+AC950170MD 2 of 12

MP 5/16/95

TECHNICAL MANUAL

MD–22150, ISSUE 1
EXTERNAL PRESSURE TESTING OF THE 60–WATT ISOTOPIC HEAT SOURCE

MOUND

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T. A. Frazier, DOE/MB
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J. M. Schneider, B–174
Drawing Control, OSW–309
Technical Manuals

CHANGES INCORPORATED/

- ☐ Replace
- ☐ Insert (New Pages)
- ☐ Remove
- ☐ Complete Reprint

This issue approved by PAC.

3/14/95
Date

All appropriate reviews by senior safety committees were conducted. This issue is authorized for use.

D. M. Gabriel 3/15/95

D. M. Gabriel, Manager HS/RTG Programs — Date

TR – TECHNICAL RESPONSIBILITY TPS6 WP – 2038 JS
E – EDITOR
QE – QUALITY ENGINEER

DISCLAIMER

PUBLICATION RECORD

ISSUE	DATE	APPLICATION	CHANGE DATE	CHANGE ACO
1	MAR 22 1995	External Pressure Testing of the 60 Watt Isotopic Heat Source	3–8–95	950026MD–II

950170MD-II
MF 5/16/95

QUALITY ENGINEER	DATE	TECHNICALLY RESPONSIBLE	DATE	MANUAL NUMBER
Keith C. Hood	3/14/95	N. D. Fröhlich/ESH	3/14/95	MD-22150

5393TR-QE (3-91)

*DENOTES CHANGE

EXTERNAL PRESSURE TESTING OF THE 60-WATT ISOTOPIC HEAT SOURCE

1. INTRODUCTION

1.1 Purpose

To establish the capability of the IHS generator system to contain its radioisotopic source under an accident scenario in which the generator is deposited in the ocean at great depth.

1.2 Applicability

This procedure is to be used on assemblies designated to demonstrate the capability of the 60-watt IHS in external pressure environments. A qualified helium leak technician (NDE) performs evaluations during post test activities. Quality Engineering (QE) is present during testing to monitor activities.

1.3 Overview

Testing involves a 60-watt IHS/Heater Head Assembly with the simulant yttria in place of the isotopic fuel. The standard length 0.094 inch diameter SST dowel pin is replaced with a longer pin to facilitate disassembly (See figure 1). The assembly is tested to 1000 atmospheres (~15,000 psi). It is then evaluated. If it shows no evidence of collapse, an additional test is conducted for information only.

1.4 Source Document

Safety Test Program Plan for the 60-Watt Isotopic Heat Source (IHS), TBE-32156-IHS-008

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Keith C Hood	3/14/95	N D. Friedrich /for	3/14/95	MD-22150

ML-5393TR-QE (3-91)

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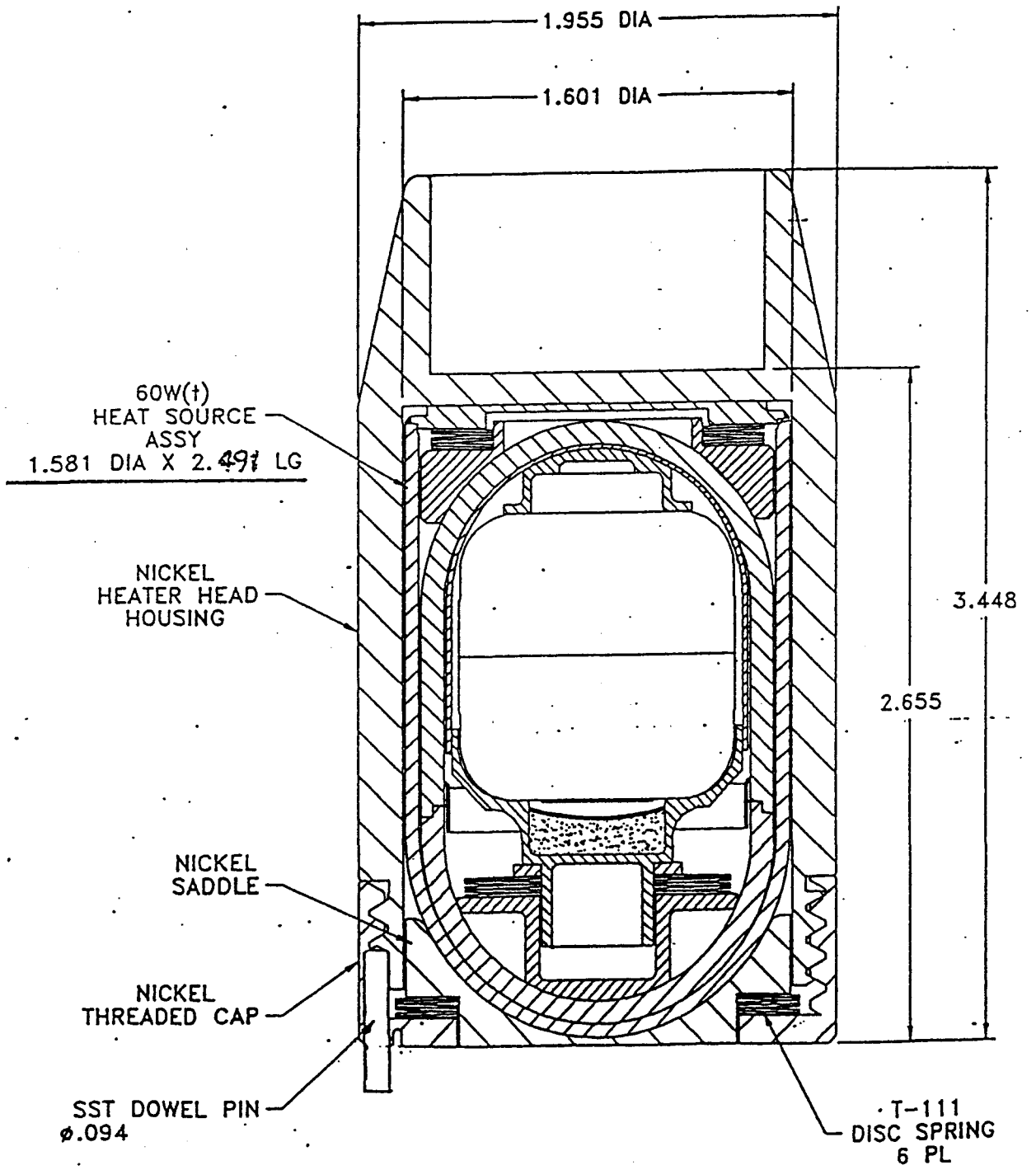

Figure 1 - IHS/Heater Head Configuration.

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+ ACO950170MD
IRP 3/14/95

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2. PREREQUISITES

2.1 Required Documents

- Data Package: 2.491 length and 1.581 diameter measurements, S/N of heater head designated for Pressure Test
- OPA800213 Operating Procedure, Isostatic Press (IP8-36-60), Bldg. 28
- P-10904 Calibration Certificate, 60 ksi pressure system
- IHS Pressure Test Data Form (see Appendix A).

2.2 Materials and Equipment

Ensure all materials are available, calibrated and in good working order. Record Mound Metrology Laboratory Control Number (MML No.) and calibration expiration date on data form for all gages and instruments.

- Kimwipes
- Microscope, 16X Stereo
- Materials and equipment called for in OPA800213.
- Metal slugs totaling approximately 11 liters to take up excess free volume.
- Chart recorder or data logger capable of generating a pressure-versus-time hardcopy graph from the 0-5 VDC output of the 60 ksi pressure system.
- Helium leak detector, portable sniffer.
- Helium leak detector, vacuum.
- Gage, indicator.

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2.3 Preparation

Note: Quality Engineering must be present during remainder of procedure.

2.3.1 Load the slugs into the chamber.

2.3.2 Set up the chart recorder to capture the test readings.

[1] Locate the recorder in the press room and hook up leads to the VDC output of the Pressure System.

[2] Record heading information on the chart paper

- IHS External pressure Test MD-22150
- S/N
- Date
- HP No.

[3] Use the calibration sheet to program the volt/psi setting of the chart recorder.

2.3.3 Place IHS/Heater Head Assembly into rubber bag.

2.3.4 Fill the rubber bag containing the assembly with tap water.

2.3.5 Clamp off bag.

2.3.6 Complete preparation as called out in section 3 of OPA800213 using these parameters.

- Set maximum desired pressure ~~at~~ greater than 15,000 psi.
- Set dwell time at maximum pressure to ~~20~~ 5 seconds.

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3. TESTING

Testing is performed at ambient temperature.

Note: Perform a run without the assembly in place to ensure proper press operation and to establish the correct scale and parameters for the chart recorder.

Run the test in the ~~/~~ automatic or manual mode as described in section 4.~~2~~ of OPA800213 with the following exceptions:

- ~~After the pump shuts off in step 4.2.3.4, do not relieve the pressure~~. Press the PUMP STOP button when the pressure reaches the 15,000 psi test pressure.
- Allow the assembly to remain under pressure for ~~an additional~~ 10 minutes.

Note: Pressure decay is allowable. But if the pressure drops below 80% of the ~~set point~~ test pressure, press the "Pump Start" to restore the pressure for the remainder of the 10 minutes.

- After 10 minutes move the large set point knob below the test pressure to activate the timer that relieves the pressure after the set dwell time expires.

4. POST TEST ACTIVITIES

4.1 Label charts

- Note any perturbations or inflection points.

4.2 Evaluate assembly

After retracting the press cover, remove the assembly from the fixture and examine for a breach or degradation. Record results and observations on the Pressure Test Data Form (Appendix A).

[1] NDE - Open bag and sniff with helium leak detector. If helium is detected stop and notify engineering of a possible test failure. Remove test assembly from bag.

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[2] If the heater head is not deformed, remove the elongated SST Dowel Pin from the heater head and slowly unscrew the nickel threaded cap. NDE - Sniff with the helium leak detector as the heater head is opened. If helium is detected stop and notify engineering of a possible test failure.

[3] Disassemble the IHS from the heater head housing and towel dry with kimwipes if it has not deformed into the housing.

Note: For proper reassembly, maintain the location and orientation information of the disc spring stacks.

[4] NDE - Vacuum leak check the IHS. If the IHS was not able to be removed from the housing, seal the IHS/heater head assembly in a bag for a minimum of 24 hours then sniff with the helium leak detector. If helium is detected, stop and notify engineering of a possible test failure.

Note: If the IHS was deformed into the housing testing is complete. Stop and record results and observations. Hold unit for post-mortem.

[5] Visually inspect at 16X. Measure and record the 2.491 length. Measure the 1.581 diameter at 3 equally spaced points near the middle of the IHS (heat source assembly) and record the maximum diameter. Record the 3 readings in the COMMENTS section. Take photographs and contour traces.

[6] Record results and observations. If heater head housing and IHS are still sound, get QE concurrence to reassemble and proceed to engineering retest.

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5. ENGINEERING INFORMATION RETEST

5.1 Preparation and Test

A hydrostatic pressure over-test is performed on units that have successfully passed the first test. Perform the preparation and test as called out in paragraphs 2.3 to 3.0, with the following exception:

[1] **Preparation**

[X] • Set maximum desired pressure ~~at~~ greater than 23,000 psi.

[2] Testing

• Press the PUMP STOP button when the pressure reaches the 23,000 psi test pressure.

5.2 Post Test Record and Evaluation

5.2.2 Perform paragraph 4.2 steps [1] through [5] except results are for information only and not a test failure.

5.2.3 Label chart for engineering information retest noting any perturbations or inflection points. Record results and observations.

5.2.4 Collect and submit quality evidence.

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APPENDIX A - IHS Pressure Test Data Form

1.	**Heading** Date: Serial Number: HP No. Operator: HP No. NDE:	**2.**	**As Received IHS Measurements** Length: Diameter:
3.	**Test Parameters @15K psi** Press Settings: MML No. & Exp.:		
4.	**Evaluation**	**Pass**	**(INITIAL) Fail**
[1]	Leak check upon bag opening: MML No. & Exp.:		
[2]	Leak check as heater head opened:		
[3]	Normal disassembly of IHS from head:		
[4]	Vacuum leak check IHS: MML No. & Exp.:		
[5]	Record length _____ and diameter _____. Initials ___ MML No. & Exp.: Visual: MML No. & Exp.:		
[6]	QC review, Initials _____ HP _____.		
	Comments and Observations:		

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5. Retest @ 23K psi. Note any changes to Settings:	Pass (INITIAL)	Fail
[1] Leak check upon bag opening: MML No. & Exp.:		
[2] Leak check as heater head opened:		
[3] Normal Disassembly of IHS from head:		
[4] Vacuum leak check IHS: MML No. & Exp.:		
[5] Record length _____ and diameter _____. Initials ____ MML No. & Exp.: Visual: MML No. & Exp.:		
[6] QC review, Initials. _____ HP _____.		
Comments and Observations:		

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ENGINEERING CHANGE NOTICE DC BL DES ___ PE ___ FB ___ * FOR DRAWING CONTROL USE ONLY (INITIAL & DATE) 1 OF 6

9-26-95

Chg No : SIER 950376 Md	Subject: ECR ___ ACO ___ FCO ___ DTER ___	SIER ✓ Will NOT be Incorporated in Dwg. or Manual
Chg Cls. : II	From : MD/Clifton W. Owens Jr. Ext. 3134	
Rev No. : 1	To : MD/A. Keller, Drawing Control	
	To : MD/ Tech. Manuals	

Distribution H70130

MD/C.D. Barklay - Bd 102
MD/D.M. Gabriel - Bd 102
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DOE/SNSP/ Lyle Rutger -
TBE/ Wayne Britt Ain
OSC/ Emil Srabek
LANL/ Liz Foltyn
PNL/ Garth Tingey

Weapon System: N/A
P/N and Product: AYD 930821 / 60 Watt IHS
/
/
/
Facility/System
Bldg. Code/Loc: /

Reason for Change: Additional removal methods of Clad Assembly from NSK2175-019 Assembly.

Reason for Revision: Add new tooling and paragraphs 6 thru 7.3.

Drawing Numbers	DWG. LOC.	NEW SUF.	NEW ISS	REPORTING/EFFECTIVITY REQUIREMENTS
				TO: TECH MANUALS
MD-70754	MD			BY: ___ DATE 9-26-95

THIS IS A RED INK STAMP
95 SEP 26 AM 8:37
RELEASED BY DRAWING CONTROL

Incorporating Instructions: Y31524 Lot S/N Date 9/25/95

SIER Application: Clad Assembly S/N 16-041

Reference and Remarks:

Engineering Coordination:

Doc	Rev	Eng/CM Approval	Quality Approval	Agcy	Date
SIER	1	Clifton W. Owens Jr. 9/21/95	H Gonzalez / K Good for	MD	9/25/95

Description of Changes: 1.0 MD-70754 (Unpublished Issue)
1.1 Add new tooling as shown on attached sheets
1.2 Add paragraphs 6. thru 6.11 as shown on attached sheets

[✓] Additional Approvals Required
[ ] No Additional Approvals Required

Org.	Signature	Date
HP		9-25-55
TRWESOC		9/25/95
SAFETY		9/25/95

Tech. Responsibility	Date
Clifton W. Owens Jr.	9/21/95
Sr. Manager	Date
D M Gabriel	9-25-95
Classification: UNCLASSIFIED	Date 9/21/95
By: Clifton W. Owens Jr.	
Title Technician, Heat Source Assembly	

CWO 4/25/95

[WARNING]
Airborne radiation is a health hazard. In the event that the Constant Air Monitor (CAM) should alarm, all individuals must don respirators and leave the area. Individuals will reenter the area only with Health Physics agreement.

1. Required Hardware, Tooling and Equipment

NSK2175-019 Assembly
Pliers, Channel Lock
Lathe, Hardinge
Tool Bit(s), Carbide tipped
Tail Stock, with live center
Tongs, Fuel Clad Transfer (SKCWO94006)
Gloves, Thermally Protective
Can, Delta Seal (AYE820526)
Tool, Deburring
Tray, Transfer (SKCWO94007)
* Ring, Ampco
* Tool, Fuel Clad Vacuum Transfer
* Chuck, 6 Jaw
* Gun, Cold Air
* Insulation Wrap

* NOTE: The sequence of operations may be changed, or operations may be performed concurrently in order to make for a more timely or logical event sequence per the discretion of Lead Engineer and by prior approval from Quality Engineering.

2. Set up Hardinge lathe located in Bldg. 38, Rm. 120.

2.1. Install a six jawed, self-centering chuck onto the spindle of the Hardinge lathe.

2.2. Using the chuck key, open the jaws of the chuck to accept the five inch mounting plate of the NSK2175-091 Assembly.

2.3. Mount a sharpened carbide tipped tool bit into the tool post of the lathe.

NOTE: A minimum of two, sharpened tool bits should be on-hand for use as backup tooling.

2.4. Set the lathe spindle rotation to the forward direction.

2.5. Set the lathe spindle speed to its lowest setting, (approximately 125 rpm).

2.6. Place the live center onto the tail stock and position leaving enough clearance to install the NSK2175-019 Assembly into the six jawed chuck.

[WARNING]
Assembly will be thermally hot and could cause personal injury. Handle using thermally protected gloves, transfer tongs or appropriate tooling.
* Denotes Revision 1 change.

CWO 9/25/95

2.7. Transfer and load the NSK2175-019 Assembly into the chuck of the lathe. Tighten the chuck to secure the assembly.

2.8. Carefully slide the tailstock toward the Heater Head Saddle and lock in place. Adjust the live center to lightly contact the Heater Head Saddle, lock live center in place.

2.9. Rotate the spindle by hand to examine for out of round condition. Loosen the chuck and readjust as necessary.

2.10. Turn power to the "ON" position and move spindle speed lever to "LOW" position thus starting spindle rotation and ensure "LOW" speed setting,"Forward" rotation and approximately 125 rpm.

2.11. Using the "Y" axis manual control, slowly move tool toward the outside diameter of the Retaining Ring near the end in contact with the live center. Carefully touch-off and set the Y" axis dial to zero and back tool out.

2.12. Using the "X" axis manual control, slowly move tool toward the face of the Retaining Ring and carefully touch-off. Set the "X" axis dial zero and back tool out.

2.13. Advance the tool in the "X" axis to a maximum of .010" beyond zero. Slowly hand feed the "Y" axis to a maximum depth of .050" then back out only the "Y" until clear of Retaining Ring.

2.14. Reposition the "X" axis to remove a maximum of .010" and cut into the Retaining Ring as defined in paragraph 2.13 above. Cautiously continue this method until the top of the Retaining Ring is separated from the Heater Head or until a total of .120" has been cut away from the side wall. At the discretion of the LE and with prior approval from QE additional machining may be performed.

2.15. Be aware of Retaining Ring top separation from the Heater Head assembly. Upon separation retract tool from work and stop spindle rotation with lever, then turn the power switch to the "OFF" position.

3. Take HP swipes of the Heater Head, Retaining Ring, the Heater Head Saddle and count. Record swipe count in in spaces provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on authorization by HP based on swipe count.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. Record the swipe count in spaces below. At the discretion of the LE and with approval from QE, the decontamination process may be repeated until the swipe count is less than 20 dpm.

* Denotes Revision 1 change

CWO 9/25/95

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

Health Physics Swipe Count Data:

NSK2175-019:	Retaining Ring:	Heater Head:	Clad Assembly:
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.

4. With the lathe power switch in the "OFF" position carefully unlock and slowly retract the tailstock from the Heater Head Saddle. Be prepared to catch the detached end of the Retaining Ring and the Heater Head Saddle.

NOTE: It may be necessary to use Channel Lock Pliers or appropriate tooling to remove the partially detached top from the Retaining Ring/Heater Head Assembly. Care should be taken to avoid the disc springs from being dislodged or damaged.

4.1. Using tweezers or appropriate tooling carefully remove the Disc Springs while maintaining orientation. Place Disc Springs aside to cool. (After springs have sufficiently cooled use a plastic tie wrap to maintain orientation).

4.2. With the Retaining Ring and Heater Head Saddle removed, visual the inside diameter of the Heater Head for sufficient clearance for the removal of the Clad Assembly.

NOTE: Using the deburring tool, manually remove burr as necessary for ease of Clad Assembly removal.

4.3. Carefully loosen the lathe chuck and remove the NSK2175-019 Assembly.

4.4. Position the NSK2175-019 horizontally and using transfer tongs SKCWO94006 or appropriate tooling remove the Clad Assembly. The NSK2175-019 may be tilted slightly to permit the Clad Assembly to slide outward allowing access with transfer tongs SKCWO94006 or appropriate tooling.

NOTE: In the event that the Clad Assembly can not be removed from the Heater Head Body by using the previous methods refer to alternate methods as described in paragraph 6 thru 6.11 of this procedure.

4.5. Place the Clad Assembly into transport tray SKCWO94007. Reposition the NSK2175-019 Assembly to vertical.

* Denotes Revision 1 change

CWO 9/25/95

4.6. Take HP swipes of the Clad Assembly and the interior and exterior surfaces of the NSK2175-019 Assembly. Count swipes and record the alpha count in spaces previously provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on HP based on swipe count.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater, decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. The decontamination process may be repeated until the swipe count is less than 20 dpm.

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

5. Place the Clad Assembly into a delta seal container and transfer to Nuclear Material Control.

* 6 . AMPCO RING APPLICATIONS

* 6.1 Place the Ampco ring onto the outer diameter of the Heater Head Body. (The Heater Head Body is welded to the NSK2175-019 Assembly).

NOTE; Verify that the lathe power switch is in the "OFF" position.

* 6.2 Using the chuck key open the jaws of the chuck to accept the Ampco ring, approximately 3.5 inches O.D.

* 6.3 Using thermally protective gloves insert the NSK2175-019 Assembly, Ampco ring first, into the six jawed chuck.

* 6.4 Position the Ampco ring near the mid point of the Heater Head Body and secure by tightening the chuck.

* 6.5 Continue to tighten the chuck against the Ampco ring applying sufficient force to reform the Heater Head Body, thus removing the out of round condition.

* 6.6 With the NSK2175-019 Assembly remaining in the chuck, remove the chuck from the lathe spindle and visual the assembly for out of round condition.

* NOTE: At the discretion of the Lead Engineer and with prior approval from Quality Engineering, paragraph 6.5 may be repeated as necessary with the Ampco ring located at various points of the Heater Head Body.

* Denotes Revision 1 change.

* 6.7 Take HP swipes. Count and record swipe count.

* HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on authorization by HP based on swipe count.

* NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. Record the swipe count. At the discretion of the Lead Engineer and with prior approval from Quality Engineering, the decontamination process may be repeated until the swipe count is less than 20 dpm.

* NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

* Health Physics Swipe Count Data:

* NSK2175-019:	Heater Head Body:	Clad Assembly:	Chuck(6 jaw)
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.

* 6.8 Transfer the lathe chuck with the NSK2175-019 Assembly to room 142 West and place in the fumehood. Position the chuck to vertical, Clad Assembly facing upward.

* NOTE: Insulation may be wrapped around the exterior of the Heater Head Body and against the ends of the Ampco ring to maintain heat.

* 6.9 Position the cold air gun to direct cold air flow onto the domed end of the Clad Assembly and allow to cool for a period of approximately 30 seconds to 5 minutes to lapse.

* 6.10 When 30 seconds to 5 minutes has lapsed (at the discretion of the LE and with prior approval from QE) attempt to remove the Clad Assembly from the Heater Head Body using the FC vacuum transfer tool.

* NOTE: Multiple removal attempts may be made using different cooling durations. Allow the Heater Head Body/Clad Assembly to thermally stabilize for approximately 10 minutes prior to recooling/removal attempts.

* 6.11 For <u>successful</u> removal of the Clad Assembly continue operations as referenced in paragraphs 4.4 thru 5.

For <u>unsuccessful</u> <u>attempts</u> of removal of the Clad Assembly reconvene MRB for the suggesting of alternate methods.

* Denote Revision <u>1</u> change.

CWO 9/14/95 10/4/95 [illegible] 10-5-95

ENGINEERING CHANGE NOTICE DC 9-18-95 DES___ PI___ FB___ FOR DRAWING CONTROL USE ONLY (INITIAL & DATE) 1 OF 4

Chg No : SIER 950376 MD
Chg Cls. : II
Rev No. : 0

Subject: ECR___ ACO___ FCO___ DTER___
From : MD/Clifton W. Owens Jr. Ext. 3134
To : MD/A. Keller, Drawing Control H00130
To MD/TECH. MANUALS

SIER ✓ Will NOT be Incorporated in Dwg. or Manual

Weapon System: N/A
P/N and Product: A/D 9308211 60 WATT IHS

Facility/System Bldg. Code/Loc: Bldg. 38 / Room 120

Reason for Change: REMOVAL of Clad ASSEMBLY FROM NSK-2175-019 ASSEMBLY

Reason for Revision:

Distribution
MD/ K.C. Good - Bd. 102
MD/ D.M. GABRIEL - Bd 102
MD/ D.C. McNEIL - Bd 102
MD/ C.D. BARKLAY - Bd 102 CDB
MD/ F.A. KOEHLER - Bd 102
MD/ N.L. KAESLER - Bd 102
~~[illegible]~~/ JACK SHOULDERS - Bd 102
DOE/MB/ T.A. FRAZIER - OSW 134
DOE/SNSP/ LYLE RUTGER
TBE/ WAYNE BRITTAIN
OSC/ EMIL SKRABEK
LANL/ LIZ FOLTYN
PNL/ GARTH TINGEY
MD/ J.R. McDOUGAL - Bd 102

Drawing Numbers	DWG. LOC.	NEW SUF	NEW ISS	REPORTING/EFFECTIVITY REQUIREMENTS
				TO: TECH MANUALS
MD-70754	MD			NONE BY: [signature] DATE 9-18-95

95 SEP 18 AM 7:47
THIS IS A RED INK STAMP

Incorporating Instructions: Y31524 Lot S/N Date 9-18-95

SIER Application: Clad ASSEMBLY S/N 16-041

Reference and Remarks:

Engineering Coordination:

Doc	Rev	Eng/CM Approval		Quality Approval	Agcy	Date
SIER	0	Clifton W. Owens Jr.	9/14/95	Keith C. Good	MD	9/14/95

Description of Changes:

1.0 MD-70754 ISSUE 1 (UNPUBLISHED ISSUE)

1.1 PERFORM OPERATION PER ATTACHED SHEETS

[✓] Additional Approvals Required
[ ] No Additional Approvals Required

Org.	Signature	Date
HP	[signature]	9/14/95
TRUESOC	[signature]	9/14/95
SAFETY	Daniel F. [signature]	14 Sep 95

Tech. Responsibility: Clifton W. Owens Jr. Date 9/14/95

Sr. Manager: D M Gabriel Date 9/14/95

Classification: UNCLASSIFIED Date 9/14/95

By: Clifton W. Owens Jr.

Title TECHNICIAN, HEAT SOURCE ASSEMBLY

SIER #950376 MD CWO 9/14/95
(Referenced against MD-70754 60 Watt IHS Assembly)

[WARNING]
Airborne radiation is a health hazard. In the event that the Constant Air Monitor (CAM) should alarm, all individuals must don respirators and leave the area. Individuals will reenter the area only with Health Physics agreement.

1. Required Hardware, Tooling and Equipment

NSK2175-019 Assembly
Pliers, Channel Lock
Lathe, Hardinge
Tool Bit(s), Carbide tipped
Tail Stock, with live center
Tongs, Fuel Clad Transfer (SKCWO94006)
Gloves, Thermally Protective
Can, Delta Seal (AYE820526)
Tool, Deburring
Tray, Transfer (SKCWO94007)

2. Set up Hardinge lathe located in Bldg. 38, Rm. 120.

2.1. Install a six jawed, self-centering chuck onto the spindle of the Hardinge lathe.

2.2. Using the chuck key, open the jaws of the chuck to accept the five inch mounting plate of the NSK2175-091 Assembly.

2.3. Mount a sharpened carbide tipped tool bit into the tool post of the lathe.

NOTE: A minimum of two, sharpened tool bits should be on-hand for use as backup tooling.

2.4. Set the lathe spindle rotation to the forward direction.

2.5. Set the lathe spindle speed to its lowest setting, (approximately 125 rpm).

2.6. Place the live center onto the tail stock and position leaving enough clearance to install the NSK2175-019 Assembly into the six jawed chuck.

[WARNING]
Assembly will be thermally hot and could cause personal injury. Handle using thermally protected gloves, transfer tongs or appropriate tooling.

2.7. Transfer and load the NSK2175-019 Assembly into the chuck of the lathe. Tighten the chuck to secure the assembly.

2.8. Carefully slide the tailstock toward the Heater Head Saddle and lock in place. Adjust the live center to lightly contact the Heater Head Saddle, lock live center in place.

2.9. Rotate the spindle by hand to examine for out of round condition. Loosen the chuck and readjust as necessary.

2.10. Turn power to the "ON" position and move spindle speed lever to "LOW" position thus starting spindle rotation and ensure "LOW" speed setting,"Forward" rotation and approximately 125 rpm.

2.11. Using the "Y" axis manual control, slowly move tool toward the outside diameter of the Retaining Ring near the end in contact with the live center. Carefully touch-off and set the Y" axis dial to zero and back tool out.

2.12. Using the "X" axis manual control, slowly move tool toward the face of the Retaining Ring and carefully touch-off. Set the "X" axis dial zero and back tool out.

2.13. Advance the tool in the "X" axis to a maximum of .010" beyond zero. Slowly hand feed the "Y" axis to a maximum depth of .050" then back out only the "Y" until clear of Retaining Ring.

2.14. Reposition the "X" axis to remove a maximum of .010" and cut into the Retaining Ring as defined in paragraph 2.13 above. Cautiously continue this method until the top of the Retaining Ring is separated from the Heater Head or until a total of .120" has been cut away from the side wall. At the discretion of the LE and with prior approval from QE additional machining may be performed.

2.15. Be aware of Retaining Ring top separation from the Heater Head assembly. Upon separation retract tool from work and stop spindle rotation with lever, then turn the power switch to the "OFF" position.

3. Take HP swipes of the Heater Head, Retaining Ring, the Heater Head Saddle and count. Record swipe count in in spaces provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on authorization by HP based on swipe count.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. Record the swipe count in spaces below. At the discretion of the LE and with approval from QE, the decontamination process may be repeated until the swipe count is less than 20 dpm.

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

Health Physics Swipe Count Data:

NSK2175-019:	Retaining Ring:	Heater Head:	Clad Assembly:
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.

4. With the lathe power switch in the "OFF" position carefully unlock and slowly retract the tailstock from the Heater Head Saddle. Be prepared to catch the detached end of the Retaining Ring and the Heater Head Saddle.

NOTE: It maybe necessary to use Channel Lock Pliers or appropriate tooling to remove the partially detached top from the Retaining Ring/Heater Head Assembly. Care should be taken to avoid the disc springs from being dislodged or damaged.

4.1. Using tweezers or appropriate tooling carefully remove the Disc Springs while maintaining orientation. Place Disc Springs aside to cool. (After springs have sufficiently cooled use a plastic tie wrap to maintain orientation).

4.2. With the Retaining Ring and Heater Head Saddle removed, visual the inside diameter of the Heater Head for sufficient clearance for the removal of the Clad Assembly.

NOTE: Using the deburring tool, manually remove burr as necessary for ease of Clad Assembly removal.

4.3. Carefully loosen the lathe chuck and remove the NSK2175-019 Assembly.

4.3. Position the NSK2175-019 horizontally and using transfer tongs SKCWO94006 or appropriate tooling remove the Clad Assembly. The NSK2175-019 may be tilted slightly to permit the Clad Assembly to slide outward allowing access with transfer tongs SKCWO94006 or appropriate tooling.

4.4. Place the Clad Assembly into transport tray SKCWO94007. Reposition the NSK2175-019 Assembly to vertical.

4.5. Take HP swipes of the Clad Assembly and the interior and exterior surfaces of the NSK2175-019 Assembly. Count swipes and record the alpha count in spaces previously provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on HP based on swipe count.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater, decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. The decontamination process may be repeated until the swipe count is less than 20 dpm.

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

5. Place the Clad Assembly into a delta seal container and transfer to Nuclear Material Control.

RWP 9-95 10-19-95 10/16/95

ENGINEERING CHANGE NOTICE DC DES PI FB * FOR DRAWING CONTROL USE ONLY (INITIAL & DATE) 1 OF 10

10-11-95

Chg No : SIER 950376 MD
Chg Cls. : II
Rev No. : 2

Subject: ECR___ ACO___ FCO___ DTER___
From : MD/Clifton W. Owens Jr. Ext. 3134
To : MD/A. Keller, Drawing Control
To : MD/ TECH. MANUALS H70130 THRU 10/18/95

SIER ✓ Will NOT be Incorporated in Dwg. or Manual

Weapon System: N/A
P/N and Product: AYD 930821 1 60 WATT IHS
1
1
1
Facility/System Bldg 38 / Room 120
Bldg. Code/Loc: 1

Reason for Change: Removal of Clad Assembly From NSK 2175-019 Assembly

Reason for Revision: MRB suggested alternate methods.

Distribution
Md/K.C. Good - Bd 102
Md/D.M. Gabriel - Bd 102
Md/D.C. McNeil - Bd 102
Md/C.D. Barklay - Bd 102 - CDB
Md/F.A. Koehler - Bd 102
Md/N.L. Kaesler - Bd 102
Jack Shoulders - Bd 102
DOE/MB/T.A. Frazier - OSW 134
DOE/SNSP/Lyle Rutger
TBE/Wayne Britain
OSC/Emil Skrabek
LANL/Liz Foltyn
PNL/Garth Tingey
Md/J.R. McDougal - Bd 102

Drawing Numbers	DWG. LOC.	NEW SUF	NEW ISS	REPORTING/EFFECTIVITY REQUIREMENTS TO: TECH MANUALS
MD 70754	MD			NONE BY: DATE 10-11-95

Incorporating Instructions: Y 31524 Lot S/N Date

SIER Application: Clad Assembly S/N 16-041 10/10/95

Reference and Remarks:

Engineering Coordination:

Doc	Rev	Eng/CM Approval	Quality Approval	Agcy	Date
SIER	2	Clifton W. Owens Jr. 9/14/95	H Snyder / for KL Cook	MD	10/10/95

Description of Changes: 1.0 MD-70754 ISSUE 1 (Unpublished Issue)
1.1 PERFORM OPERATIONS PER ATTACHED Sheets.

RELEASED DRAWING CONTROL 1995 OCT 11 AM 6:57 THIS IS A RED INK STAMP

[✓] Additional Approvals Required
[ ] No Additional Approvals Required

Org.	Signature	Date
HP		10-10-95
TEMSOC	Mel Williams	10/10/95
SAFETY	John Schneider	10/11/95

Tech. Responsibility Clifton W. Owens Jr. Date 10/10/95

Sr. Manager D.M. Gabriel Date 10/10/95

Classification: UNCLASSIFIED Date 10/10/95

By: Clifton W. Owens Jr.

Title TECHNICIAN, HEAT SOURCE ASSY.

[WARNING]
Airborne radiation is a health hazard. In the event that the Constant Air Monitor (CAM) should alarm, all individuals must don respirators and leave the area. Individuals will reenter the area only with Health Physics agreement.

1. Required Hardware, Tooling and Equipment
NSK2175-019 Assembly
Pliers, Channel Lock
Lathe, Hardinge
Tool Bit(s), Carbide tipped
Tail Stock, with live center
Tongs, Fuel Clad Transfer (SKCWO94006)
Gloves, Thermally Protective
Can, Delta Seal (AYE820526)
Tool, Deburring
Tray, Transfer (SKCWO94007)
* Ring, Ampco
* Tool, Fuel Clad Vacuum Transfer
* Chuck, 6 Jaw
* Gun, Cold Air
* Insulation Wrap
** Indicator, Dial
** Calipers,Dial
** Tool Bits, High Speed Steel
** Pliers, Needle Nose
** Drill Blank, 1/4 inch

* NOTE:The sequence of operations may be changed, or operations may be performed concurrently in order to make for a more timely or logical event sequence per the discretion of Lead Engineer and by prior approval from Quality Engineering.

2. Set up Hardinge lathe located in Bldg. 38, Rm. 120.

2.1. Install a six jawed, self-centering chuck onto the spindle of the Hardinge lathe.

2.2. Using the chuck key, open the jaws of the chuck to accept the five inch mounting plate of the NSK2175-091 Assembly.

2.3. Mount a sharpened carbide tipped tool bit into the tool post of the lathe.

NOTE: A minimum of two, sharpened tool bits should be on-hand for use as backup tooling.

2.4. Set the lathe spindle rotation to the forward direction.

2.5. Set the lathe spindle speed to its lowest setting, (approximately 125 rpm).

2.6. Place the live center onto the tail stock and position leaving enough clearance to install the NSK2175-019 Assembly into the six jawed chuck.

[WARNING]
Assembly will be thermally hot and could cause personal injury. Handle using thermally protected gloves, transfer tongs or appropriate tooling.

2.7. Transfer and load the NSK2175-019 Assembly into the chuck of the lathe. Tighten the chuck to secure the assembly.

2.8. Carefully slide the tailstock toward the Heater Head Saddle and lock in place. Adjust the live center to lightly contact the Heater Head Saddle, lock live center in place.

2.9. Rotate the spindle by hand to examine for out of round condition. Loosen the chuck and readjust as necessary.

2.10. Turn power to the "ON" position and move spindle speed lever to "LOW" position thus starting spindle rotation and ensure "LOW" speed setting,"Forward" rotation and approximately 125 rpm.

2.11. Using the "Y" axis manual control, slowly move tool toward the outside diameter of the Retaining Ring near the end in contact with the live center. Carefully touch-off and set the Y" axis dial to zero and back tool out.

2.12. Using the "X" axis manual control, slowly move tool toward the face of the Retaining Ring and carefully touch-off. Set the "X" axis dial zero and back tool out.

2.13. Advance the tool in the "X" axis to a maximum of .010" beyond zero. Slowly hand feed the "Y" axis to a maximum depth of .050" then back out only the "Y" until clear of Retaining Ring.

2.14. Reposition the "X" axis to remove a maximum of .010" and cut into the Retaining Ring as defined in paragraph 2.13 above. Cautiously continue this method until the top of the Retaining Ring is separated from the Heater Head or until a total of .120" has been cut away from the side wall. At the discretion of the LE and with prior approval from QE additional machining may be performed.

2.15. Be aware of Retaining Ring top separation from the Heater Head assembly. Upon separation retract tool from work and stop spindle rotation with lever, then turn the power switch to the "OFF" position.

3. Take HP swipes of the Heater Head, Retaining Ring, the Heater Head Saddle and count. Record swipe count in in spaces provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on authorization by HP based on swipe count.

* Denotes Revision 1 change
** Denotes Revision 2 change.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. Record the swipe count in spaces below. At the discretion of the LE and with approval from QE, the decontamination process may be repeated until the swipe count is less than 20 dpm.

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

Health Physics Swipe Count Data:

NSK2175-019:	Retaining Ring:	Heater Head:	Clad Assembly:
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.
_____dpm.	_____dpm.	_____dpm.	_____dpm.

4. With the lathe power switch in the "OFF" position carefully unlock and slowly retract the tailstock from the Heater Head Saddle. Be prepared to catch the detached end of the Retaining Ring and the Heater Head Saddle.

NOTE: It may be necessary to use Channel Lock Pliers or appropriate tooling to remove the partially detached top from the Retaining Ring/Heater Head Assembly. Care should be taken to avoid the disc springs from being dislodged or damaged.

4.1. Using tweezers or appropriate tooling carefully remove the Disc Springs while maintaining orientation. Place Disc Springs aside to cool. (After springs have sufficiently cooled use a plastic tie wrap to maintain orientation).

4.2. With the Retaining Ring and Heater Head Saddle removed, visual the inside diameter of the Heater Head for sufficient clearance for the removal of the Clad Assembly.

NOTE: Using the deburring tool, manually remove burr as necessary for ease of Clad Assembly removal.

4.3. Carefully loosen the lathe chuck and remove the NSK2175-019 Assembly.

4.4. Position the NSK2175-019 horizontally and using transfer tongs SKCWO94006 or appropriate tooling remove the Clad Assembly. The NSK2175-019 may be tilted slightly to permit the Clad Assembly to slide outward allowing access with transfer tongs SKCWO94006 or appropriate tooling.

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NOTE: In the event that the Clad Assembly can not be removed from the Heater Head Body by using the previous methods refer to alternate methods as described in paragraph 6 thru 6.11 of this procedure.

4.5. Place the Clad Assembly into transport tray SKCWO94007. Reposition the NSK2175-019 Assembly to vertical.

4.6. Take HP swipes of the Clad Assembly and the interior and exterior surfaces of the NSK2175-019 Assembly. Count swipes and record the alpha count in spaces previously provided.

HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on HP based on swipe count.

NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater, decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. The decontamination process may be repeated until the swipe count is less than 20 dpm.

NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

5. Place the Clad Assembly into a delta seal container and transfer to Nuclear Material Control.

* 6 . AMPCO RING APPLICATIONS

* 6.1 Place the Ampco ring onto the outer diameter of the Heater Head Body. (The Heater Head Body is welded to the NSK2175-019 Assembly).

NOTE; Verify that the lathe power switch is in the "OFF" position.

* 6.2 Using the chuck key open the jaws of the chuck to accept the Ampco ring, approximately 3.5 inches O.D.

* 6.3 Using thermally protective gloves insert the NSK2175-019 Assembly, Ampco ring first, into the six jawed chuck.

* 6.4 Position the Ampco ring near the mid point of the Heater Head Body and secure by tightening the chuck.

* 6.5 Continue to tighten the chuck against the Ampco ring applying sufficient force to reform the Heater Head Body, thus removing the out of round condition.

* 6.6 With the NSK2175-019 Assembly remaining in the chuck, remove the chuck from the lathe spindle and visual the assembly for out of round condition.

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* NOTE: At the discretion of the Lead Engineer and with prior approval from Quality Engineering, paragraph 6.5 may be repeated as necessary with the Ampco ring located at various points of the Heater Head Body.

* 6.7 Take HP swipes. Count and record swipe count.

* HOLD: Operations shall remain on hold during the evaluation of HP swipes. Continuation of the process is dependent on authorization by HP based on swipe count.

* NOTE: Operations may proceed if the swipe count is less than 20 dpm. If the alpha count is 20 dpm or greater decontaminate by wiping with a damp cloth. Swipe and count after decontamination is completed. Record the swipe count. At the discretion of the Lead Engineer and with prior approval from Quality Engineering, the decontamination process may be repeated until the swipe count is less than 20 dpm.

* NOTE: MRB will determine disposition of units that continue to have swipe counts of 20 dpm or greater after the decontamination process has been deemed unsuccessful

* Health Physics Swipe Count Data:

* NSK2175-019:	Heater Head Body:	Clad Assembly:	Chuck(6 jaw)
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.
_____ dpm.	_____ dpm.	_____ dpm.	_____ dpm.

* 6.8 Transfer the lathe chuck with the NSK2175-019 Assembly to room 142 West and place in the fumehood. Position the chuck to vertical, Clad Assembly facing upward.

* NOTE: Insulation may be wrapped around the exterior of the Heater Head Body and against the ends of the Ampco ring to maintain heat.

* 6.9 Position the cold air gun to direct cold air flow onto the domed end of the Clad Assembly and allow to cool for a period of approximately 30 seconds to 5 minutes to lapse.

* 6.10 When 30 seconds to 5 minutes has lapsed (at the discretion of the LE and with prior approval from QE) attempt to remove the Clad Assembly from the Heater Head Body using the FC vacuum transfer tool.

* NOTE: Multiple removal attempts may be made using different cooling durations. Allow the Heater Head Body/Clad Assembly to thermally stabilize for approximately 10 minutes prior to recooling/removal attempts.

* 6.11 For successful removal of the Clad Assembly continue operations as referenced in paragraphs 4.4 thru 5.

For unsuccessful attempts of removal of the Clad Assembly reconvene MRB for the suggesting of alternate methods.

** 7. Machine open Vibration Fixture (NSK2175-019) Using Lathe: in Bldg 38, Room 120.

**7.1. Open the shielding (top and front) of the Hardinge lathe and set up the lathe and necessary tooling.

**7.2 Verify that the lathe power switch is in the "OFF" position.

**7.3 Install the six jawed, self centering chuck onto the lathe spindle.

**7.4 Using the chuck key, open the jaws of the chuck to accept the five inch diameter mounting plate of the NSK2175-019 Assembly.

**7.5 Mount a sharpened, carbide tipped tool bit into the tool post of the lathe.

** NOTE: A minimum of five, sharpened tool bits should be on hand for use as backup tooling.

**7.6 Turn the lathe power switch to the "ON" position and set the lathe spindle rotation to the forward direction. With the power switch remaining in the "ON" position set the spindle speed to its lowest setting, (approximately 125 rpm).

**7.7 Turn the tool power feed to the "ON" position.

**7.8 Turn the tool power feed and lathe power switches to the "OFF" position.

**7.9 Place the live center into the tail stock and position leaving enough clearance to install the NSK2175-019 Assembly into the six jawed chuck.

** [WARNING]
Assembly will be thermally hot and could cause personal injury. Handle using thermally protected gloves, transfer tongs or appropriate tooling.

**7.10 Load the NSK2175-019 Assembly into the lathe chuck. Tighten the chuck to secure the assembly.

* Denotes Revision 1 change.
** Denotes Revision 2 change.

**7.11 Using a dial indicator, indicate the base of the NSK2175-019 Assembly and the radius end of the Clad Assembly to inspect for run-out. Loosen the chuck and readjust as necessary.

** NOTE: At the operator's discretion Step 7.11 may be performed as often as desired to adjust for run-out.

** 7.12 Mount a 1/4" drill blank into the tool post and position the tool post to an angle of approximately 5 to 10 degrees. Manually move the drill blank to make contact with the inside diameter of the Heater Head Body, using extreme caution not to contact the Clad Assembly. Manually rotate the lathe spindle while continuing to move the drill blank against the inside diameter of the Heater Head Body until a minimum of 1.600" has been reached.

** 7.13 Beginning near the base plate measure the outer diameter of the Heater Head Body. Continue measuring outward,(moving away from the base plate) to locate an outer diameter measurement of less than or equal to 1.950". Using a permanent marker, mark the circumference of the Heater Head Body at this point for use as a reference.

** 7.14 Carefully slide the tailstock toward the Heater Head Body and lock in place. Using tweezers or appropriate tooling replace the Heater Head Saddle, curved end onto the domed end of the Clad Assembly. Ensure that the saddle is seated against the Clad Assembly. Adjust the live center to lightly contact the Heater Head Saddle and lock the live center in place.

** 7.15 Turn the power switch to the "ON" position and move the spindle speed lever to the "LOW" position thus starting spindle rotation and ensure "LOW" speed setting, "FORWARD" rotation and approximately 125 rpm.

** 7.16 Move the cutting tool to make contact with the outside diameter of the Heater Head Body immediately left of the reference mark. Carefully touch-off and set the "Y" axis dial to zero and back tool out.

** 7.17 Move the cutting tool to make contact with the outer diameter of the Heater Head Body near the end in contact with the live center. Touch off on high spot then move the "X" axis away from the part.

** 7.18 Close the shielding (top and front) of the lathe.

** 7.19 In the "Y" axis feed the cutting tool in a maximum of .020" (equals .010" per side wall) per cut. Using the tool power feed carefully turn the diameter to the reference (circumference) mark on the Heater Head Body. Continue machining a maximum of .020" per pass until a minimum wall thickness of .025" remains.

** 7.20 Move the cutting tool away from the part and turn the lathe and tool power feed switches to the "OFF" position.

* Denotes Revision 1 change.
** Denotes Revision 2 change.

** 7.21 Carefully slide the tailstock/live center from the NSK2175-019 Assembly. Remove the Heater Head Saddle and place aside. Using the FC vacuum transfer tool and/or appropriate tooling, attempt to remove the Clad Assembly.

** 7.22 For successful removal of the Clad Assembly continue as referenced in paragraphs 4.5 thru 5. of this procedure.

For unsuccessful removal attempts of the Clad Assembly continue operations beginning with paragraph 7.23.

** 7.23 Replace the Heater Head Saddle and reposition the tailstock/live center and lock in place.

** 7.24 Using a sharp carbide tipped tool bit continue to machine the outer diameter removing a maximum of .020" to achieve a minimum of .005 " wall thickness remaining.

** 7.25 Move the cutting tool away from the part and turn the lathe power switch to the "OFF" position.

** 7.26 Remove the carbide tipped tool bit from the tool post and replace using a high speed steel tool bit.

** 7.27 With the lathe power switch in the "OFF" position manually move the tool bit to touch the machined diameter of the Heater Head Body. Manually move the tool in the "X" axis to make a score mark the length of the machined area. Back the tool bit away and repeat if necessary.

** 7.28 Manually rotate the lathe spindle approximately 1/4" and repeat paragraph 7.27.

** 7.29 Manually rotate the lathe spindle approximately 180 degrees and repeat paragraphs 7.27 and 7.28.

** 7.30 Using needle nose pliers or appropriate tooling peel away the approximate 1/4" prescored strip of material.

** 7.31 Repeat paragraph 7.21 and attempt to remove the Clad Assembly.

** 7.32 For successful removal of the Clad Assembly continue as referenced in paragraphs 4.5 thru 5. of this procedure.

For unsuccessful removal of the Clad Assembly continue operations beginning with paragraph 7.33 of this procedure.

**7.33 Repeat paragraphs 7.13 thru 7.31 and machine away the side wall of the Heater Head Body beginning at the reference mark and continuing to a point as near to the base of the NSK2175-019 Assembly as possible.

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(Referenced against MD-70754,60 Watt IHS Assembly)

**7.34 Upon removal of the Clad Assembly refer to paragraphs 4.5 thru 5 of this procedure.

** Denotes Revision 1 change.
** Denotes Revision 2 change.