part of a BTO, ensure the enclosure from SD 3.0.22, Request Form to Lift or Clear Safety Tags, is utilized.

A. Use Attachment 9.10 and Attachment 9.11 to lift and/or rehang tags as required.

6.2. Voiding Tags/Tag outs

A. Only the OCG may void a tag or tag out.

B. When voiding tag outs that were <u>not</u> placed, discard them. We do <u>not</u> retain voided tags. Void the tag out on the tag out computer. Remove the tag out number on the R362 screen for the Applicable Work Orders on WMS.

C. When voiding tags that were <u>not</u> placed, discard them. We do <u>not</u> retain voided tags. Void the tag from the applicable tag out on the tag out computer. If the tag is voided after the removal sheets are printed, a new set of sheets will have to be printed.

D. When clearing tags that were placed but <u>not</u> used, write PLACED/NOT USED across the tag stub and date and sign the stub. Restoration of the system or component will be per the normal restoration process in Attachment 9.2.

6.3. Use of Tag Stickers

A. A red or white tag sticker shall be used on control panel switches and other devices where a tag would obscure indications or controls or proper attachment of a tag is hindered. Stickers are intended primarily for use in the Control Room but may be used in the plant as well. Use in the plant should be documented in the REMOVAL/RESTORATION REMARKS as to their location. A Controlling Sticker will be used if more than two stickers are required on a device as per 6.3.H

B. Tag stickers shall be considered the same as a tag. Improper placement and overriding tag stickers to operate equipment is considered as serious as violating a tag and will be treated accordingly.

C. The tag stub associated with a sticker will be given to the work supervisor in the usual manner and the tag itself will be retained by the OCG.

D. The following information shall be placed on a tag sticker:

Red Tag/White Tag ID

Equipment ID and Description

Breaker or Valve Position

E. When a control panel switch or other device is to be tagged but the motive force for the device is to remain operable the position on the sticker is the status of the component. For example if a fan breaker is to remain energized the position on the sticker would be the status of the fan, OFF or ON as appropriate. For a valve the position would be OPEN or CLOSED as appropriate.

F. When the motive force (breaker, air supply or other force) for a control panel switch or other device is to be tagged rendering the switch inoperable the position on the sticker should be the status of the component and NOT the motive force. For example the position for a valve would be OPEN or CLOSED as appropriate.

NOTE:	Stickers should be placed on the edges of the red guard so that the switch indicating lights remain visible.

G. For all Cutler-Hammer E-30 Type switches without a water protective cover a red guard should be placed around the switch to indicate the use of a tag sticker. For switches with a water protective cover the sticker may be placed on the panel adjacent to the switch but so as not to obscure any indications.

H. Controlling Sticker

1. When more than two tag stickers are required for a control panel switch or other device a Controlling Sticker shall be placed on the device. The individual red or white tag stickers will be placed in the Control Room Sticker Log. All stickers for a particular device should be on the same page of the Sticker Log.

2. The controlling sticker shall show the position of the component just as if it were an individual sticker as per 6.3.E or 6.3.F

3. The individual stickers shall be removed from the Sticker Log as tags are lifted or cleared and when two or less stickers remain the Controlling Sticker removed and individual stickers implemented as appropriate.

6.4. Addendums to Tag Outs That are Approved and Placed

A. Additional equipment may be added to a tag out that is approved and placed by using a Removal Addendum Record Sheet.

7. Pre-Planned Tag Outs

7.1. Repetitive tagging requirements are captured for many work activities with pre-planned tag outs documented on the R213 or R362 screen of the Work Order. Pre-planned tag outs are not controlled documents and shall be checked for accuracy by the tag out preparer.

7.2. It is permissible to alter a pre-planned tag out to fit the maintenance activity. Use Checklist for Modifying and/or Adding a New Pre-planned Tag Out found in Ops Library under the OWPM file folder to permanently alter a pre-planned tag out.

8. Protection of Components Critical to Safe Unit Operation

8.1. CAUTION Placards

A. If the component that is being removed from service is critical to safe unit operation, then a "**CAUTION**" placard shall be placed on the breaker of the related component on the opposite train.

B. Examples of systems/components that require these placards to be hung include the following: LH, KC, KG, ND, NV, RN, VC/YC, MG sets, HWPs, CBPs, Xfmer power and VI compressors.

C. During outages the protected equipment shall include those items listed in the "Outage Status Report" under "Critical Equipment Required for Current Plant Configuration".

D. The "**CAUTION**" placards will be stored in the WCC and placed on the appropriate breaker as the R&R is being hung. A note in the remarks section of the R&R should be made to ensure the placard is placed and removed with the tagout.

8.2. Caution Zones

A. A Caution Zone should be set up around components that are critical to safe unit operation when the opposite trains component is out of service. These zones shall be marked by any of the following means; use of yellow caution tape, yellow chain and stanchions or placement of signs warning not to work in the specified area or both.

B. Examples of areas that are required to be protected when the unit is at power are the Diesel Generator rooms, VC/YC chiller rooms, NV pump rooms, LXC & LXD, Hotwell pumps, Condensate Booster pumps, Motor Generator sets and RN pumphouse of the only operable train when an RN header is out of service.

C. During outages the protected equipment should include VC/YC chiller rooms, ND Pump Rooms, essential switchgear rooms, and D/G rooms when only 1 Train on the outage unit is available or operable. RN pumphouse should also be protected anytime only 1 RN header is available or operable.

D. No work shall be permitted in these areas until the opposite train has been returned to an available status. Examples of work that are not allowed include scaffold building and other preliminary work such as hanger removals.

E. The R&R Remarks section should be used to designate that a Caution Zone was established and should be cleared as the R&R is cleared.

F. Yellow caution signs are kept in the WCC in a labeled file cabinet drawer.

9. Attachments

9.1. Removal/Removal Addendum Record Sheet

9.2. Partial Restoration/Restoration Record Sheets

9.3. Venting Restoration Sheet

9.4. Effects of Opening Valve Breakers

9.5. Dual Function Valves

9.6. Safety Concerns With VP and VQ Systems

9.7. Tagging Power Lockouts

9.8. Operations Guidelines For Draining Plant Equipment

9.9. Safety Tag Return/Functional Request Form

9.10. TLFT Checklist

9.11. TLFT Sequencing Sheet

9.12. How To Access OWPM Reference Documents

Attachment 9.1
Removal/Removal Addendum Record Sheet

Duke Power Co.		**Page**
Catawba Nuclear Station	**Unit ____**	**Tagout ID:**
Removal	[redacted]	

System Tagged:			**Reason for Removal:**		
Applicable Work Orders:					
Affected Procedures:					
Supervisor Responsible and/or Crew:			**Modification:**		
Prepared By:	**Date/Time:**	**Reviewed By:**	**Date/Time:**	**Approved By:**	**Date/Time**

Technical Specifications / SLC Unit 1 / Unit 2	**ORAM/Sentinel Evaluation**	**Mode Req'd By**	**Fire Impair**	**SSF Degrade**	**Containment Closure:**

Pre Job Briefing:	**Ctrl Rm SRO Ack**	**Ctrl Rm Ack** Unit 1 / Unit 2	**1.47 Panel** Unit 1 / Unit 2	**Ctrl Rm Log** Unit 1 / Unit 2

Copies Filed By:	**R&R Filed By:**	**Computer Updated By:**	**OAC Points Removed From Service**

Remarks:

Attachment 9.1
Removal/Removal Addendum Record Sheet

Duke Power Co.	**Catawba Nuclear Station**		**Page**
	Unit ____	**Tagout ID:**	
Removal	[redacted]		

Seq#	**Equipment ID**	**Position**	**Part Approval:**	**Date / Time:**
Red Tag ID	**Equipment Description**		**Placed By:**	**Date/Time**
[redacted]	**Location:**		**IV Req'd?**	**IV By:**
Special Info:		**As Found Position:**	**LBL**	**OCG:**

Seq#	**Equipment ID**	**Position**	**Part Approval:**	**Date / Time:**
Red Tag ID	**Equipment Description**		**Placed By:**	**Date/Time**
[redacted]	**Location:**		**IV Req'd?**	**IV By:**
Special Info:		**As Found Position:**	**LBL**	**OCG:**

Seq#	**Equipment ID**	**Position**	**Part Approval:**	**Date / Time:**
Red Tag ID	**Equipment Description**		**Placed By:**	**Date/Time**
[redacted]	**Location:**		**IV Req'd?**	**IV By:**
Special Info:		**As Found Position:**	**LBL**	**OCG:**

Seq#	**Equipment ID**	**Position**	**Part Approval:**	**Date / Time:**
Red Tag ID	**Equipment Description**		**Placed By:**	**Date/Time**
[redacted]	**Location:**		**IV Req'd?**	**IV By:**
Special Info:		**As Found Position:**	**LBL**	**OCG:**

Seq#	**Equipment ID**	**Position**	**Part Approval:**	**Date / Time:**
Red Tag ID	**Equipment Description**		**Placed By:**	**Date/Time**
[redacted]	**Location:**		**IV Req'd?**	**IV By:**
Special Info:		**As Found Position:**	**LBL**	**OCG:**

Attachment 9.1
Removal/Removal Addendum Record Sheet

Duke Power Co.		**Page**
Catawba Nuclear Station	**Unit ___**	**Tagout ID:**
Removal Addendum	[redacted]	

Component Tagged:			**Reason for Removal Addendum:**		
Applicable Work Orders:					
Affected Procedures:					
Supervisor Responsible and/or Crew:			**Modification:**		
Prepared By:	**Date/Time:**	**Reviewed By:**	**Date/Time:**	**Approved By:**	**Date/Time**
Technical Specifications / SLC **Unit 1** **Unit 2**		**ORAM/Sentinel Evaluation**	**Mode Req'd By**	**Fire Impair**	**SSF Degrade**	**Containment Closure:**
Pre Job Briefing:	**Ctrl Rm SRO Ack**	**Ctrl Rm Ack** **Unit 1** **Unit 2**		**1.47 Panel** **Unit 1** **Unit 2**	**Ctrl Rm Log** **Unit 1** **Unit 2**
Copies Filed By:	**R&R Filed By:**	**Computer Updated By:**	**OAC Points Removed From Service**		
Remarks:					

Attachment 9.1
Removal/Removal Addendum Record Sheet

Duke Power Co.	Catawba Nuclear Station			Page
		Unit ____	Tagout ID:	
Removal Addendum		[redacted]		

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Placed By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:		As Found Position:	LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Placed By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:		As Found Position:	LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Placed By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:		As Found Position:	LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Placed By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:		As Found Position:	LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Placed By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:		As Found Position:	LBL	OCG:

Attachment 9.1
Removal/Removal Addendum Record Sheet

9.13. Removal/Removal Addendum Record Sheet (Attachment 9.1)

NOTE:	Ensure Operating Experience Tagging Reference is referred to for every tag out.

A. Operational Control Group, Unit # and Tag out number as assigned by the computer. The OCG is designated OPS for Operations, MNT for Maintenance or CHM for Chemistry. The Tag out number consists of the unit number (0, 1 or 2), last digit of the current year, and a sequential number. When applicable a Block Tag Out Identifier such as BTO-NCXMID is listed.

B. Component Or System Tagged - A clear description of the specific piece of equipment is listed.

C. Reason For Removal- A reason for the tag out, for example PM's is listed.

D. Applicable Work Orders- A list of all the Work Orders or Work Requests that will be covered by this tag out. If this is a Block Tag Out (BTO), the BTO Identifier will be listed here. Multiple work crews can work under the same tag out but all groups have to verify safe working conditions. Additional Work Orders/Work Requests can be added to a tag out but the work crews have to verify safe working conditions. Once tag stubs are signed, dated and returned to the OCG they can not be used for any other work. The work supervisor signing and dating the tag stubs is responsible for ensuring all the work under the tag out is completed and the tags can be cleared.

NOTE:	All applicable work orders will appear on Removal/Restoration Sheet with only 6 to appear on safety tags. If sheet contains more than 6 work orders, a statement will be printed: See R&R/BTO Sheet.

E. Affected Procedures- The procedure(s) affected by the tag out should be listed here. This is normally assigned by the computer. Other procedures than the Operating Procedures may be affected and should be discussed with the SRO or Chemistry Staff for the need to file the tag out with those procedures. Usually it is necessary to file the tag out in the OP's only. Chemistry Operating Procedures require an R&R search prior to procedure implementation so tag out copies do not need to be filed in their OP's. N/A if not required.

F. Supervisor Responsible and/or Crew- The supervisor(s) responsible for the listed work are indicated here. The crew number with their phone number and/or beeper number should be used. The BTO Administrator is the responsible supervisor for Block Tag Outs.

G. Modification- MOD number is listed for reference.

Attachment 9.1
Removal/Removal Addendum Record Sheet

H. Prepared By, Date/Time- The TSO ID of the qualified individual preparing the tag out with the date and time the tag out was prepared.

I. Reviewed By, Date/Time- TSO ID of the OCG Supervisor/designee reviewing the tag out with the date and time of the review. This individual is verifying the correctness of the tag out for the listed work. When possible an OPS supervisor should review Chemistry tag outs to provide a plant oversight function. The OPS oversight review is NOT looking for the technical accuracy of the tag out to perform the work. It is permissible for an OPS Supervisor to provide the technical accuracy review for Chemistry tag outs as long as final approval is by a Chemistry Staff. Tag outs that are generated from approved operating procedures can be prepared and reviewed by the same individual. The OPS reviewer must be an SRO or knowledgeable staff personnel. A Chemistry reviewer must be a Chemistry Staff or an SRO. This review is separate and independent of the preparer.

J. Approved By, Date/Time- TSO ID of the OCG Supervisor/designee approving the tag out with the date and time of the approval. The OSM or designated SRO shall approve any tag out of engineered safeguards equipment. This individual is verifying the correctness of the tag out for the listed work. The approval process should also take into account the compatibility of the tagout with overall current plant conditions. Except as stated in Step I above, approval must be a separate independent verification of the review and must be performed by a licensed SRO for all OPS tag outs and a Chemistry Staff for Chemistry tag outs. Completion of the hanging of a tag out can be turned over to another shift with the proper supervisory or Chemistry Staff initials.

NOTE: The following items (K-Y) do not require any computer entries.

K. Technical Specifications/SLC - The CR SRO or WCC SRO shall place the TSAIL item number generated from the TSAIL Logbook if applicable. The OCG supervisor or designee should N/A if not required.

L. ORAM/Sentinel Evaluation - Scheduled work has had an ORAM/Sentinel Evaluation performed. If this tagout is for emergent work, perform an evaluation IAW OMP 2-38 (Shift Work Manager Turnover Process).

Systems under Chemistry control per Site Directive 3.10.1 do not require an evaluation (WT, YT, WC, CT, AM). The OCG supervisor or designee should N/A if not required.

M. Mode Req'd By- The SS, CR SRO, WCC SRO or Chemistry Staff shall enter the mode or other plant condition which requires operability of the tagged component or system. The OCG supervisor or designee should N/A if not required.

Attachment 9.1
Removal/Removal Addendum Record Sheet

N. Fire Impair- The initials of the individual initiating a Fire Impairment for fire protection/detection systems made inoperable by the tag out. N/A shall be placed in the block if no fire protection/detection systems affected. The OSM, Chemistry Staff or designee is responsible for reporting fire impairments.

O. SSF Degrade- The initials of the individual reporting the degradation of the SSF to Security. This will normally be the WCC SRO or CR SRO. The OCG supervisor or designee should N/A if not required.

P. Containment Closure- The initials of the individual indicating a review of the affects of the tag out on containment closure when it is in effect during an outage. This is normally an NLO or RO designated to that position for the outage. This block may be N/A by the SS, Balance of Plant Operator (BOP), or Chemistry Staff when closure is not in effect or during non-outage periods.

Q. Pre-Job Briefing- The initials of the individual performing the tag out indicating participation in a briefing with the approving supervisor. If the Approver is not available, Chemistry pre-job briefs may be performed by another knowledgeable individual. Only one individual is required to initial the blank but all personnel performing the tag out are required to participate in the briefing. Turnover of the tag out to another individual requires a briefing. Control Room personnel should participate in a briefing as necessary for systems or components under OPS operational control. Operations Guidelines For Draining Plant Equipment (Attachment 9.8) should be utilized where applicable in the pre-job brief.

R. CTRL RM SRO ACK (U1/U2) - The Control Room SRO shall place his initials here indicating that he acknowledges the Tagout is about to be performed and is aware of the effect the equipment removal will have on the plant. The approver may N/A this block for tagouts under Chemistry operational control if the Control Room is not affected.

S. CR ACK (U1/U2) - The Control Operator shall place his initials here indicating that he acknowledges the Tagout is about to be performed and is aware of the effect the equipment removal will have on the plant. Attachment 9.4 (Effects of Opening Valve Breakers) should be reviewed if applicable and the Control Room Operator should ensure that any effects are written in the Removal Remarks blank. The approver may N/A this block for tagouts under Chemistry operational control if the Control Room is not affected.

T. 1.47 (U1/U2) - The Control Room SRO or Control Operator shall initial here indicating the 1.47 panel button(s) for the component affected by the Tagout are illuminated. If the operability of the component is not affected, N/A shall be placed in the block.

Attachment 9.1
Removal/Removal Addendum Record Sheet

U. Control Room Logs- A Control Room Operator shall determine the effect of the tag out on plant operations and enter it in the Control Room Log (Autolog) and initial the block as applicable. Shared tag outs will be entered in both unit logbooks. Chemistry will log tag outs under their control. N/A if not required.

V. Copies Filed By- A copy of the Equipment Removed From Service Sheet should be placed in the affected procedures listed. The individual placing the copies shall initial here that the copies have been placed. N/A if not required. A copy of the tag out shall be given to the WCC if it impairs the Fire Protection/Detection System.

W. R&R Filed By- The original Removal/Removal Addendum Record Sheet is filed in the Tag Out Notebook in the WCC. The individual placing the sheets shall initial here indicating that the sheets have been placed. Chemistry will maintain their own logbook. Removal/Removal Addendum Record Sheets for BTOs are filed with the BTO Administrator in the WCC along with the BTO procedure.

X. Computer Updated By- The initials of the individual updating the computer program that the tag out has been placed. Individual tags will be updated in lieu of the entire tag out as necessary.

Y. OAC Points Removed - A list of computer points removed from service to support this tag out should be placed here. The NCO shall record any computer points rendered inoperable by this Tagout and removed from service. N/A if not required.

NOTE:	These removals need to be entered in computer and will show up on the Removal Sheet only. If you want Remarks to show up on Restoration Sheet, the Remarks will need to also be entered in Tag Restoration Remarks.

Z. Removal Remarks - Any information determined to be pertinent during the development of the tag out shall be placed here.

BTO interdependency or dependent tag outs shall be documented here.

The use of **CAUTION** placards and zones should be documented here to ensure removal when the tag out is cleared. **CAUTION** placards should be placed on the redundant equipment needed to maintain safe unit operations. **CAUTION** zones should be set up to restrict work in areas around the redundant equipment.

The location of Tag Stickers used in the plant should be documented here.

Attachment 9.1
Removal/Removal Addendum Record Sheet

AA. Red Tag ID/White Tag ID- The number on the tag that is normally assigned by the computer. No/Tag is used when no tag is being assigned. No/Tag shall not be used for isolating purposes. No/Tag is normally used on vents, drains or components being worked on.

BB. Equipment ID and Description- The name of the specific component to be tagged is listed. The use of a valve number not including the valve name is permissible but not desired.

CC. OCG- Identifies the Operational Control Group for the component being tagged.

NOTE:	Any component being worked on whose position can be changed shall be included on the tag out to ensure proper restoration. Removal shall be a No/Tag with a Removed Position of VAR (Verify At Restoration). Restoration entries shall be completed as normal. Any component being worked on whose position can not be changed (i.e. a relief valve) are restored by the Maintenance Programs. It is permissible to list a vent or drain valve inside the boundary as N/A Open, if that valve is a component being worked on but is needed to vent or drain the system.

DD. Position-The position the component is to be placed in during the removal process. VAR is to be used for components being worked on.

NOTE:	As Found Position: The use of this space to document the as found condition of a component is determined at the discretion of the Approver and is not required to be filled in. Partial Approval: Removal/Removal Addendum Partial approval not used at CNS.

EE. LBL- The number of Safety Tag Stickers attached to a component for this tag out. If none are used, enter 0 (zero). The total number of stickers that can be placed on a component is controlled by Step 6.3 Use of Tag Stickers.

Attachment 9.1
Removal/Removal Addendum Record Sheet

NOTE: In general, the isolation sequence will be from higher energy to lower energy components.

1) Motor or fan feeder breaker
2) MOV's
3) MOV feeder breaker
4) Manual valves
5) Vents and drains

FF. Seq #- Sequence numbers shall indicate the order in which the tags are hung to remove the equipment from service. It is permissible to assign duplicate numbers when the order of removal is not significant. The Approving SRO or Chemistry Staff is responsible for the proper sequencing. N/A is appropriate for tag outs that are driven by an approved operating procedure.

GG. Location- The physical location in the plant of the component being tagged. Usually provided by the Database. Location aids can be added as desired.

NOTE: Safety tags are attached per NSD500. If the component to be tagged is in a potentially contaminated area a copy of the tag out shall be used to perform the tag out in that area and the information transferred to the original as soon as practical. Tag stubs should not be removed until the tag is properly attached to the component. It is permissible to remove tag stubs from tags being hung under the following conditions:

1) Prior to entry into containment or contaminated areas.
2) For personal safety concerns i.e. climbing a ladder.

HH. Placed By/Date/Time- The date and time the equipment is removed from service. Initials of the individual placing the equipment in the removal position.

II. Special Info- Normally provided by the computer from the Database. It is information available to use as a tool in ensuring compliance with unique requirements for a specific component.

JJ. IV Req'd?, IV By- Documentation of the requirement for independent verification and the initials of the individual performing such.

Attachment 9.2
Partial Restoration/Restoration Record Sheet

Duke Power Co.		**Page**
Catawba Nuclear Station	**Unit ____**	**Tagout ID:**
Partial Restoration/ Restoration	[redacted]	

Component Tagged:			**Reason for Restoration:**		
Applicable Work Orders:					
Affected Procedures:					
Supervisor Responsible and/or Crew:			**Modification:**		
Prepared By:	**Date/Time:**	**Reviewed By:**	**Date/Time:**	**Approved By:**	**Date/Time**
Technical Specifications / SLC Unit 1 Unit 2		**ORAM/Sentinel Evaluation**	**Mode Req'd By**	**Fire Impair**	**SSF Degrade**	**Containment Closure:**
Pre Job Briefing:	**Ctrl Rm SRO Ack**	**Ctrl Rm Ack** Unit 1 Unit 2	**1.47 Panel** Unit 1 Unit 2	**Ctrl Rm Log** Unit 1 Unit 2	
Copies Removed By:	**R&R Removed By:**	**Computer Updated By:**	**OAC Points Restored To Service**		
Remarks:					

Attachment 9.2
Partial Restoration/Restoration Record Sheet

Duke Power Co.	Catawba Nuclear Station		Page
		Unit ___	Tagout ID:
Partial Restoration/ Restoration	[redacted]		

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Cleared By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Cleared By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Cleared By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Cleared By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:			LBL	OCG:

Seq#	Equipment ID	Position	Part Approval:	Date / Time:
Red Tag ID	Equipment Description		Cleared By:	Date/Time
[redacted]	Location:		IV Req'd?	IV By:
Special Info:			LBL	OCG:

Attachment 9.2
Partial Restoration/Restoration Record Sheet

9.2 Partial Restoration/Restoration Record Sheet (Attachment 9.2)

NOTE:	The computer carries forward heading information from the Removal Sheet. This information can be deselected as appropriate.

A. Operational Control Group, Unit # and Tag out number as assigned by the computer. The OCG is designated OPS for Operations, MNT for Maintenance or CHM for Chemistry. The Tag out number consists of the unit number (0, 1 or 2), last digit of the current year, and a sequential number. When applicable a Block Tag Out Identifier such as BTO-NCXMID is listed.

B. Component Or System Tagged - A clear description of the specific piece of equipment is listed.

C. Reason For Partial Restoration/Restoration- A reason for restoration, for example work completion is listed.

D. Applicable Work Orders- A list of all the Work Orders or Work Requests that were covered by this tag out. If this is a Block Tag Out (BTO), the BTO Identifier will be listed here.

E. Affected Procedures- The procedure(s) affected by the tag out shall be listed here. This is normally assigned by the computer. This shall include the procedures listed in the Removal Record Sheet. N/A if not required.

F. Supervisor Responsible and/or Crew- The supervisor(s) responsible for the listed work are indicated here. The crew number with their phone number and/or beeper number should be used. The BTO Administrator is the responsible supervisor for Block Tag Outs.

G. Modification- MOD number is listed for reference.

H. Prepared By, Date/Time- The initials of the qualified individual preparing the restoration sheet with the date and time the sheet was prepared.

I. Reviewed By, Date/Time- The initials of the OCG Supervisor/designee reviewing the sheet with the date and time of the review. This individual is verifying the correctness of the restoration for proper implementation. OPS review of Chemistry tag outs is <u>not</u> required. Tag outs that are generated from approved operating procedures can be prepared and reviewed by the same individual. The OPS reviewer must be an SRO or knowledgeable staff personnel. A Chemistry reviewer must be a Chemistry Staff or an SRO. This review is separate and independent of the preparer.

Attachment 9.2
Partial Restoration/Restoration Record Sheet

J. Approved By, Date/Time- The initials of the OCG Supervisor/designee approving the restoration with the date and time of approval. The OSM or designated SRO shall approve the restoration of any engineered safeguards equipment. This individual is verifying the correctness of the restoration for properly returning the system or component to service or standby. Approval must be independent of the review and must be performed by a licensed SRO for all OPS tag outs and a Chemistry Staff for Chemistry tag outs. Completion can be turned over to another shift with proper supervisory or staff initials. Initials in this space preclude having to fill in the Part Appvl By space. Chemistry Staff may complete this sign off per phone conversion on a case by case basis but not as a matter of convenience.

NOTE: The following items (K-Y) do not require any computer entries.

K. Technical Specifications/SLC- The CR SRO or WCC SRO shall initial here indicating the removal of the tag out from the TSAIL Logbook if applicable. The OCG supervisor or designee should N/A if not required.

L. ORAM/Sentinel Evaluation - N/A during the restoration process.

M. Mode Req'd By- N/A for Restoration.

N. Fire Impair- The initials of the individual closing out a Fire Impairment initiated by this tag out. N/A if none.

O. SSF Degrade- The initials of the individual reporting to Security the need to clear the degradation of the SSF. This will normally be the WCC SRO or CR SRO. The OCG supervisor or designee should N/A if not required.

P. Containment Closure - The initials of the individual indicating a review of the affects of clearing the tag out on containment closure when it is in effect during an outage. This is normally an NLO or RO designated to that position for the outage. This block may be N/A by the SS, BOP or Chemistry Staff when closure is not in effect or during non-outage periods.

Q. Pre-Job Brief- The initials of the individual performing the restoration indicating participation in a briefing with the approving supervisor or qualified reviewer the purpose, sequence and expected results. Only one individual is required to initial the blank but all personnel involved are required to participate in the briefing. Turnover to another individual requires a briefing. Control Room personnel should participate in a briefing as necessary for tags under OPS operational control.

Attachment 9.2
Partial Restoration/Restoration Record Sheet

R. CTRL RM SRO ACK (U1/U2) - The Control Room SRO shall place his initials here indicating that he acknowledges the Tagout is about to be restored and is aware of the effect the equipment restoration will have on the plant. The approver may N/A this block for tagouts under Chemistry operational control if the Control Room is not affected.

S. CTRL RM ACK (U1/U2) - The Control Operator shall place his initials here indicating that he acknowledges the Tagout is about to be restored and is aware of the effect the equipment restoration will have on the plant. The approver may N/A this block for tagouts under Chemistry operational control if the Control Room is not affected.

T. 1.47 (U1/U2) - The Control Room SRO or Control Operator shall initial here indicating the 1.47 panel button(s) for the component affected by the Tagout are returned to service. N/A for Chemistry tag outs.

U. Control Room Logs- A Control Room Operator shall make an entry in the Control Room Log (Autolog) and initial in the blank as applicable the clearing of the tag out. Shared tag outs will be entered in both unit logbooks. Chemistry will make an entry for their tag outs. N/A if not required.

V. Copies Removed By- The Equipment Restored From Service Sheet should be removed from the affected procedures. The individual removing the copies shall initial here that the copies have been removed. N/A if not required. Handle completed BTO procedures as directed by the BTO procedure.

W. R&R Removed By- R&R Sheets should be removed from the Logbook or BTO file in the WCC. The individual removing the sheets shall initial here indicating the sheets have been removed. Chemistry will maintain their own Logbook.

X. Computer Updated By- The initials of the individual updating the computer program that the tag out has been cleared. Individual tags will be updated in lieu of the entire tag out as necessary.

Y. OAC Points Restored - A list of computer points restored from service to support this tag out should be placed here.

Attachment 9.2
Partial Restoration/Restoration Record Sheet

NOTE:	These remarks need to be entered in the computer and will show up on the Restoration Sheet only.

Z. Partial Restoration/Restoration Remarks

1. Any information determined to be pertinent during the development of the Restoration Sheet shall be placed here.

2. Use of a Venting Restoration Sheet (Attachment 9.3) shall be documented here.

3. If the system or component can not be filled and vented due to another tag out list that tag out number here.

4. The removal of **CAUTION** placards and zones should be documented here.

AA. Red Tag ID/White Tag ID- The number on the tag that is normally assigned by the computer.

BB. Equipment ID and Description- The name of the specific component tagged is listed. The use of a valve number not including the valve name is permissible but not desired.

CC. OCG- Identifies the Operational Control Group for the component.

DD. Position-The position the equipment is to be returned to during the restoration. This is normally the position specified by the procedure checklist, filed procedures (the body of the procedure), procedures in progress and other R&Rs, or as specified by the Approving SRO or Chemistry Staff based on plant conditions. Breakers with racking capabilities shall be listed as Racked In/Open or Racked In/Closed as appropriate. If the equipment can not be restored due to another tag out, procedure in progress or open item, document such reason in this space. The individual performing the restoration and the I/Ver when applicable are responsible for ensuring the component is returned to the restoration position stated. An NLO or Chem Tech is the preferred preparer of a Partial Restoration/Restoration sheet.

EE. LBL- The number of Safety Tag Stickers removed from the component for this tag out. If none are used, enter 0 (zero). The total number of stickers that can be placed on a component is controlled by Step 6.3 Use of Tag Stickers.

Attachment 9.2
Partial Restoration/Restoration Record Sheet

FF. Part Appvl Date/Time, Part Appvl By- This space will be used for equipment restoration of the component listed on the same line when it is not desired to restore the entire tag out. The individual performing the restoration shall discuss the restoration of the component with the Control Room Operator, Containment Closure Coordinator, and CR SRO as applicable and have a pre-job brief with the approving supervisor. If the Approver is not available, Chemistry pre-job briefs may be performed by another knowledgeable individual. Approval must be accomplished by two independent individuals with the final approval by on shift personnel or Chemistry Staff. This entry is not required when the "Approved By" blank is completed on the cover sheet allowing the entire tag out to be restored.

NOTE:	In general, the Restoration sequence should be the reversal of the Removal sequence.

GG. Seq #- Sequence numbers shall indicate the order in which the tags are to be cleared. It is permissible to assign duplicate numbers when the order of restoration is not significant. The Approving SRO or Chemistry Staff is responsible for the proper sequencing. N/A is appropriate for tag outs that are procedure driven.

HH. Location- The physical location in the plant of the component tagged. Usually provided by the Database.

NOTE:	Safety tags are removed per NSD500. If the equipment to be restored is in a potentially contaminated area, a copy of the tag out shall be used in that area and the information transferred to the original as soon as practical. Tag stubs should be in the possession of the individual removing the tag. Contamination, ALARA and personnel safety concerns preclude this requirement. It is permissible to leave the Time the tag is removed blank when in a contaminated area.

II. Cleared By/Date/Time- The date and time the equipment is restored to service. Initials of the individual placing the equipment in the restoration position.

JJ. Special Info- Normally provided by the computer from the Database. It is information available to use as a tool in ensuring compliance with unique requirements for a specific component.

KK. IV Req'd?, IV By- Documentation of the requirement for independent verification and the initials of the individual performing such.

Attachment 9.3
Venting Restoration Sheet

Tagout ID: _____ Block Tagout ID: _____

Page ___ of ___

Prepared By _____ RP Contact _____

Supervisor Approval _____ Radwaste Contact _____

Vent Valve	Location	Sequence	Vented		Pipe Cap Installed		Venting Remarks
			Date/Time/Initials	DV	Initials	DV	

NOTE:
1) Completed venting restoration sheets shall be attached to completed Tagout Sheet.
2) On closed loop systems, such as KC, ensure higher elevation components adjacent to the isolated portion of the system are vented, if the adjacent portion of the system was depressurized at any time during the isolation.
3) Document use of this Venting Restoration Sheet in the Restoration Remarks.

Attachment 9.3
Venting Restoration Sheet

Tagout ID: _____ Block Tagout ID: _____

Page ___ of ___

9.3 Venting Restoration Sheet (Attachment 9.3)

NOTE:	Operating Procedures are the preferred method to fill and vent components and systems and should be used when available.

A. Tag Out ID/Block Tag Out ID- These numbers shall agree with the tag out number that was used to drain the component or system.

B. Page __ of __ - The page number and total number of pages is documented here.

C. Prepared By- Initials of the qualified individual who prepared this sheet.

D. Supervisor Approval- Initials of the OCG Supervisor/designee approving use of this Venting Restoration Sheet. An available fill source, the system or component properly aligned, and a proper venting sequence need to be identified for approval to start the venting process.

E. RP Contact- Name of the Radiation Protection individual contacted for any venting requirement of potentially contaminated systems or components. N/A if <u>not</u> applicable.

F. Rad Waste Contact- Name of the Rad Waste individual contacted informing them of potential sump or tank input in an RCA/RCZ. N/A if <u>not</u> applicable.

G. Vent Valve- All valves that are to be used to vent the system or component. The use of valve numbers without the name is acceptable.

H. Location- The location of the valve is entered here. The use of prompts is acceptable.

I. Sequence- A number indicating the order in which the listed valves shall be used to vent the system or component. ALARA, containment integrity, personnel safety and system layout (elevation) should be considered for proper sequencing.

J. Vented, Date/Time/Initials/DV- Date, time and initials of the individuals performing the venting process. Venting is defined as opening and verifying a solid stream of water flowing out of the vent valve and then re-closing the valve. The OCG Supervisor/designee is responsible for indicating N/A for valves that do <u>not</u> require DV.

Attachment 9.3
Venting Restoration Sheet

Tagout ID: _____ Block Tagout ID: _____

Page ___ of ___

K. Pipe Cap Installed/Initials/DV- Initials of the individuals verifying that a pipe cap is proper installed if applicable per OMP 2-33. N/A if not applicable.

L. Venting Remarks- Any additional information is listed here.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
1CA-174	SDSD-F01D	0147-04.19	Removes 250 VDC motor power from the valve. If control power (SDSP1 Bkr 4) remains energized and 2/3 loss of suction contacts are made, the valve will auto open when motor power is restored. This action is due to the seal in control power circuit.
1CA-175	SDSD-F02C	0147-04.20	Removes 250 VDC motor power from the valve. If control power (SDSP1 Bkr 4) remains energized and 2/3 loss of suction contacts are made, the valve will auto open when motor power is restored. This action is due to the seal in control power circuit.
1FW-33A	1EMXI-F01A	0155-02.10	"J152" relay will be de-energized and even if 1FW-33A is open the FW Recirc Pumps 1A or 1B can not be started.
1FW-49B	1EMXB-F01A	0155-02.11	"J103" relay will be de-energized and even if 1FW-49B is open the FW Recirc. Pumps 1A or 1B can not be started.
1HM-5	1MXH-R06C	0154-02.03	"GB" relay is de-energized and auto opening and closing of valves 1HM-6, 1HM-11 and 1HM-12 will be lost.
1HM-1	1MXH-R06B	0154-02.01	"GA" relay is de-energized causing 1HM-2 to go closed.
1HS-137	1MXD-F01A	0154-01.05	1. De-energizes relay Q1 valve position lights on MC13. 2. De-energizes relay S011 & S012 - computer points. 3. De-energizes relay CA - will not auto open valve even if 1HM-1 and 1HA-4 are open, A2 heater emergency "HI" level, and unit load $\geq$ 20%.
1HS-141	1MXD-F01B	0154-01.07	1. De-energizes relay Q3 - valve position lights on MC13. 2. De-energizes relay S031 and S032 - computer points. 3. De-energizes relay CB - will not auto open valve even if 1HM-7 & 1HM-8 are open, 1HB-5 opens. B2 heater emergency "HI" level and unit load $\geq$ 20%.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
1HS-157	1MXD-F01C	0154-01.09	1. De-energizes relay Q5 - valve position lights on MC13. 2. De-energizes relay S051 and S052 - computer points. 3. De-energizes relay CC - valve will not auto open even if 1HM-2 & 1HM-3 open, A1 heater emergency "HI" level and unit load ≥ 20%.
1HS-161	1MXD-F01D	0154-01.11	1. De-energizes relay Q7 - valve position lights on MC13. 2. De-energizes relay S071 and S072 - computer points. 3. De-energized relay CD - will not auto open valve even if 1HM-13 or 1HM-14 open, 1HB-2 opens, B1 heater emergency "HI" level and Unit Load ≥ 20%.
1ND-28A	1EMXA-F02A	0141-01.05	"ED" relay will be de-energized and even if 1ND-28A is closed valves 1NI-115A and 1NI-144A can not be opened.
1ND-36B	1EMXD-F02A	0141-01.07	"DE" relay will be de-energized and even if 1ND-36B is closed valves 1NI-136B and 1NS-38B can not be opened.
1NI-136B	1EMXJ-R05B	0151-01.07	"BC" relay will be de-energized and even if 1NI-136B is closed valves 1NI-147B and 1ND-36B can not be opened. "18804BX" relay will be de-energized. Valves 1ND-37A, 1NI-115A and 1NI-144A can be opened if 1ERPA-5 is ON with 1NI-136B closed.
1NS-1B	1EMXJ-F02B	0159-01.08	"BA" relay will be de-energized and even if 1NS-1B is closed 1FW-55B and 1NS-3B can not be opened.
1NS-3B	1EMXJ-F01C	0159-01.09	"VA" relay will be de-energized and even if 1NS-3B is closed 1NS-1B can not be opened and NS Pump 1B will not auto start after suction aligns to the sump.
1NS-18A	1EMXA-F03A	0159-01.01	"FB" relay will be de-energized and even if 1NS-18A is closed 1FW-27A and 1NS-20A can not be opened.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
1NS-20A	1EMXA-F01D	0159-01.02	"VA" relay will be de-energized and even if 1NS-20A is closed 1NS-18A can not be opened and NS Pump 1A will not auto start after suction aligns to the sump.
1NS-38B	1EMXJ-F01D	0159-01.06	"FE" relay will be de-energized and even if 1NS-38B is closed 1FW-55B and 1NW-227B can not be opened.
1NS-43A	1EMXA-F08A	0159-01.05	"EE" relay will be de-energized and even if 1NS-43A is closed 1FW-27A and 1NW-180A can not be opened.
1NV-188A	1EMXA-R04D	0157-02.08	1NV-188A can not reposition on receipt of a valid 'A' Train BDMS signal.
1NV-189B	1EMXL-F12C	0157-02.09	1NV-189B can not reposition on receipt of a valid 'B' Train BDMS signal.
1NV-252A	1EMXA-R04A	0157-02.13	1NV-252A can not reposition on receipt of a valid 'A' Train BDMS signal.
1NV-253B	1EMXJ-R03A	0157-02.14	1NV-253B can not reposition on receipt of a valid 'B' Train BDMS signal.
1NV-477	1MXK-F06A	0157-02.17	PD Pump will not start.
1RC-21	1MXH-F08C	0136-01.09	Valve will not auto open on RC Pump 1A start or stop pump on closure.
1RC-22	1MXC-R02C	0136-01.10	Valve will not auto open on RC Pump 1B start or stop pump on closure.
1RC-23	1MXH-F08D	0136-01.11	Valve will not auto open on RC Pump 1C start or stop pump on closure.
1RC-24	1MXC-R02D	0136-01.12	Valve will not auto open on RC Pump 1D start or stop pump on closure.
1RL-25	SMXIA-F02A	0026-01.02	Valve will not open on RL Pump 1A start and will not trip pump on closure.
1RL-28	SMXI-F05C	0026-01.05	Valve will not open on RL Pump 1B start and will not trip pump on closure.
1RL-31	SMXI-F01A	0026-01.08	Valve will not open on RL Pump 1C start and will not trip pump on closure.
1RN-1A	1EMXO-F01B	0138-01.01 0138-01.01-01	With the 600V breaker open, the green closed light is disabled. If the valve moves off the closed seat, the red open light will be illuminated. This means the valve may be in any position but fully closed.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
1RN-2B	2EMXP-F01B	0138-01.02 0138-01.02-01	With the 600V breaker open, the green closed light is disabled. If the valve moves off the closed seat, the red open light will be illuminated. This means the valve may be in any position but fully closed.
1RN-5A	1EMXO-F01D	0138-01.05 0138-01.05-01	With the 600V breaker open, the green closed light is disabled. If the valve moves off the closed seat, the red open light will be illuminated. This means the valve may be in any position but fully closed.
1RN-6B	2EMXP-F01D	0138-01.06 0138-01.06-01	With the 600V breaker open, the green closed light is disabled. If the valve moves off the closed seat, the red open light will be illuminated. This means the valve may be in any position but fully closed.
1RN-11A	1EMXQ-F01C	0138-01.07	Valve will not auto open on RN Pump 1A start and will not close on pump stop.
1RN-20B	1EMXR-F01C	0138-01.08	Valve will not auto open on RN Pump 1B start and will not close on pump stop.
1RN-144A	1EMXA-F07B	0138-01.30	Loss of Flow interlock to radiation monitoring
1RN-148A	1EMXA-F07C	0138-01.31	Loss of Flow interlock to radiation monitoring
1RN-225B	1EMXJ-F08C	0138-01.34	Loss of Flow interlock to radiation monitoring
1RN-229B	1EMXJ-F07D	0138-01.35	Loss of Flow interlock to radiation monitoring.
1SM-41	1MXH-R07A	0170-01.09	"CA" & "CB" relays will be de-energized. These relays are interlocked with 1SM-42, 1SM-43, 1SM-44, 1SM-45, 1SM-21 & 1SM-29. These valves will still open on a turbine trip but the auto open circuit will not be maintained isolated.
1WL-825A	1EMXC-F05B	0160-02.15	Containment floor & equipment sump pumps 1B1 & 1B2 will not run.
1WL-827B	1EMXJ-R01C	0160-02.06	Containment floor & equipment sump pumps 1A1 & 1A2 will not run.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
2CA-174	SDSD-F03C	0247-04.19	Removes 250 VDC motor power from the valve. If control power (SDSP2 Bkr 3) remains energized and 2/3 loss of suction contacts are made, the valve will auto open when motor power is restored. This action is due to the seal in control power circuit.
2CA-175	SDSD-F04B	0247-04.20	Removes 250 VDC motor power from the valve. If control power (SDSP2 Bkr 3) remains energized and 2/3 loss of suction contacts are made, the valve will auto open when motor power is restored. This action is due to the seal in control power circuit.
2FW-33A	2EMXI-F01A	0255-02.10	"J152" relay will be de-energized and even if 2FW-33A is open the FW Recirc Pumps 2A or 2B can not be started.
2FW-49B	2EMXB-F01A	0255-02.11	"J103" relay will be de-energized and even if 2FW-49B is open the FW Recirc. Pumps 2A or 2B can not be started.
2HM-5	2MXH-R06C	0254-02.03	"GB" relay is de-energized and auto opening and closing of valves 2HM-6, 2HM-11 and 2HM-12 will be lost.
2HM-1	2MXH-R06B	0254-02.01	"GA" relay is de-energized causing 2HM-2 to go closed.
2HS-137	2MXD-F01A	0254-01.05	1. De-energizes relay Q1- valve position lights on MC13. 2. De-energizes relay S011 & S012 - computer points. 3. De-energizes relay CA - will not auto open valve even if 2HM-1 and 2HA-4 are open, A2 heater emergency "HI" level, and unit load $\geq$ 20%.
2HS-141	2MXD-F01B	0254-01.07	1. De-energizes relay Q3 - valve position lights on MC13. 2. De-energizes relay S031 and S032 - computer points. 3. De-energizes relay CB - will not auto open valve even if 2HM-7 & 2HM-8 are open, 2HB-5 opens, B2 heater emergency "HI" level and unit load $\geq$ 20%.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
2HS-157	2MXD-F01C	0254-01.09	1. De-energizes relay Q5 - valve position lights on MC13. 2. De-energizes relay S051 and S052 - computer points. 3. De-energizes relay CC - valve will not auto open even if 2HM-2 & 2HM-3 open, and A1 heater emergency "HI" level & unit load ≥ 20%.
2HS-161	2MXD-F01D	0154-01.11	1. De-energizes relay Q7 - valve position lights on MC13. 2. De-energizes relay S071 and S072 - computer points. 3. De-energized relay CD - will not auto open valve even if 2HM-13 or 2HM-14 open, and 2HB-2 opens & B1 heater emergency "HI" level and Unit Load ≥ 20%.
2ND-28A	2EMXA-F02A	0241-01.05	"ED" relay will be de-energized and even if 2ND-28A is closed valves 2NI-115A and 2NI-144A can not be opened.
2ND-36B	2EMXD-F02A	0241-01.07	"DE" relay will be de-energized and even if 2ND-36B is closed valves 2NI-136B and 2NS-38B can not be opened.
2NI-136B	2EMXJ-R05B	0251-01.07	"BC" relay will be de-energized and even if 2NI-136B is closed valves 2NI-147B and 2ND-36B can not be opened. "18804BX" relay will be de-energized. Valves 2ND-37A, 2NI-115A and 2NI-144A can be opened if 2ERPA-5 is ON with 2NI-136B closed.
2NS-3B	2EMXJ-F01C	0259-01.09	"VA" relay will be de-energized and even if 2NS-3B is closed, 2NS-1B can not be opened and NS Pump 2B will not auto start after suction aligns to the sump.
2NS-1B	2EMXJ-F02B	0259-01.08	"BA" relay will be de-energized and even if 2NS-1B is closed, 2NS-3B and 2FW-55B can not be opened.
2NS-20A	2EMXA-F01D	0259-01.02	"VA" relay will be de-energized and even if 2NS-20A is closed, 2NS-18A can not be opened and NS Pump 2A will not auto start after suction aligns to the sump.

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
2NS-18A	2EMXA-F03A	0259-01.01	"FB" relay will be de-energized and even if 2NS-18A is closed 2NS-20A and 2FW-27A can not be opened.
2NS-43A	2EMXA-F08A	0259-01.05	"EE" relay will be de-energized and even if 2NS-43A is closed, 2FW-27A and 2NW-180A can not be opened.
2NS-38B	2EMXJ-F01D	0259-01.06	"FE" relay will be de-energized and even if 2NS-38B is closed, 2FW-55B and 2NW-227B can not be opened.
2NV-188A	2EMXA-R04D	0257-02.08	2NV-188A can not reposition on receipt of a valid 'A' Train BDMS signal.
2NV-189B	2EMXL-F12C	0257-02.09	2NV-189B can not reposition on receipt of a valid 'B' Train BDMS signal.
2NV-252A	2EMXA-R04A	0257-02.13	2NV-252A can not reposition on receipt of a valid 'A' Train BDMS signal.
2NV-253B	2EMXJ-R03A	0257-02.14	2NV-253B can not reposition on receipt of a valid 'B' Train BDMS signal.
2NV-477	2MXK-F06A	0257-02.17	PD Pump will not start.
2RC-21	2MXH-F08C	0236-01.09	Valve will not auto open on RC Pump 2A start or stop pump on closure.
2RC-22	2MXC-R02C	0236-01.10	Valve will not auto open on RC Pump 2B start or stop pump on closure.
2RC-23	2MXH-F08D	0236-01.11	Valve will not auto open on RC Pump 2C start or stop pump on closure.
2RC-24	2MXC-R02D	0236-01.12	Valve will not auto open on RC Pump 2D start or stop pump on closure.
2RN-11A	2EMXQ-F01C	0238-01.07	Valve will not auto open on RN Pump 2A start and will not close on pump stop.
2RN-20B	2EMXR-F01C	0238-01.08	Valve will not auto open on RN Pump 2B start and will not close on pump stop.
2RN-144A	2EMXA-F07B	0238-01.30	Loss of Flow interlock to radiation monitoring
2RN-148A	2EMXA-F07C	0238-01.31	Loss of Flow interlock to radiation monitoring
2RN-225B	2EMXJ-F08C	0238-01.34	Loss of Flow interlock to radiation monitoring

Attachment 9.4

Effects of Opening Valve Breakers

Valve #	Breaker #	CNEE #	Effects of Opening Breaker
2RN-229B	2EMXJ-F07D	0238-01.35	Loss of Flow interlock to radiation monitoring.
2SM-41	2MXH-R07A	0270-01.09	"CA" & "CB" relays will be de-energized. These relays are interlocked with 2SM-42, 2SM-43, 2SM-44, 2SM-45, 2SM-21 & 2SM-29. These valves will still open on a turbine trip but the auto open circuit will not be maintained isolated.
2WL-825A	2EMXC-F05B	0260-02.15	Containment floor & equipment sump pumps 2B1 & 2B2 will not run.
2WL-827B	2EMXJ-R01C	0260-02.06	Containment floor & equipment sump pumps 2A1 & 2A2 will not run.

Attachment 9.5
Dual Function Valves

VALVE	FUNCTION
CA-62A, 58A, 46B, 42B CA Pump A/B Discharge to S/Gs Isolations	Open for standby readiness of CA System. Capable of closing to isolate CA flow to faulted S/G.
CA-66B, 54B, 50A, 38A CA Pump Turb Disch to S/G Isolations	Open for standby readiness of CA System. Capable of closing to isolate CA flow to faulted S/G.
FW-27A, 55B ND Pump Suctions From FWST	Open in standby readiness as suction source to ND Pumps. Capable of closing on FWST swap to containment sump.
KC-C37A, C40B KC Pump Miniflow	Capable of opening at 2500 gpm flow for pump miniflow. Capable of closing at 5300 gpm to ensure sufficient flow to Essential Header during an accident.
ND-25A, 59B ND Pump Miniflow	Capable of opening at 533 gpm ND Pump discharge flow for pump miniflow protection. Capable of closing at 1400 gpm to ensure sufficient ECCS flow to NCS Cold Legs.
ND-28, ND Supply to NV and A Trn NI Pumps	Closed in standby readiness to ensure sufficient ND flow to cold legs during large break LOCA. Open in cold and hot leg recirc to supply suction to NV and NI Pumps.
ND-32A, 65B ND Train Hot Leg Injection Isolation	Open during standby readiness, the injection phase and hot leg recirculation to ensure ECCS flow from either train. Closed during cold leg recirculation to ensure ECCS train separation.
NI-100B NI Pump Suction From FWST	Open during standby readiness to supply NI Pump suction. Closed in cold and hot leg recirculation to prevent pump air binding.
NI-115A, 144A, 147B NI Pumps Miniflow Isolation	Open in standby readiness and injection phase to ensure NI Pump miniflow. Closed during cold and hot leg recirculation to prevent discharging contaminated water to the FWST and to satisfy the interlocks to open ND-28A and NI-136B.
NI-136B ND Supply to NI Pump B	Closed in standby readiness and injection phase to ensure sufficient ND flow to cold legs during large break LOCA. Open in cold and hot leg recirculation to supply NI Pumps.
NI-184B, 185A ND Pump Containment Suction	Closed in standby readiness to prevent dumping FWST to containment sump. Capable of opening automatically on low low FWST level with SI signal.

Attachment 9.5
Dual Function Valves

VALVE	FUNCTION
NI-332A, 333B NI Pump Suction From ND	Closed in standby readiness and injection phase to ensure separation of NV and NI Pump suctions. Open in cold and hot leg recirculation to supply NI Pump suction.
NV-89A, 91B NC Pump Seal Return Containment Isolation	Capable of closing on a Phase A isolation to ensure NCS inventory is maintained. Capable of opening on ASP transfer to ensure normal NCP seal leakoff flow.
NV-188A, 189B VCT Outlet Isolation	Capable of closing on SI, BDMS signal or lo-lo VCT level. Interlocked with NV-252A, 253B to ensure a suction to the charging pump. Capable of opening on transfer to the ASP to ensure a suction to the charging pumps for plant shutdown from outside the Control Room.
NV-202B, 203A NC Pumps A & B Recirc Isolation	Opened at NC pressure > 2000 psig for pump miniflow protection. Closed if NC pressure < 1500 psig and S/I flow is to remain aligned from NV Pumps to NC System to ensure sufficient ECCS flow to NCS Cold Legs.
NV-252A, 253B NV Pumps Suction From FWST	Closed in standby readiness and cold/hot leg recirculation. Capable of opening on SI, BDMS signal or lo-lo VCT level. Interlocked with NV-188A, 189B to ensure a suction source to the charging pumps.
NV-312A, 314B Charging Line Containment Isolation	Capable of closing on SI to ensure adequate ECCS flow to the NCS cold legs. Capable of opening upon transfer to the ASP to ensure a charging flow path for plant shutdown from outside the Control Room.
NS 18A, 1B NS Pump Suction From Cont. Sump	Closed in standby readiness and spray operation from FWST. Open when the containment sump is pump suction source.
NS-20A, 3B NS Pump Suction From FWST	Open in standby readiness and spray operation from FWST. Closed when the containment sump is pump suction source.
RN-28A, 38B RN Pump Discharge Isolations	Capable of opening on pump start. Capable of closing on pump stop to block reverse flow through the pump and ensure header pressure is maintained.
SA-1 and 4 (or SA-3 and 6) Main Steam to CAPT Isolations	Open when CA is aligned for standby readiness. Capable of manually closing as called for in EPs (Isolating ruptured S/G).

Attachment 9.6
Safety Concerns With VP And VQ Systems

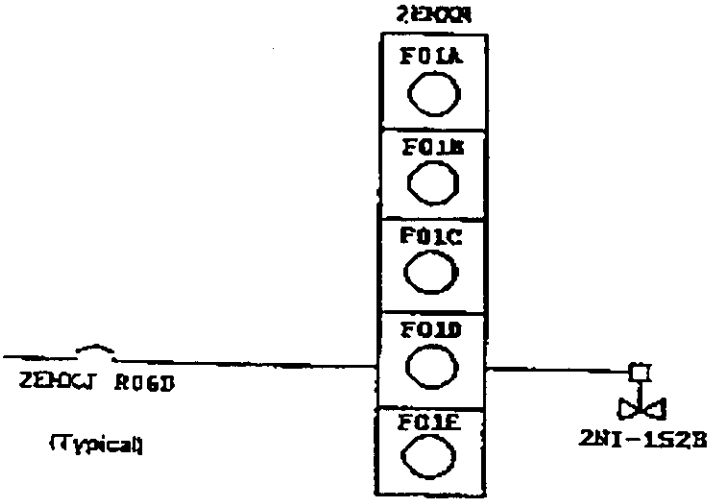
During outages while working on VP and VQ valves, the containment is subject to be opened in a manner not always considered. This may establish a direct path to the outside. The containment may be at a different pressure than outside air pressure. This could result in a rapid exchange of air while working on one of these valves.

When developing tagouts, or giving clearance to perform work on VP or VQ valves, the safety consequences of the containment being pressurized needs to be considered.

This should not be a concern when the Personnel Airlocks are open, however, you need to consider the air lock may be closed at any time while the work is in progress.

Attachment 9.7
Tagging Power Lockouts

To tagout a power lockout cubicle, the upstream breaker must be tagged because the power lockout cubicle is hard wired. However, be sure to include the power lockout breaker on the Tagout (Tag VAR) to ensure its return position is verified upon completion of the work.



Upstream Breaker	Power Lockout	Component
1EMXA-R07D	1EMXM F01B	1NI173A
1EMXA-R07C	1EMXM F01D	1NI121A
1EMXA-R05A	1EMXM F01E	1NI162A
1EMXK-F11A	1EMXM F01A	CARF Mtr 1A
1EMXJ-R04A	1EMXN F01B	1NI178B
1EMXJ-R06D	1EMXN F01D	1NI152B
1EMXB-F01D	1EMXN F01E	1NI183B
1EMXL-F11A	1EMXN F01A	CARF Mtr 1B
1EMXJ-R08B	1EMXZ F01A	1NI100B
1EMXJ-R07A	1EMXZ F01B	1NI147B
2EMXJ-R08B	1EMXZ F01C	2NI100B
2EMXJ-R07A	1EMXZ F01D	2NI147B
2EMXA-R07D	2EMXM F01B	2NI173A
2EMXA-R07C	2EMXM F01D	2NI121A
2EMXA-R05A	2EMXM F01E	2NI162A
2EMXK-F11A	2EMXM F01A	CARF Mtr 2A
2EMXJ-R04A	2EMXN F01B	2NI178B
2EMXJ-R06D	2EMXN F01D	2NI152B
2EMXB-F01D	2EMXN F01E	2NI183B
2EMXL-F11A	2EMXN F01A	CARF Mtr 2B

Attachment 9.8
Operations Guidelines For Draining Plant Equipment

The following are guidelines to be incorporated into Pre-job Briefings involving draining equipment in the plant:

Ensure adequate monitoring capabilities. Determine if local and/or Control Room indications will be used.

Ensure adequate sump availability to prevent flooding. Will additional sump pumps be needed?

Ensure appropriate material is used for draining, i.e. sleeving, tygon, rubber hose. Consider the temperature and pressure of the fluid to be drained. {PIP 98-4712}

Ensure any drain rigging is properly secured by the use of tie wraps or other appropriate means. 90 deg. plastic elbows should be used to help secure and direct flow into floor drains. {PIP 00-3011}

Monitor pressure of the drain to ensure proper system isolation has been achieved and to determine if leak-by exists.

Consider the possibility of siphoning effects during the drain.

Evaluate potential to affect operating equipment.

Chemistry should be contacted prior to commencing the drain and provided the following information:

Component to be drained

Location of drain (including column line and drain number if avail.).

Estimated duration of the drain

Approximate volume to be drained

Contact Chemistry at the conclusion of the drain.

Persons responsible for the drain evolution should verify the drain progresses as expected and report any unexpected problems to their Supervisor.

Attachment 9.9
Safety Tag Return/Functional Request Form

Unit: 0 ☐ 1 ☐ 2 ☐ Component: _____

_____

R&R # _____ WO# _____

Operational Control Group (OCG) ☐ OPS ☐ CHM Clear entire R&R ☐

Lift tags for testing ☐, # of tags attached _____, Clear partial R&R ☐, # of tags attached. _____

NOTE: If the answer is "Yes" to ANY of the below questions, then form must be handed to WCCSRO. If "No" is the answer to ALL of the questions, complete MNT contact information and leave form with tag stubs attached to the "Tag Return Box" on the WCC counter. Thanks.

Tech. Spec. Related Equipment. Yes ☐ No ☐

Is continuous Maintenance coverage required until functional is complete. Yes ☐ No ☐

OCG to perform this functional when returning equipment to service. Yes ☐ No ☐

Requested time for OCG to place equipment in service. Date: _____ Time: _____

MNT Contact Name: _____ Phone # _____ Pager # _____ Crew # _____

OCG Rep Contacted: _____ Date: _____ Time: _____

Type of Functional Required. Note: Initial ALL that apply and fill out MNT supervisor name and contact information.

____ Visual inspection for leakage. Acceptable ☐ Not Acceptable☐

____ Valve cycled, ☐ 1 cycle, ☐ 2 cycles required. Acceptable ☐ Not Acceptable☐

____ Any unusual noises during equipment operation. None noted ☐ Needs MNT Evaluation ☐

____ Oil level Acceptable ☐ Not Acceptable☐

____ Component started Yes ☐ Date:____ Time: _____

MNT Supervisor Name: _____ Phone # _____ Pager # _____

Equipment Returned to Service, OCG Signature _____

MNT Supervisor Notified: ☐ Yes, ☐ No, ☐ N/A

Comments: _____

_____

Place completed form in Maintenance Supervisor's box in the WCC.

Staple tag stubs HERE

Attachment 9.10
TLFT Checklist

Date: _____ BTO Identifier _____ R&R #: _____

NOTE:	If tags are part of a BTO, ensure the enclosure from Site Directive 3.0.22, Request Form to Lift or Clear Safety Tags, is utilized.

Supervisor/Phone # requesting tags be lifted: _____
Supervisor Name/BTO Administrator

Reason tag being lifted and component affected: _____

_____

NOTE:	1. SRO/Chemistry Staff required to complete Steps 10-12 and 18 as appropriate. 2. Reviews shall be separate and independent with the second review by a licensed SRO or a Chemistry Staff.

_____ _____ 10. Review Tagout and procedures in progress to determine consequences of lifting tag(s) for testing.
SRO/Chem

11. Verify the situation meets the criteria for allowing tags to be lifted for testing as described below:

_____ a. Evolution is simple (evaluate if clearing the tag out would be more time effective).
SRO/Chem

_____ b. Tests or other activities requiring tag(s) lifted for testing are ready to immediately begin (within 4 hours).

_____ 12. Assign sequence numbers for equipment to be restored on Attachment 9.11.
SRO/Chem

_____ 13. Assign TLFT position for equipment to be restored on Attachment 9.11.

14. Determine IV requirements. If <u>not</u> required, place an N/A in the IV block on Attachment 9.11.

Attachment 9.10
TLFT Checklist

Date: _____ BTO Identifier _____ R&R #: _____

15. Review prior to lifting tags for testing (Operations controlled equipment only):

_____ Closure RO (During Outage)
_____ OATC
_____ CR SRO
_____ Operations Shift Manager/Shift Supervisor

16. _____ Lift tags for testing using Attachment 9.11.

17. _____ Lift any applicable tag stickers using Attachment 9.11.

NOTE: Tags shall not be lifted for testing greater than 24 hours without a re-evaluation of the need to rehang or clear the tags.

18. _____ SRO/Chem When testing has been completed, if tags are to be rehung, assign sequence numbers for equipment to be removed from service.

19. _____ Rehang tags as required using Attachment 9.11.

20. _____ SRO/Chem Notify the requesting supervisor or BTO Administrator that lockout/blocking devices and safe working conditions can now be reverified.

NOTE: Attach completed Attachment 9.10 and 9.11 to applicable Tagout sheet.

BTO Identifier _____ R&R No. _____

Attachment 9.11
TLFT Sequencing Sheet

TAG #	COMPONENT	TLFT RESTORATION SEQUENCE NO.	TLFT POSITION	DATE & TIME	TLFT BY	STICKER LIFTED	IV	TLFT REMOVAL SEQUENCE	POSITION TAGGED	DATE & TIME	RHT BY	STICKER REPLACED	IV

NOTE: Attach completed Attachment 9.11 to applicable Tagout sheet

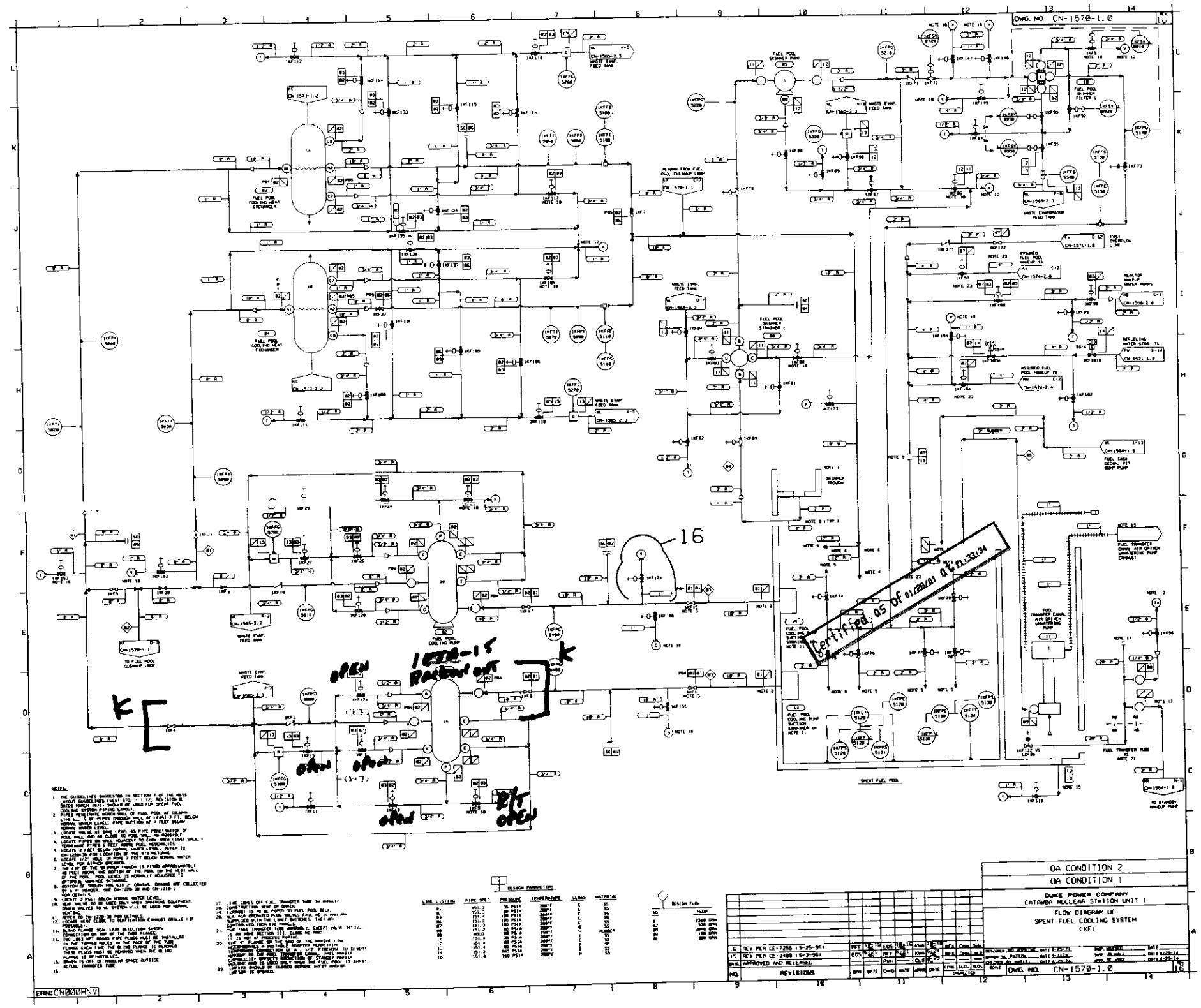
Attachment 9.12
How To Access OWPM Reference Documents

- Double click on "Network Neighborhood"
- Double click on "Entire Network"
- Double click on "Catawba"
- Double click on "Cns1f3"
- Double click on "op-lib"
- Double click on "OWPM"
- Double click on "Operating Experience Tagging Reference"

  or

  Double click on "Guidance for Modifying and/or Adding a New Pre-planned Tagout"

NOTE: This method is one of several means of accessing these documents.


DWG. NO. CN-1570-1.0
QA CONDITION 2
QA CONDITION 1
DUKE POWER COMPANY
CATAWBA NUCLEAR STATION UNIT 1
FLOW DIAGRAM OF
SPENT FUEL COOLING SYSTEM
(1KF)
REVISIONS
Certified as of 01-31-94
16

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM 4R/ADMIN

Calculate the Maximum Permissible Stay Time Within Duke Power Basic Administrative Limits

CANDIDATE _____

EXAMINER _____

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Calculate the maximum permissible stay time within Duke Power Basic administrative limits.

Alternate Path:

N/A

Facility JPM #:

N/A

K/A Rating(s):

GKA 2.3.4 (2.5/3.1)

Task Standard:

Stay time is correctly calculated and the Duke Power basic administrative limit is not exceeded.

Preferred Evaluation Location:

Simulator ____ In-Plant __X__

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

Duke Power Company, Radiation Worker Training Student Guide

Validation Time: 5 min **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Simulator Setup

N/A

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

An individual has been assigned the task of performing a valve lineup in the auxiliary building. The area where the valves are located has a dose rate of 250 mr/hr. The individual previously received 1100 mrem total dose this year.

INITIATING CUE:

Calculate the maximum permissible time the individual can work in this area without exceeding the Duke Power Basic administrative limit.

JPM OVERALL STANDARD:

Stay time is correctly calculated and the Duke Power basic administrative limit is not exceeded.

References allowed?

What is ref. for 2000 mrem total dose value?

STEP 1: Determines the remaining allowable dose within the DPC Basic limit. STANDARD: Permissible dose is 900 mrem. (2000 mrem/year basic DPC Limit minus 1100 mrem previously received). COMMENTS:	**Critical Step** ___SAT ___UNSAT
STEP 2 Determines the maximum permissible stay time within the DPC Basic limit. STANDARD: Determines the maximum permissible stay time to be 3.5 to 3.6 hours. (900 mrem divided by 250 mrem/hour) COMMENTS:	**Critical Step** ___SAT ___UNSAT

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

An individual has been assigned the task of performing a valve lineup in the auxiliary building. The area where the valves are located has a dose rate of 250 mrm/hr. The individual previously received 1100 mrem total dose this year.

INITIATING CUE:

Calculate the maximum permissible time the individual can work in this area without exceeding the Duke Power Basic administrative limit.

507.6 EXPOSURE LIMITS

507.6.1 OCCUPATIONAL MAXIMUM ALLOWABLE EXPOSURE (MAE) LIMITS

Table 507-1. Occupational Maximum Allowable Exposure (MAE) Limits

Body Location	NRC MAE Limit	DPC MAE Limit
Total Effective Dose Equivalent (TEDE) to the whole body	5.0 rem/year	2.0 rem/year up to 5.0 rem/year with extension
Shallow Dose Equivalent to Skin and Extremities	50.0 rem/year	50.0 rem/year
Committed Dose Equivalent (CDE) to any tissue or organ except lens of eye	50.0 rem/year	50.0 rem/year
Committed Dose Equivalent to lens of eye	15.0 rem/year	15.0 rem/year
Embryo/fetus (declared pregnant female)	0.5 rem/pregnancy duration, controlled uniformly at .05 rem/month	0.5 rem/pregnancy duration, controlled uniformly at .05 rem/month
Planned Special Exposure (PSE)	Up to 5 times annual limits in a lifetime. Requires Site VP approval	Up to 5 times annual limits in a lifetime. Requires Site VP approval.
Emergency Exposure		See Site Emergency Plan
Minors (< 18 years of age)	10% of adult limit and may not enter a High Radiation Area	10% of adult limit and may not enter a High Radiation Area

507.6.2 DECLARATION OF PREGNANCY

A worker may declare pregnancy at any time during pregnancy in order to minimize exposure of the fetus to radiation. Upon declaration of pregnancy, the worker's dose limit is reduced to the limits described in 507.6.1 and a BBA is performed. In addition, declared pregnant workers should avoid entries into Airborne Radioactivity Areas, High Radiation Areas, Extra High Radiation Areas and Very High Radiation Areas.

A declared pregnant worker may undeclare a pregnancy at any time. At the time a pregnancy is undeclared, the worker's MAE limit is returned to the non-declared worker limit. Contact RP to declare or undeclare a pregnancy and at the conclusion of pregnancy.

- Second jobs such as x-ray/laboratory technician
- Contract radiography work

Prior to leaving for a non-Duke nuclear facility requiring or with potential to require occupational monitoring contact dosimetry office personnel to:

- Complete paperwork for inprocessing at the non-Duke location
- Obtain a Body Burden Analysis

First working day upon returning from a non-Duke nuclear facility where occupational monitoring was provided or exit processing took place with DRC contact dosimetry office personnel to:

- Determine monitoring results
- Obtain a Body Burden Analysis

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

JPM 5R/ADMIN

Activate the Oil Spill Response Team

CANDIDATE _____

EXAMINER _____

CATAWBA
INITIAL LICENSE EXAMINATION
JOB PERFORMANCE MEASURE

Task:

Activate the Oil Spill Response Team.

Alternate Path:

N/A

Facility JPM #:

New

K/A Rating(s):

GKA 2.4.27 (3.0/3.15)

Task Standard:

Activate the Oil Spill Response Team per RP/O/A/5000/008 (Spill Response) Enclosure 4.5.

Preferred Evaluation Location:

Simulator ___ In-Plant __X___

Preferred Evaluation Method:

Perform __X__ Simulate _____

References:

RP/0/A/5000/008 (Spill Response)

Validation Time: N/A min **Time Critical:** No

==========

Candidate: _____ Time Start : _____
NAME Time Finish: _____

Performance Rating: SAT _____ UNSAT _____ Performance Time _____

Examiner: _____ _____/_____
NAME SIGNATURE DATE

==========

COMMENTS

_____

_____

_____

Simulator Setup

N/A.

READ TO OPERATOR

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

You are the OATC on Unit 1. The Control Room SRO has just received a 4911 call stating there is an oil spill on the Standby Nuclear Service Water Pond.

INITIATING CUE:

The Control Room SRO directs you to activate the Oil Spill Response Team ~~per step 1 of~~ RP/0/A/5000/008 (Spill Response) Enclosure 4.5.) why?

JPM OVERALL STANDARD:

Candidate activates the Oil Spill Response Team using Step 1 of Enclosure 4.5 of RP/0/A/5000/008 (Spill Response)

STEP 1: Determines from the Initial Conditions that a actual spill has occurred. Step 1.1 is N/A. Goes to step 1.2. (there is not a spill drill) STANDARD: Step is N/A. COMMENTS:	___SAT ___UNSAT
STEP 2 At the Quiktel Key Pad located in the Control Room type in "Oil Spill" and press "ENTER" STANDARD: Candidate locates the Quiktel Key Pad and simulates typing "Oil Spill" and pressing "ENTER" COMMENTS:	**Critical Step** ___SAT ___UNSAT
STEP 3 : Press "M" and type the following message: "Oil Spill to water at CNS. All team members respond. Team Leader call 803-831-5164 for safety information." Press "ENTER" to send. STANDARD: Candidate simulates typing and transmitting message. COMMENTS:	**Critical Step** ___SAT ___UNSAT
STEP 4 : Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager actuation. STANDARD: Examinee monitors the confirmation pagers located at the Quiktel Key Pad to verify proper pager actuation. **EXAMINER CUE: Message has been sent.** COMMENTS:	___SAT ___UNSAT
This JPM is complete	

TIME STOP: _____

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

You are the OATC on Unit 1. The Control Room SRO has just received a 4911 call stating there is an oil spill on the Standby Nuclear Water Pond.

INITIATING CUE:

The Control Room SRO directs you to activate the Oil Spill Response Team per step 1 of RP/0/A/5000/008 (Spill Response) Enclosure 4.5.

Duke Power Company (1)ID No. RP/0/B/5000/008

PROCEDURE PROCESS RECORD Revision No. 017

(2) ON tion Catawba Nuclear Station

(3) Procedure Title Spill Response

(4) Prepared By E. D. Bradley Date 4/20/2000

(5) Requires 10CFR50.59 evaluation?
- [X] Yes (New procedure or reissue with major changes)
- [ ] No (Revision with minor changes)
- [ ] No (To incorporate previously approved changes)

(6) Reviewed By GBM for M. Mitchell (QR) Date 4-21-00

Cross-Disciplinary Review By LB Cummings (QR) NA ____ Date 4-24-2000

Reactivity Mgmt. Review By ____ (QR) NA GBM Date 4-21-00

(7) Additional Reviews

Reviewed By ____ Date ____

Reviewed By ____ Date ____

(8) Temporary Approval *(if necessary)*

By ____ (SRO/QR) Date ____

By ____ (QR) Date ____

(9) APPROVED BY Richard L Swingle Date 4/26/00

PERFORMANCE (Compare with control copy at least once every 14 calendar days while work is being performed)

(10) Compared with Control Copy ____ Date ____

Compared with Control Copy ____ Date ____

Compared with Control Copy ____ Date ____

(11) Dates(s) Performed ____

Work Order Number (W/O #) ____

COMPLETION

(12) Procedure Completion Verification

- [ ] Yes [ ] N/A Check lists and/or blanks properly initialed, signed, dated, or filled in NA, as appropriate?
- [ ] Yes [ ] N/A Listed enclosures attached?
- [ ] Yes [ ] N/A Data sheets attached, completed, dated and signed?
- [ ] Yes [ ] N/A Charts, graphs, etc attached and properly dated, identified and marked?
- [ ] Yes [ ] N/A Procedure requirements met?

Verified By ____ Date ____

(13) Procedure Completion Approved ____ Date ____

(14) Remarks *(attach additional pages, if necessary)*

Duke Power Company Catawba Nuclear Station **Spill Response** **Multiple Use**	Procedure No. RP/0/B/5000/008 Revision No. 017 Electronic Reference No. CN005GO3

Spill Response

1. Symptoms

1.1 An unplanned or uncontrolled release of a chemical product, oil, or hazardous waste from a container or system in excess of normal drips and splatters.

The release of water from a plant system to the environment may also be considered a spill, especially for chemically treated water systems such as the fire protection system or drinking water system which both contair chlorine.

A spill to the "environment" means soil, water, or air that is not under the direct control of mankind. For CNS the environment includes all ground/soil/gravel areas that are not protected by a liner such as concrete or asphalt (in good condition - not broken or cracked), the air outside any building or air that is discharged from a vent to the outside, and all exterior waters including the Standby Nuclear Service Water Pond, (SNSWP), wetlands (environmentally sensitive areas), and Lake Wylie.

NOTE:
1. On-Site is defined as inside the Owner Controlled Area.
2. Off-Site is defined as outside the Owner Controlled Area.
3. Navigable Waters is defined as Lake Wylie and the Standby Nuclear Service Water Pond.

2. Immediate Actions

2.1 For On-Site Spill Response, go to Enclosure 4.1.

2.2 For Off-Site Spill Response, go to Enclosure 4.2.

2.3 For Oil Spills to Navigable Waters (Lake Wylie **OR** SNSW Pond), go to Enclosure 4.3.

3. Subsequent Actions

3.1 On-Site, go to Enclosure 4.1.

3.2 Off-Site, go to Enclosure 4.2.

3.3 Oil Spills to Navigable Waters (Lake Wylie **OR** SNSW Pond), go to Enclosure 4.3.

4. Enclosures

4.1 On-Site Spill Response

4.2 Off-Site Spill Response

4.3 Oil Spills to Navigable Waters (Lake Wylie **OR** SNSW Pond)

4.4 HazMat Emergency Response Team Activation and Emergency Telephone/Pager Numbers

4.5 Oil Spill Response Team Activation

1. Immediate Actions

1.1 Initiate a response by the Fire Brigade Leader to investigate and report conditions to Control Room. Any additional Fire Brigade response should be determined based on the conditions reported by the Fire Brigade Leader.

1.2 Announce the following over the plant PA system:

"Attention all plant personnel. Attention all plant personnel. This is the Control Room. A chemical spill has been reported to the Control Room. This spill is occurring at (provide plant location). Please stay clear of this area until further notice."

1.3 **IF** any of the below Chemical Spill conditions exist:

NOTE: If the product source of the spill/leak has been secured, **AND** the release of the product is no longer occurring, **AND** the spilled product has been contained/confined, the HazMat Emergency Response Team is not needed. Go to Environmental Work Practices 5.1.

(Check any that apply)

_____ The spill is an unknown product/substance, **OR**

_____ The spill is a labeled HAZARDOUS WASTE, **OR**

_____ The spill requires immediate attention because of danger such as fire or explosion, **OR**

_____ The spill requires donning of Personal Protective Equipment (PPE) other than that normally used while working with the product, or could create an exposure hazard for others in the area, **OR**

_____ The spill requires additional equipment for containment not normally stored in the area.

Contact the HazMat Emergency Response Team as listed on Enclosure 4.4 for spill response resources.

1.4 **IF** the above conditions do not exist or the material involved is asbestos/insulating materials, water from RF, RY or YD systems, go to Environmental Work Practice 5.1.

1.5 For oil spills/releases to navigable water (Lake Wylie or SNSW), or any imminent potential of such, refer to Enclosure 4.3 for immediate actions. Oil spills of non-flammable/combustible materials **DO NOT** require any action by the HazMat Emergency Response Team.

1. Immediate Actions

_____ Upon receiving a call involving the release of a CNS related hazardous substance or material (hazardous wastes or radioactive materials) which were shipped from CNS, request the caller's name and phone number and Radiological Shipping Record Number (RSR Number may not be available).

Name: _____ Phone #: _____

RSR #: _____

_____ Keep the caller on hold. Do not hang up.

NOTE: CNS Commodities and Facilities personnel shall provide information regarding the Hazardous Material incident directly to the caller.

_____ Contact Commodities and Facilities shift personnel at 831-3453 or duty pager 778-4054 and instruct them to call the Control Room immediately.

_____ Connect them to the caller when they return the call or page.

2. Subsequent Actions

NOTE: Lines in left margin are for place-keeping. Subsequent actions may be performed simultaneously.

Radiological Materials Incidents

_____ Notify the RP Shift Technician on duty at 831-5572 or pager #778-2777 and provide the caller's name and phone number.

_____ Contact Environmental Management (EM), ext. 3333 for assistance in reporting to state, local, or federal authorities. After hours, contact the Environmental Duty person by phone or pager. **IF** no answer, page 8-777-3333, which pages all Environmental Management personnel.

_____ Notify Communications and Community Relations of the incident (pager #8-777-7388).

_____ Refer to RP/0/B/5000/013, "NRC Notification Requirements," to make NRC notifications.

_____ Notify York County EOC of the incident at 803-329-1110 and provide the caller's name and phone number (if incident occurred in York County, SC). (PIP # C-00-1689)

_____ Notify Duke Power Risk Management at (704) 382-8186 (24 hour phonemail service).

_____ Notify American Nuclear Insurers (ANI) at (860) 561-3433.

_____ In the event that a responsible group is not identified, the Operations Shift Manager (or designee) shall initiate a PIP. Refer to Environmental Work Practice 5.1 for information to include in the PIP.

Hazardous Waste Incidents

_____ Contact Environmental Management (EM), ext. 3333 for assistance in reporting to state, local, or federal authorities. After hours contact the Environmental Duty person by phone or pager. **If** no answer, page 8-777-3333, which pages all Environmental Management personnel.

_____ Notify Communications and Community Relations at 1-800-777-3852, then pager number 777-7388.

_____ Notify York County EOC of the incident at 803-329-1110 and provide the caller's name and phone number (if incident occurred in York County, SC). (PIP # C-00-1689)

_____ In the event that a responsible group is not identified, the Operations Shift Manager (or designee) shall initiate a PIP. Refer to Environmental Work Practice 5.1 for information to include in the PIP.

Enclosure 4.3
Oil Spills to Navigable Waters (Lake Wylie OR SNSW Pond)

1. Immediate Actions

_____ Upon receiving notification of a spill of oil (petroleum products, synthetic oils, hydraulic oils, etc.) to Lake Wylie or the Standby Nuclear Service Water Pond which requires clean-up, request the caller's name and phone number:

Name: _____ Phone: _____

_____ **IF** necessary to confirm the spill, **THEN** dispatch an Operator.

NOTE: Oil Spill Response Team will call the Control Room upon arrival on site.

_____ Contact the Lower Catawba Hydro Oil Spill Response Team as listed on Enclosure 4.5 to initiate a response.

2. Subsequent Actions

_____ Contact Environmental Management (EM), ext. 3333 for assistance in reporting to state, local, or federal authorities. After hours, contact the Environmental Duty person by phone or pager. If no answer, page 8-777-3333, which will page all Environmental Management personnel.

_____ **IF** an emergency classification has not been declared, for an actual Oil Spill Response Team notification inform York County 911 of the event. (PIP # C-00-1689)

_____ Refer to RP/0/B/5000/013, "NRC Notification Requirements," to make NRC notifications, if needed.

_____ Notify Communications and Community Relations of the incident (pager # 8-777-7388).

_____ In the event that a responsible group is not identified, the Operations Shift Manager (or designee) shall initiate a PIP. Refer to Environmental Work Practice 5.1 for information to include in the PIP.

1. HAZMAT Team Notification During an Emergency

1.1 IF the HAZMAT Team is being called out for a drill, go to Step 2.

1.2 Activate the Off-Site emergency pager system Quiktel Key Pad located in the Control Room.

1.2.1 Type in SPILL and press "ENTER"

1.2.2 Press "M"

1.2.3 Type the following message;

"CNS Hazardous Materials Spill; All Team Members Respond."

1.2.4 Press "ENTER"

NOTE: Pager activation can be delayed up to 5 minutes depending on pager system status.

1.2.5 Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager activation.

1.3 IF the Quiktel Key Pad is unavailable, dial 8-777-8091 and enter your phone number (e.g., 803-831-3250), and press #. The HazMat Response Team duty person will return your call and make additional call-outs as necessary to ensure team response.

2. HAZMAT Team Notification During a Drill

2.1 Activate the Off-Site emergency pager system Quiktel Key Pad located in the Control Room.

2.1.1 Type in SPILL and press "ENTER"

2.1.2 Press "M"

2.1.3 Type in the following message:

"This is a Drill. CNS Hazardous Materials Spill; All Team Members Respond. This is a Drill."

2.1.4 Press "ENTER"

NOTE: Pager activation can be delayed up to 5 minutes depending on pager system status.

2.1.5 Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager activation.

2.2 IF the Quiktel Key Pad is unavailable, dial 8-777-8091 and enter your phone number (e.g., 803-831-3250), and press #. The HazMat Response Team duty person will return your call and make additional call-outs as necessary to ensure team response.

1. Hazmat Emergency Response Team

Name	Off-Site Pager
Tim Daniels	8-777-4619
Cleve Brown	8-777-4682
Richard Flowers	8-778-4667
David Hord	8-778-7974
Ronnie Bangle	8-778-7975
John Williams	8-778-7976
Eddie Benfield	8-777-7272
Andy Miller	8-778-7119
Tom Christensen	8-778-7979
Jasper Armstrong	8-777-7297
Jamie Andrews	8-778-7978
John Bailes	8-778-7184
Kim McManus	8-778-9443
Roy Hembree	8-778-5839
Rick Tack	8-778-4964
Robin Caskey	8-778-2444
Larry Berry	8-778-5884
Wayne Jarman	8-778-7125
Bill Edmunds	8-778-7141
Chad Eurey	8-778-7121

NOTES:
1. The Oil Spill Response Team will call the Control Room to determine any personnel or radiological safety hazards associated with their response to the Site.
2. The Oil Spill Response Team will respond to the Water Chemistry Building unless the Control Room advises them otherwise.
3. Pager activation can be delayed up to 5 minutes depending on pager system status.

1. Oil Spill Response Team Notification For An Actual Spill

1.1 **IF** the Oil Spill Response Team is being called out for a drill, go to Step 2.

1.2 Activate the Off-Site emergency pager system Quiktel Key Pad located in the Control Room.

1.2.1 Type in "OILSPILL" and press "ENTER"

1.2.2 Press "M"

1.2.3 Type in the following message:

"Oil spill to water at CNS. All team members respond. Team leader call 803-831-5164 for safety information."

1.2.4 Press "ENTER"

1.2.5 Monitor the confirmation pagers located at the Quiktel Key Pad to verify proper pager activation.

1.3 **IF** the Quiktel Key Pad is unavailable, dial 8-778-1075 and enter your phone number (e.g., 803-831-3250), and press #. The Oil Spill Response Team will return your call.

2. Oil Spill Response Team Notification For A Drill

2.1 Activate the Off-Site emergency pager system Quiktel Key Pad located in the Simulator.

2.1.1 Type in "OILSPILL" and press "ENTER"

2.1.2 Press "M"

2.1.3 Type in "This is a Drill. Oil spill to water at CNS. All team members respond. Team leader call 803-831-3000 Extension 2801 for safety information. This is a Drill."

2.1.4 Press "ENTER"

2.2 **IF** the Quiktel Key Pad is unavailable, dial 8-778-1075 and enter your phone number (e.g., 803-831-3250), and press #. The Oil Spill Response Team will return your call.