WATTS BAR NUCLEAR PLANT
UNIT 2 PREOPERATIONAL TEST

TITLE: Nuclear Instrumentation Source Range Noise Checks During Hot Functional Testing

Instruction No: 2-PTI-092-03
Revision No: 0000

PREPARED BY: Bryan Mack Bryan Mack DATE: 3/5/13
PRINT NAME / SIGNATURE

REVIEWED BY: Regina Ballard Regina Ballard DATE: 3/5/13
PRINT NAME / SIGNATURE

INSTRUCTION APPROVAL

JTG MEETING No: 2-13-009
JTG CHAIRMAN: Nick A Welch DATE: 5/9/13
APPROVED BY : Nick A Welch DATE: 5/9/13
PREOPERATIONAL STARTUP MANAGER

TEST RESULTS APPROVAL

JTG MEETING No: _____
JTG CHAIRMAN: _____ DATE: _____
APPROVED BY : _____ DATE: _____
PREOPERATIONAL STARTUP MANAGER

Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
0000	5/9/13	ALL	Initial issue based on SPT-92-01 including CN-1. CN-2 is not applicable.

Table of Contents

Table of Contents (continued)

1.0 INTRODUCTION

1.1 Test Objectives

The objective of this test is to demonstrate that the Source Range (SR) detectors are not adversely affected by electrical noise.

1.2 Scope

This test will be conducted during Hot Functional Testing (HFT). Both Source Range channels and Appendix R Wide Range Monitor will be monitored for electrical noise. Specifically channels 2-NI-92-131-D, 2-NI-92-138, and 2-NI-92-132-E will be monitored.

2.0 REFERENCES

2.1 Performance References

A. SMP-9.0,Watts Bar Nuclear Plant Unit 2 Conduct of Test

B. SMP-15.0, Watts Bar Nuclear Plant Unit 2 Status and Control of Isolation Devices

2.2 Developmental References

A. Unit 2 Final Safety Analysis Report (FSAR), Amendment 109

Chapter 14, Table 14.2-1, Sheet 60 of 89, Excore Nuclear Instrumentation Test Summary

B. Drawings

1. Flow Diagrams

None

2. Electrical Drawings

a. 2-45W600-92-1, Rev 0, Wiring Diagrams Neutron Monitoring Schematic Diagram, CCD
DRA 52421-3, Rev 1

2.2 Developmental References (continued)

b. 2-45W600-92-2, Rev 0, Wiring Diagrams Neutron Monitoring Schematic Diagram, CCD
DRA 52421-92, Rev 1

c. 2-47W610-92-1, Rev 0, Electrical Control Diagram Neutron Monitoring System, CCD
DRA 52421-002, Rev 0

d. 45N706-1, Rev 20, Wiring Diagram 120V AC Vital Inst. Power Bds 1-I & 2-I Connection Diagram - Sheet 1, AD
DRA 52421-044, Rev 0

e. 45N706-2, Rev 21, Wiring Diagram 120V AC Vital Inst. Power Bds 1-II & 2-II Connection Diagram - Sheet 2, AD

f. 45N2652-1, Rev 3, Wiring Diagram Unit Control Board Panel 2-M-13 Connection Diagrams-Sheet 1, AD
DRA 52421-073, Rev 0
DRA 52421-074, Rev 0
DRA 52421-075, Rev 0
DRA 52421-076, Rev 0
DRA 52421-078, Rev 0
DRA 52421-079, Rev 0
DRA 52421-080, Rev 0
DRA 52421-081, Rev 0
DRA 52421-082, Rev 0
DRA 52421-083, Rev 0
DRA 52421-084, Rev 0
DRA 52421-085, Rev 0
DRA 52352-001, Rev 0
DRA 52352-002, Rev 0

g. 45N2652-3, Rev 3, Wiring Diagrams Unit Control Board Panel 2-M-13 Connection Diagrams- Sheet 3, AD
DRA 52421-067, Rev 0
DRA 52421-068, Rev 0
DRA 52421-069, Rev 0

2.2 Developmental References (continued)

h. 45N2652-4, Rev 3, Wiring Diagrams Unit Control Board Panel 2-M-13 Connection Diagrams- Sheet 4, AD
DRA 52421-064, Rev 0
DRA 52421-065, Rev 0
DRA 52421-066, Rev 0

i. 45N2637-11, Rev 5, Wiring Diagram Unit Control Board Panel 2-L-10 Connection Diagrams-Sheet II, AD
DRA 52421-109, Rev 1

3. Mechanical

None

4. Logic/Control

None

5. Vendor Drawings

None

C. Documents

1. WBN2-92-4003, Neutron Monitoring System, Rev 1

2. 2-TSD-92-2, Source and Intermediate Range (SR & IR) Nuclear Instrumentation System, Rev. 1

3. EDCR 52421, Source and Intermediate Range Neutron Flux Monitoring, Rev. A

4. 2-NMD-92-131-SR, Setpoint and Scaling Document, Rev 1

5. 2-NMD-92-131-WR, Setpoint and Scaling Document, Rev 1

6. 2-NMD-92-132-SR, Setpoint and Scaling Document, Rev 1

D. Vendor Manuals

"Ex-core Neutron Flux Monitoring Systems - WR Channel Instruction Manual for Watts Bar Unit 2," MN868 Rev. 2

3.0 PRECAUTIONS AND LIMITATIONS

A. Standard precautions shall be followed for working around energized electrical equipment in accordance with TVA Safety Manual Procedure 1021.

B. Steps may be repeated if all components cannot be tested in a step. However, if the test has been exited, prerequisite steps must be re-verified and a Chronological Test Log (CTL) entry made.

C. Discrepancies between component ID tags and the description in a procedure/instruction do not require a Test Deficiency Notice (TDN) in accordance with SMP-14.0, if the UNIDs match, exclusive of place-keeping zeros and train designators (e.g. 2-HS-31-468 vs. 2-HS-031-0468) and the noun description is sufficient to identify the component. If the component label needs to be changed, a Tag Request Form (TR Card) should be processed in accordance with TI-12.14. Make an entry in the CTL and continue testing.

D. All open problems are to be tracked by a corrective action document and entered on the appropriate system punchlist.

E. Problems identified during the test shall be annotated on the CTL from SMP-9.0 including a description of the problem, the procedure step when/where the problem was identified, corrective action steps taken to resolve the problem, and the number of the corrective action document, if one was required.

F. Ensure there are no adverse effects to the operation of Unit 1 structures, systems, or components.

G. All Nuclear Instrumentation System channels should have a four hour warmup period prior to testing.

H. The ADJUST potentiometer on the Source and Intermediate Range drawer should be fully counterclockwise PRIOR to placing the Intermediate Range drawer OPERATION SELECTOR switch in the TEST ENABLE position. For the duration of this test the ADJUST potentiometer should remain in the fully counterclockwise position.

I. When extending or retracting an NIS drawer from the cabinet, extreme care must be used to NOT damage cables connected to rear of drawer.

Date _____

4.0 PREREQUISITE ACTIONS

NOTE

Prerequisite steps may be performed in any order unless otherwise stated and should be completed as close in time as practicable to the start of the instruction subsection to which they apply.

4.1 Preliminary Actions

[1] **EVALUATE** open items in Watts Bar Integrated Task Equipment List (WITEL), **AND**

ENSURE they will NOT adversely affect the test performance and results. _____

[2] **ENSURE** changes to the references listed on Appendix A, have been reviewed, and determined NOT to adversely affect the test performance. _____

[3] **VERIFY** current revisions and change paper for referenced drawings has been reviewed and determined NOT to adversely affect the test performance, **AND**

ATTACH documentation of current drawing revision numbers and change papers that were reviewed to the data package. _____

[4] **VERIFY** the test/performance copy of this Preoperational Test Instruction (PTI) is the current revision including any change notices and as needed, each test person assisting in this test has the current revision including any change notices. _____

[5] **ENSURE** outstanding Design Change Notices (DCN's), Engineering Document Construction Releases (EDCR's) or Temporary Modifications (T-Mods) do NOT adversely impact testing, and

ATTACH documentation of DCN's, EDCR's, and T-Mods's that were reviewed to the data package. _____

[6] **ENSURE** required Component Testing has been completed PRIOR to start of test. _____

Date _____

4.1 Preliminary Actions (continued)

[7] **CONDUCT** a pretest briefing with Test and Operations personnel in accordance with SMP-9.0. _____

[8] **ENSURE** communications are available for areas where testing is to be conducted. _____

[9] **VERIFY** plant instruments, listed on Appendix C, Permanent Plant Instrumentation Log, are placed in service and are within their calibration interval. _____

[10] **ENSURE** the following Integrated Computer System (ICS) points are in scan:

A. N0031A, SOURCE RNG DETECTOR 1 LOG Q _____

B. N0032A, SOURCE RNG DETECTOR 2 LOG Q _____

[11] **ENSURE** the breakers listed in Appendix E, Breaker Lineup are in the specified positions. _____

[12] **VERIFY** Source Range Channels have been energized for a minimum of four hours PRIOR to testing. _____

[13] **ENSURE** components contained within the boundaries of this test are under the jurisdictional control of Preoperational Startup Engineering (PSE) and/or Plant Operations. _____

[14] **ENSURE** a review of outstanding Clearances has been coordinated with Operations for impact to the test performance, **AND**

RECORD in Appendix B, Temporary Condition Log if required. _____

[15] **OBTAIN** copies of the applicable forms from the latest revision of SMP-9.0, **AND**

ATTACH to this PTI for use during the performance of this PTI. _____

[16] **PERFORM** a pretest walkdown on equipment to be tested to ensure no conditions exist that will impact test performance. _____

[17] **REVIEW** preventive maintenance for system/components covered by this test, **AND**

VERIFY no conditions exist that will impact test performance. _____

Date _____

4.2 Special Tools, Measuring and Test Equipment, Parts, and Supplies

NOTES

1) The strip chart recorders used for this PTI will be in use for an extended period of time.
2) When in use the chart recorders will use approximately 25 feet of paper per day.

[1] **ENSURE** the following M&TE or equivalent is available and within their calibration due dates, **AND**

RECORD the M&TE data on SMP-9.0, Measuring and Test Equipment (M&TE) Log.

A. One 4 pen strip chart recorder or equivalent, ±10 VDC (Accuracy 2.0% full scale or better), 5 mm/sec to 50 mm/sec (Accuracy ± 0.75% of chart speed or better) _____

B. One 2 pen strip chart recorder or equivalent, ±10 VDC (Accuracy 2.0% full scale or better), 5 mm/sec to 50 mm/sec (Accuracy ± 0.75% of chart speed or better) _____

[2] **ENSURE** an adequate supply of strip chart recorder paper exists for the recorders selected in Step 4.2[1]. _____

NOTE

For the chart recorders, 0.0 VDC is equivalent to 0.1 CPS, 3.334 VDC is equivalent to 10 CPS, and 10 VDC is equivalent to 100,000 CPS.

[3] **ENSURE** the 4 pen strip chart recorder is setup as follows:

A. Jumper/Parallel Pen #1 and Pen #2 _____

B. Jumper/Parallel Pen #3 and Pen #4 _____

C. Pen #1 scaled for 0.0 VDC to 3.334 VDC _____

D. Pen #2 scaled for 0 to 10.0 VDC _____

Date _____

4.2 Special Tools, Measuring and Test Equipment, Parts, and Supplies (continued)

E. Pen #3 scaled for 0.0 to 3.334 VDC _____

F. Pen #4 scaled for 0 to 10.0 VDC _____

[4] **ENSURE** the 2 pen strip chart recorder is setup as follows:

A. Jumper/Parallel Pen #1 and Pen #2 _____

B. Pen #1 scaled for 0.0 to 3.334 VDC _____

C. Pen #2 scaled for 0 to 10.0 VDC _____

4.3 Field Preparations

[1] **PERFORM** the following Substeps at 2-NM-92-138-D, OPTICAL ISOLATOR, located in the Auxiliary Building Additional Equipment Room, Column (A11W), El (737').

A. **OPEN** the enclosure to gain access to the TEST/STATUS CONTROL switch. _____

B. **ENSURE** TEST/STATUS CONTROL switch is in the CTRL ROOM position. _____

_____
CV

C. **CLOSE** and **SECURE** the OPTICAL ISOLATOR enclosure. _____

Date _____

4.4 Approvals and Notifications

[1] **OBTAIN** permission of the Preoperational Startup Manager to start the test.

_____ _____
Preoperational Startup Manager Signature — Date

[2] **OBTAIN** the Unit 2 Supervisor's (US/SRO) or Shift Manager's (SM) authorization.

_____ _____
US/SRO/SM Signature — Date

5.0 ACCEPTANCE CRITERIA

With all detectors installed, monitor and record the source range channels output for unacceptable noise when major electrical equipment is started. Unacceptable noise shall be considered readout greater than 10 counts per second for duration of 2 seconds or counts per seconds X duration (seconds) greater than 20 where the maximum duration is 2 seconds. If unacceptable noise is encountered, determine the cause and source. (Step 6.2[6])

Date _____

6.0 PERFORMANCE

NOTE

If unacceptable noise is encountered or a Source Range Trip occurs during performance of this test a TDN should be initiated and troubleshooting will occur to determine the cause/source and mitigate as necessary.

6.1 Connection to Source Range Channels and Verification of Recorders

[1] **VERIFY** prerequisites listed in Section 4.0 have been completed. _____

CAUTION

When extending or retracting an NIS drawer from cabinet, extreme care must be used to NOT stress or damage cables connected to rear of drawer.

[2] **PERFORM** the following Substeps at 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY on panel 2-L-10 in the Auxiliary Control Room.

A. **LOOSEN** the front panel thumbscrews, **AND**

SLIDE the drawer out. _____

B. **REMOVE** top cover to permit access to internal components on the drawer backplane. _____

C. **CONNECT** channel 1 of the two channel recorder to A6-TP2(+) and A6-TP3(-). _____

D. **ENSURE** the two channel recorder is powered on. _____

E. **ENSURE** the two channel recorder is set to a speed of 5mm/sec. _____

F. **VERIFY** channel 1 of the two channel recorder displays approximately 0.0 VDC. _____

Date _____

6.1 Connection to Source Range Channels and Verification of Recorders (continued)

G. **VERIFY** channel 2 of the two channel recorder displays approximately 0.0 VDC. _____

H. **SLIDE** the drawer in as far as practical while ensuring test connections remain in place and the test connection leads are NOT pinched. _____

[3] **PERFORM** the following Substeps at the NUCLEAR INSTRUMENTATION PROTECTION CHANNEL IV rack on panel 2-M-13 in the Main Control Room

A. **ENSURE** AUDIO MULTIPLIER switch located on 2-IDWR-92-N34, AUDIO COUNT RATE N34 to OFF. _____

B. **ENSURE** POWER switch located on the SCALER TIMER to the OFF POSITON. _____

[4] **PERFORM** the following Substeps at the NUCLEAR INSTRUMENTATION PROTECTION CHANNEL I rack on panel 2-M-13 in the Main Control Room

A. **PLACE** OUTPUT SELECTOR switch located on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR to SR LEVEL. _____

B. **CONNECT** channel 1 of the four channel recorder to the OUTPUT BNC on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR. _____

C. **ENSURE** four channel recorder is powered on. _____

D. **ENSURE** four channel recorder is set to speed of 5 mm/sec. _____

E. **VERIFY** channel 1 of the four channel recorder displays approximately 0.0 VDC. _____

F. **VERIFY** channel 2 of the four channel recorder displays approximately 0.0 VDC. _____

G. **PLACE** LEVEL TRIP switch on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR, in BYPASS. _____

Date _____

6.1 Connection to Source Range Channels and Verification of Recorders (continued)

H. **PLACE** LEVEL TRIP switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in BYPASS. _____

I. **PLACE** 2-NI-92-131-D (2-M-13) HIGH FLUX AT SHUTDOWN switch to BLOCK. _____

J. **PLACE** OPERATION SELECTOR switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in TEST ENABLE. _____

K. **PLACE** TEST SELECTOR switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in LCR1. _____

L. **VERIFY** channel 1 of the four channel recorder indicates off scale HIGH. _____

M. **VERIFY** channel 2 of the four channel recorder indicates approximately 3.48 VDC. _____

[5] **PERFORM** the following Substeps at 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY on panel 2-L-10.

A. **VERIFY** Channel 1 of the two channel recorder indicates off scale HIGH. _____

B. **VERIFY** Channel 2 of the two channel recorder indicates approximately 3.48 VDC. _____

[6] **PERFORM** the following Substeps at the NUCLEAR INSTRUMENTATION PROTECTION CHANNEL I rack on panel 2-M-13.

A. **PLACE** TEST SELECTOR switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in OPR. _____

B. **PLACE** OPERATION SELECTOR switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in NORMAL. _____

C. **PLACE** LEVEL TRIP switch on 2-NI-92-135-D, CH I NEUT MON INTERM RNG DWR, in NORMAL. _____

Date _____

6.1 Connection to Source Range Channels and Verification of Recorders (continued)

D. **PLACE** LEVEL TRIP switch on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR, in NORMAL. _____

E. **VERIFY** Channel 1 of the four channel recorder indicates 0.0 VDC. _____

F. **VERIFY** Channel 2 of the four channel recorder indicates 0.0 VDC. _____

[7] **PERFORM** the following Substeps at 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY on panel 2-L-10.

A. **VERIFY** Channel 1 of the two channel recorder at panel 2-L-10 indicates 0.0 VDC. _____

B. **VERIFY** Channel 2 of the two channel recorder at panel 2-L-10 indicates 0.0 VDC. _____

C. **ADJUST** chart speed of two pen recorder to 5 mm/min. _____

[8] **PERFORM** the following Substeps at the NUCLEAR INSTRUMENTATION PROTECTION CHANNEL II rack on panel 2-M-13.

A. **PLACE** OUTPUT SELECTOR switch located on 2-NI-92-132-E, CH II NEUT MON SOURCE RNG DWR to SR LEVEL. _____

B. **CONNECT** channel 3 of the four channel recorder to the OUTPUT BNC on 2-NI-92-132-D, CH II NEUT MON SOURCE RNG DWR. _____

C. **VERIFY** channel 3 of the four channel recorder displays approximately 0.0 VDC. _____

D. **VERIFY** channel 4 of the four channel recorder displays approximately 0.0 VDC. _____

E. **PLACE** LEVEL TRIP switch on 2-NI-92-132-E, CH II NEUT MON SOURCE RNG DWR, in BYPASS. _____

F. **PLACE** LEVEL TRIP switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in BYPASS. _____

Date _____

6.1 Connection to Source Range Channels and Verification of Recorders (continued)

G. **PLACE** 2-NI-92-132-E (2-M-13) HIGH FLUX AT SHUTDOWN switch to BLOCK. _____

H. **PLACE** OPERATION SELECTOR switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in TEST ENABLE. _____

I. **PLACE** TEST SELECTOR switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in LCR1. _____

J. **VERIFY** channel 3 of the four channel recorder indicates off scale HIGH. _____

K. **VERIFY** channel 4 of the four channel recorder indicates approximately 3.48 VDC. _____

L. **PLACE** TEST SELECTOR switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in OPR. _____

M. **PLACE** OPERATION SELECTOR switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in NORMAL. _____

N. **PLACE** LEVEL TRIP switch on 2-NI-92-136-E, CH II NEUT MON INTERM RNG DWR, in NORMAL. _____

O. **PLACE** LEVEL TRIP switch on 2-NI-92-132-E, CH II NEUT MON SOURCE RNG DWR, in NORMAL. _____

P. **VERIFY** channel 3 of the four channel recorder displays approximately 0.0 VDC. _____

Q. **VERIFY** channel 4 of the four channel recorder displays approximately 0.0 VDC. _____

R. **ADJUST** chart speed of four pen recorder to 5 mm/min. _____

Date _____

6.2 Collection of Noise Data During Hot Functional Testing

NOTE

During performance of this section chart scaling and speed may be adjusted at the discretion of the Test Director to better observe noise. Initially, chart speed should be increased to 5 mm/sec. Detector output voltage is scaled as 1.667 VDC per decade with 0.1 CPS equivalent to 0 VDC.

[1] **CONTACT** the Hot Function Test Coordinator to determine when operation of plant equipment, listed in Data Sheet 1, NOISE DATA DURING PLANT EQUIPMENT CYCLING, will occur. _____

NOTES

1) Additional plant equipment may be added to Data Sheet 1 as required. Plant Equipment Cycling may be monitored more than once to acquire additional data.
2) If multiple noise counts are recorded for the same transient, record the "worst case" when completing Data Sheet 1.
3) Signoffs for Substeps 6.2[2.1] through Substeps 6.2[2.4] are provided in the Table 1: Plant Equipment Runs During HFT following Step 6.2[2.4]

[2] **PERFORM** Substeps 6.2[2.1] through Substeps 6.2[2.4] for each plant equipment cycling listed in the Table following step 6.2[2.4]:

[2.1] **INCREASE** all chart recorders' speed at least one minute PRIOR to the start of the plant loads specified, **AND**

VERIFY all chart recorders operation.

[2.2] **DECREASE** all chart recorders' speed to 5 mm/min, approximately 1 minute after the end of each plant transient.

[2.3] **RECORD** the following on the chart paper, for each chart recorder, for each transient monitored:

A. Drawer Monitored (N31, N32, or N38)

B. Initial

6.2 Collection of Noise Data During Hot Functional Testing (continued)

C. Date

D. Time

E. RCS Temperature

F. Plant Equipment being cycled (e.g. rod stepping)

G. Chart recorder M&TE number

H. Chart recorder scaling (chart speed, input span and scaling factor)

I. 2-PTI-92-03

J. Equipment operated by: (name)

[2.4] **FILL** out Data Sheet 1.

Table 1: Plant Equipment Runs During HFT

Equipment	Initials Step 6.2[2.1]	Initials Step 6.2[2.2]	Initials Step 6.2[2.3]	Initials Step 6.2[2.4]
RCP #1				
RCP #2				
RCP #3				
RCP #4				
2A-A PZR HTR Backup Group				
2B-B PZR HTR Backup Group				
2C PZR HTR Backup Group				
2D PZR HTR Control Group				
Lower Compartment Cooling Fan 2A-A				
Lower Compartment Cooling Fan 2B-B				

Date _____

6.2 Collection of Noise Data During Hot Functional Testing (continued)

Equipment	Initials Step 6.2[2.1]	Initials Step 6.2[2.2]	Initials Step 6.2[2.3]	Initials Step 6.2[2.4]
Lower Compartment Cooling Fan 2C-A				
Lower Compartment Cooling Fan 2D-B				
Upper Compartment Cooling Fan 2A-A				
Upper Compartment Cooling Fan 2B-B				
Upper Compartment Cooling Fan 2C-A				
Upper Compartment Cooling Fan 2D-B				
CRDM Cooling Fan 2A-A				
CRDM Cooling Fan 2B-B				
CRDM Cooling Fan 2C-A				
CRDM Cooling Fan 2D-B				
Rod Stepping				

[2.5] Subsections 6.2[2.1] through 6.2[2.4] Completed. _____

NOTE

Fill in the signoff blanks after Hot Functional Testing is Complete.

[3] **WHEN** random noise spikes are observed on the chart recorder, **THEN**

PERFORM Substeps 6.2[3.1] through 6.2[3.4].

[3.1] **INCREASE** chart recorder(s) speed. _____

[3.2] **DECREASE** chart recorder(s) speed after obtaining a sample of the noise spike. _____

Date _____

6.2 Collection of Noise Data During Hot Functional Testing (continued)

[3.3] **RECORD** the following on the chart paper.

A. Drawer Monitored (N31, N32, or N38) _____

B. Initial _____

C. Date _____

D. Time _____

E. RCS Temperature _____

F. Plant Equipment in Operation _____

G. Chart recorder M&TE number _____

H. Chart recorder scaling (chart speed, input span and scaling factor) _____

I. 2-PTI-92-03 _____

J. Equipment operated by: (name) _____

[3.4] **FILL** out Data Sheet 2, RANDOM NOISE DATA. _____

[4] **IF** steady state noise is observed, **THEN**

RECORD applicable information in Data Sheet 3, STEADY STATE NOISE DATA. _____

[5] **WHEN** the test is complete, **THEN**

PERFORM the following :

[5.1] **POWER** down four channel recorder. _____

[5.2] **PLACE** OUTPUT SELECTOR switch located on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR to OFF. _____

[5.3] **PLACE** 2-NI-92-131-D (2-M-13) HIGH FLUX AT SHUTDOWN switch to NORMAL. _____

[5.4] **DISCONNECT** channel 1 of the four channel recorder from the OUTPUT BNC on 2-NI-92-131-D, CH I NEUT MON SOURCE RNG DWR. _____

Date _____

6.2 Collection of Noise Data During Hot Functional Testing (continued)

[5.5] **PLACE** OUTPUT SELECTOR switch located on 2-NI-92-132-E, CH II NEUT MON SOURCE RNG DWR to OFF. _____

[5.6] **PLACE** 2-NI-92-132-E (2-M-13) HIGH FLUX AT SHUTDOWN switch to NORMAL. _____

[5.7] **DISCONNECT** channel 3 of the four channel recorder from the OUTPUT BNC on 2-NI-92-132-D, CH II NEUT MON SOURCE RNG DWR. _____

[5.8] **POWER** down two channel recorder. _____

[5.9] **DISCONNECT** channel 1 of the two channel recorder from A6-TP2(+) and A6-TP3(-) at 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY on panel 2-L-10 in the Auxiliary Control Room. _____

[5.10] **ENSURE** top cover of 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY is secured. _____

[5.11] **SLIDE** IN drawer 2-NI-92-138, APP R NEUT MON SIGNAL PROCESSOR DISPLAY, **AND**

SECURE front panel thumbscrews. _____

[5.12] **ATTACH** all chart recordings to the data package. _____

[6] **WHEN** the test is complete, **THEN**

VERIFY data collected on chart recordings and in Data Sheets 1 through 3 is NOT greater than 10 counts per second for a duration of 2 seconds or counts per second × (multiplied by) duration (seconds) NOT greater than 20 where the maximum duration is 2 seconds. **(ACC CRIT)** _____

[7] **When** the test is complete, **THEN**

PERFORM the following Substeps at 2-NM-92-138-D, OPTICAL ISOLATOR, located in the Auxiliary Building Additional Equipment Room, Column (A11W), El (737').

Date _____

6.2 Collection of Noise Data During Hot Functional Testing (continued)

A. **OPEN** the enclosure to gain access to the TEST/STATUS CONTROL switch. _____

B. **PLACE** TEST/STATUS CONTROL switch in the APPX R position. _____

_____
CV

C. **CLOSE** and **SECURE** the OPTICAL ISOLATOR enclosure. _____

[8] **When** the test is complete, **THEN**

ENSURE Data Sheets 1 through 3 have been completed and signed off. Any blanks NOT used should be N/A'd. _____

Date _____

7.0 POST PERFORMANCE ACTIVITY

NOTE

Post-performance steps may be performed in any order unless otherwise stated and should be completed as close in time as practicable to the end of the instruction performance.

[1] **NOTIFY** the Unit 2 US/SRO of the test completion and system alignment. _____

[2] **VERIFY** that Post-test calibration of the M&TE used to record quantitative acceptance criteria has been satisfactorily performed, **AND**

RECORD the results on SMP-9.0 Measuring and Test Equipment (M&TE) Log. _____

[3] **VERIFY** that Post-test calibration of permanent plant instruments used to record quantitative acceptance criteria has been satisfactorily performed, **AND**

RECORD the results on Appendix C, Permanent Plant Instrumentation Log. _____

8.0 RECORDS

A. QA Records

Completed Test Package

B. Non-QA Records

None

Appendix A
(Page 1 of 1)

TEST PROCEDURES/INSTRUCTIONS REFERENCE REVIEW

Date _____

NOTES

1) Additional copies of this table may be made as necessary.
2) Initial and date indicates review has been completed for impact.

PROCEDURE/ INSTRUCTION	REVISION/CHANGES	IMPACT Yes/No	INITIAL AND DATE. (N/A for no change)
FSAR-Amendment 109 Table 14.2-1 Sheet 60 of 89			
MN868 Rev 2			
WBN2-92-4003			
2-TSD-92-2			
2-NMD-92-131-SR			
2-NMD-92-131-WR			
2-NMD-92-132-SR			
EDCR 52421, Rev. A			

Appendix B
(Page 1 of 1)

TEMPORARY CONDITION LOG

Date _____

NOTE

These steps will be N/A'd if NO temporary condition existed. Additional copies of this table may be made as necessary.

ITEM No.	TEMPORARY CONDITION DESCRIPTION	PERFORMED		RETURNED TO NORMAL	
		Step No.	Performed By/Date CV By/Date	Step No.	Returned By/Date CV By/Date

Appendix C
(Page 1 of 1)

PERMANENT PLANT INSTRUMENTATION LOG

Date _____

INSTRUMENT OR INSTRUMENT LOOP #	CAL DUE DATE	FILLED AND VENTED[1]	PLACED IN SERVICE[1]	USED FOR QUANTITATIVE ACC CRIT		POST-TEST CAL DATE[2]	POST-TEST CALIBRATION ACCEPTABLE[2] INITIAL/DATE
		INIT/DATE	INIT/DATE	YES	NO		
2-NI-092-131-D				YES			
2-NI-092-132-E				YES			
2-NI-092-135-D					NO		
2-NI-092-136-E					NO		
2-NI-092-138				YES			

1. These items may be initialed and dated by personnel performing the task. Instrumentation not required to be filled and vented may be identified as Not Applicable (N/A).

2. May be identified as Not Applicable (N/A) if instrument was not used to verify/record quantitative acceptance criteria data.

Appendix D
(Page 1 of 1)

COMPUTER POINT VERIFICATION LOG

Date _____

COMPUTER POINT	DESCRIPTION	STATUS - IN SCAN INITIAL & DATE
N0031A	SOURCE RANGE DETECTOR 1 LOG Q	
N0032A	SOURCE RANGE DETECTOR 2 LOG Q	

Appendix E
(Page 1 of 1)

BREAKER LINEUP

Date _____

BREAKER IDENTIFICATION	BREAKER NOMENCLATURE	BREAKER LOCATION	TEST POSITION	VERIFIED BY INITIAL/DATE
2-BKR-235-1/45	NIS INST PWR CH I	120V AC VITAL INSTR POWER BOARD 2-I, 2-BD-235-1	ON	
2-BKR-235-1/46	NIS CONT PWR CH I MAIN CONTROL TO PNL 2-M-13	120V AC VITAL INSTR POWER BOARD 2-I, 2-BD-235-1	ON	
2-BKR-235-2/45	NIS INST PWR CH II	120V AC VITAL INSTR POWER BOARD 2-II, 2-BD-235-2	ON	
2-BKR-235-2/46	MCR PNL 2-M-13 NIS CONT PWR CH II	120V AC VITAL INSTR POWER BOARD 2-II, 2-BD-235-2	ON	
2-BKR-235-1/30	NEUTRON FLUX MONITOR 2-NM-92-138D	120V AC VITAL INSTR POWER BOARD 2-I, 2-BD-235-1	ON	
2-BKR-235-1/18	PNL 2-L-10 PLUGMOLD INST BUS 1 NEUTRON FLUX IND 2-NI-92-138	120V AC VITAL INSTR POWER BOARD 2-I, 2-BD-235-1	ON	

Data Sheet 1
(Page 1 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
RCP #1	Start									
RCP #1	Stop									
RCP #2	Start									
RCP #2	Stop									
RCP #3	Start									
RCP #3	Stop									
RCP #4	Start									

Data Sheet 1
(Page 2 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
RCP #4	Stop									
2A-A PZR HTR Backup Group	On									
2A-A PZR HTR Backup Group	Off									
2B-B PZR HTR Backup Group	On									
2B-B PZR HTR Backup Group	Off									

Data Sheet 1
(Page 3 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
2C PZR HTR Backup Group	On									
2C PZR HTR Backup Group	Off									
2D PZR HTR Control Group	On									
2D PZR HTR Control Group	Off									
Lower Compartment Cooling Fan 2A-A	Start									

Data Sheet 1
(Page 4 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
Lower Compartment Cooling Fan 2A-A	Stop									
Lower Compartment Cooling Fan 2B-B	Start									
Lower Compartment Cooling Fan 2B-B	Stop									
Lower Compartment Cooling Fan 2C-A	Start									

Data Sheet 1
(Page 5 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
Lower Compartment Cooling Fan 2C-A	Stop									
Lower Compartment Cooling Fan 2D-B	Start									
Lower Compartment Cooling Fan 2D-B	Stop									
Upper Compartment Cooling Fan 2A-A	Start									

Data Sheet 1
(Page 6 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
Upper Compartment Cooling Fan 2A-A	Stop									
Upper Compartment Cooling Fan 2B-B	Start									
Upper Compartment Cooling Fan 2B-B	Stop									
Upper Compartment Cooling Fan 2C-A	Start									

Data Sheet 1
(Page 7 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
Upper Compartment Cooling Fan 2C-A	Stop									
Upper Compartment Cooling Fan 2D-B	Start									
Upper Compartment Cooling Fan 2D-B	Stop									
CRDM Cooling Fan 2A-A	Start									

Data Sheet 1
(Page 8 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
CRDM Cooling Fan 2A-A	Stop									
CRDM Cooling Fan 2B-B	Start									
CRDM Cooling Fan 2B-B	Stop									
CRDM Cooling Fan 2C-A	Start									
CRDM Cooling Fan 2C-A	Stop									

Data Sheet 1
(Page 9 of 9)

NOISE DATA DURING PLANT EQUIPMENT CYCLING

Date _____

Equipment	Condition	Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Initial/Date
				Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	
CRDM Cooling Fan 2D-B	Start									
CRDM Cooling Fan 2D-B	Stop									
Rod Stepping	In									
Rod Stepping	Out									

Data Sheet 2
(Page 1 of 1)

RANDOM NOISE DATA

Date _____

NOTE

Additional copies of this table may be made as necessary. N/A rows not used.

Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Plant Equipment in Operation	Initial/Date
		Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)		

Data Sheet 3
(Page 1 of 1)

STEADY STATE NOISE DATA

Date _____

NOTE

Additional copies of this table may be made as necessary. N/A rows not used.

Time	RCS Temperature (°F)	2-NI-92-131-D		2-NI-92-132-E		2-NI-92-138		Plant Equipment in Operation	Initial/Date
		Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)	Peak Counts	Total Counts (Counts ×Time)		