MNRS KEY CONTROL/BAY ACCESS PROCEDURES

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REVISION RECORD

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MNRS KEY CONTROL/BAY ACCESS PROCEDURES

1.0 Introduction

This document describes various procedures to be followed for controlling keys and access to the Maneuverable Neutron Radiography System (MNRS).

Section 2.0 addresses the personnel that are authorized to operate the MNRS.

Section 3.0 identifies the keys to be controlled for MNRS and procedures for controlling these keys.

Section 4.0 discusses the procedures for personnel access to the MNRS bay.

2.0 Authorized Personnel

The personnel (robotics operator/radiographer) authorized to check out MNRS keys and operate the MNRS shall be posted in the MNRS control room. Authorization shall be IAW the TI Radiation Safety Program, Radiographer Certification and\or Robotics Operator Qualification.

Robotics operators will be qualified as either level I or level II for access to production mode or teaching and production modes, respectively.

The Health Physics Section (TIRH) shall control access to the MNRS bay. The TIRH personnel shall be familiar with the MNRS [illegible] system.

3.0 Key Control

3.1 The MNRS [illegible] shall control and [illegible] the MNRS control room door code to authorized personnel, as posted in the MNRS control room.

NOTE: As a backup, the MNRS control room door can also be opened using a DB200 key. DB200 keys are controlled by TIRH, TIRO, and TIR.

3.2 The following keys shall be left in control console position.

T251	1	POP CIMROC Front Panel On/Off (control console)
T251	1	PUP CIMROC Front Panel On/Off (controller cabinet)
602	1	RPS System

3.2 TIRH shall control the following keys:

KEY NUMBER	QTY	KEY DESCRIPTION
72409	2	Source Carrier Transfer Rod Padlock (POP)
72408	2	Rotator Rod Padlock (POP)
3220	2	Storage Tube Padlock (POP)
3220	2	Storage Tube Padlock (PUP)
Y101	1	Sliding Personnel Door Power Control
Y102	1	Sliding Personnel Door Power Control
DB200	2	Lower Control Room Door Bay Entry Personnel Door Maze Personnel Door (Emergency Exit) MNRS Control Room Door (Backup to Cypherlock)

NOTE: 1. Keys Y103 - Y105 (power sliding personnel door) are controled by TIR/TIRO.

2. TIRO and TIR each have one (1) DB200 key.

3.2.1 The following key control procedures shall be followed when operating the MNRS:

NOTE: The term operator refers to: (1) radiographer in charge (RIC) when running production and/or the neutron systems; (2) robotics operator (level II) when running the robotic systems and the neutron sources are not being utilized (i.e. locked in storage positions).

3.3 First shift of the day:

1. Security system to MNRS must be disarmed by authorized personnel.

2. Bay to be opened by TIRH to allow access.

3.4 Completion of day (no follow on shift):

1. Operator (RIC) shall contact the N-ray Foreman/Alternate.

2. The operator shall conduct a visual account of each keybox's six keys (total of 18 keybox keys).

3. Security system is armed by authorized personnel.

3.5 Teaching or robot maintenance:

The operator performing these tasks does not have to be a radiographer, if neutron sources are not being utilized (sources locked in storage position).

1. The N-ray Foreman/Alternate and operator shall follow Steps 1-2 in Paragraph 3.3.

2. The operator (level II robotics operator) may have to sign out those keys required to enter the bay, this may include the DB200, & Y102.

3. Verify, via CCTV on west side of bunker, that the transfer yoke door (pop bunker) is lowered to the full down position. If not lowered and source carrier is in stowed position, contact TIRH to lower the door.

5. After completion of the assigned tasks, operator and N-ray Foreman/Alternate shall follow Steps 1 - 3 in Paragraph 3.4.

3.6 Neutron system maintenance:

Maintenance of the neutron systems requires a radiographer and TIRH approval, if the neutron sources are to be utilized. Follow the steps outlined in Paragraph 3.3 and 3.4 when performing maintenance on the neutron systems.

4.0 Bay Access Procedures

Access to the MNRS bay, controlled by TIRH, is through the powered sliding door. There are two modes of access, one is when the sources are not in the storage tubes and ready for use (USE CONDITION), the other is when the sources are in the storage tubes (STORAGE CONDITION). TIRH will restrict access (as required) during USE CONDITION. TIRH and/or the operator (radiographer in charge or robotic operator) shall be observant of who enters the bay and if they are following proper procedures during STORAGE CONDITION. TIRH shall be notified prior to opening the large hangar doors.

CAUTION: **TIRH must at the beginning of each day assure safe radiation levels exist in the MNRS bay.**

4.1 USE Condition Sources in Storage Carrier.

The following procedures/steps shall be followed prior to entering the MNRS Bay while system is in 'USE' condition.

1. The operator shall verify from Status Display on Control Console, Radiation Area Monitors and CCTV that Moderator Collimator Shield (MCS) for Programmable Overhead Positioner (POP) is stowed in POP Bunker.

2. If the POP system is not stowed in bunker follow production program for proper stowage per MNRS-0005-DOC.

3. The operator shall verify from Status Display on Control Console, Radiation Area Monitors and CCTV that source carrier for Programmable Underside Positioner (PUP) is stowed in PUP Bunker.

4. If the PUP system source carrier is not stowed in PUP Bunker, operator to follow MNRS-0008-DOC to properly stow the source carrier.

5. The operator shall verify from Status Display on Control Console and CCTV, that PUP Bunker door is CLOSED.

6. Prior to entering the bay, operator to verify that the RPS key is in off position (full CCW).

7. TIRH shall control access to the MNRS bay and will open the personnel door and the powered sliding door.

   CAUTION: Whenever the MCS for the overhead system is not in the bunker and the loaded source carrier is stored in the bunker, the transfer yoke door must be closed.

8. Each individual entering the MNRS bay shall have appropriate dosimetry and remove a key from the keybox (KB-1 is located inside the bay next to the sliding door).

9. If more than six (6) personnel enter the bay and all six (6) KB-1 keys have been removed, then keys from the other two keyboxes shall be pulled.

10. If all 18 keybox keys are removed, then no other individuals shall be allowed in the bay.

11. Upon leaving the bay each person must return the key to the keybox.

12. Upon exiting the bay, each person shall use and be cleared by the Hand and Foot monitor. If person does not clear, contact TIRH.

13. TIRH to secure the bay by closing and locking power off to sliding door and closing the personnel door.

14. TIRH may leave DB200 and Y102 keys with the RIC or Robot operator (level II). When bay is in A or B condition of PAR.4.3 this doc.

4.2 Storage Condition (Sources stored in Storage Tube Position)

The following procedures/steps shall be followed prior to entering the MNRS Bay while system is in 'STORAGE' condition.

1. TIRH to verify radiation levels in bay are < 2 mrem/hr.

2. TIRH to unlock the personnel door and open the powered sliding door (if closed).

3. TIRH may leave DB200 AND Y102 keys with the RIC or operator responsible to close the door before leaving at the end of the day.

4. TIRH does not control individual access to the bay while in 'STORAGE' condition.

5. Each individual entering the MNRS bay shall have appropriate dosimetry and remove a key from the keybox (KB-1 is located inside the bay next to the sliding door).

6. If more than six (6) personnel enter the bay and all six (6) KB-1 keys have been removed, then keys from the other two keyboxes shall be pulled.

7. If all 18 keybox keys are removed, then no other individuals shall be allowed in the bay.

8. Upon leaving the bay each person must return the key to the keybox.

9. Upon exiting the bay, each person shall use and be cleared by the Hand and Foot monitor. If person does not clear, contact TIRH.

4.3 TIRH shall post the entrance to the MNRS Bay, denoting the current condition of the Bay.

A) Restricted Area - Sources Stored in Storage Tube Position (STORAGE CONDITION).

B) Radiation Area - Sources in Source Carrier, Source Carrier Stowed in Bunker (USE CONDITION).

C) High Radiation Area - Sources in Use, Radiography in Process (USE CONDITION).

NOTE: TIRH may leave DB200 & Y102 keys with the RIC or Robot Operator (level II) when the bay is in either A or B condition PAR 4.3 . ONLY. Not C condition.

NOTE: Specific areas within the mnrs bay may be 'HIGH RADIATION AREAS' even though the bay is posted as 'RESTRICTED' or 'RADIATION AREA'. These shall be marked and controlled as is appropriate.

BLDG 248 TIRH CHECKLIST

Month: J F M A M J J A S O N D 1992 / 93 / 94

DAILY'S

Check Security Alarm Status																											
Check Rad. Postings																											
Response Check Radiacs																											
PUP Door Locked																											
Check HFMs for Operation																											
PUP/POP Flux Monitor Check																											
Review PD Log																											
MNRS RPS Check Complete																											
PUP Door Locked																											
POP Source Carrier Locked																											
Roof Hatch Secured																											
Entrance Swipe Survey Performed																											
Meters Off/Stored																											
Bay Secured																											
MNRS Keys Secured																											
POP Sources Used ? Y/N																											
PUP Sources Used ? Y/N																											

WEEKLY'S

Response Check RAMs																											
Darkroom Survey																											
MNRS Radiation Survey																											
MNRS Contamination Survey																											
Source Check Emergency Meter																											
Source Check HFM																											

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MNRS OVERHEAD SYSTEM
SOURCE CARRIER TRANSFER PROCEDURE
BETWEEN BUNKER STORAGE POSITION AND MCS

Document Number: MNRS-0011-DOC

Revision: 00 CN-1 ~~CN-1~~

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REVISION RECORD

Revision #	Description	Date	
00 CN-1	Original Issue	18 JULY 89	CN-1

GUIDANCE FOR HANDLING RADIOACTIVE SOURCES

In any operation involving the manipulation of the neutron sources, pre-planning and set-up operations are most important. If at all possible, trial runs with dummy sources or simulated operations without a dummy source should be done. It is important to be assured that the operation you want to perform is as efficient as possible and that what you set out to accomplish is what you are set-up to do. It is important also to maintain good records of the source location or position so that the source you intend to transfer is the one you actually transfer. This is especially true when the sources are in the secondary storage tubes within the bunkers since the normal storage condition has the sources stacked atop one another.

You must continually remind yourself that you are dealing with radioactive sources which will at times be out of a shielded configuration and will present a hazard to you and other personnel in the area. For this reason, it is mandatory that the area of interest be initially surveyed to determine the current radiation levels and predict the radiation levels that may be encountered during the operation by operating personnel and/or other, non-involved, personnel. If required, additional temporary shielding may be installed to lower the dose received during the transfer. During all capsule transfer operations the source capsule is confined within a tube located between shielded termini. This assures that the capsule will not be lost during the transfer and that the capsule can always be placed in one of the two termini if for some reason the transfer cannot be effected. For better tracking of the source, it is recommended that audible radiation monitors be located near the exit point of each terminus. This will provide immediate notification that the source is in an unshielded condition.

MNRS OVERHEAD SYSTEM
SOURCE CARRIER TRANSFER PROCEDURE
BETWEEN BUNKER STORAGE POSITION AND MCS

This procedure describes the transfer of 252-Cf source carrier from the Programmable Overhead Positioner (POP) bunker storage position to the POP Moderator Collimator Shield (MCS), and the return of the source carrier to the (POP) bunker storage position.

1.0 Prerequisites

The following steps shall be performed/verified prior to transferring source carrier in Sections 2.0 and 3.0.

1. No more than four people shall participate in actual source carrier transfers. The transfers shall be performed by qualified transfer operators under the supervision of a Health Physicist (~~MNRS~~ TIRH). CN-1

2. Movement of the source carrier between the two locations is carried out manually.

3. Enter MNRS bay per procedure MNRS-0002-DOC.

4. Verify the source carrier transfer rod (upper rod) is completely retracted (full OUT) prior to moving the robot to the transfer position. VERIFY THAT THE TRANSFER ROD IS PINNED AND LOCKED BEFORE OPERATING THE SHIELDED DOOR. CN-1

   NOTE: This is a safety check. The robot production program checks an I/O for the correct position of the source carrier transfer rod. This is also the padlocked position for the rod.

5. Verify the transfer yoke is in full UP position.

   WARNING: FAILURE TO HAVE THE SOURCE CARRIER TRANSFER ROD COMPLETELY RETRACTED PRIOR TO MOVING THE TRANSFER YOKE WILL RESULT IN DAMAGE TO THE SOURCE CARRIER.

6. LOWER CAMERA INTO BUNKER TO OBSERVE TRANSFER. TURN ON LIGHT AND TV MONITOR CN-1

2.0 Transfer of Source Carrier from the Bunker Storage Position to the MCS

1. Move the POP robot/MCS to the transfer ~~(HOME)~~ position via the application program. CN-1

2. Have ~~MAINT~~ TIRH personnel remove the lock on the source carrier transfer rod (upper rod). CN-1

NOTE: ~~MAINT~~ TIRH controls this key. CN-1

3. Rotate the source carrier to the UNLOCK position by rotating the source carrier transfer rod in the CCW direction. CN-1

NOTE: The UNLOCK position is visually verified, via CCTV monitor, for correct alignment by checking for the letters "MCS" on the side of the source carrier and the insertion alignment slot at the 9:00 position.

4. Push the source carrier transfer rod forward (full IN) extending the source carrier into the MCS until the circumferential mark on the source carrier transfer rod is even with the steel side plate on the bunker face.

5. Rotate the source carrier transfer rod in the CCW direction to the LOCK position. * Verify that the shoulder bolts on the MCS are tight against the left side of the slots in the source carrier, as viewed through the CCTV monitor. CN-1

6. Pull the source carrier transfer rod to the full OUT storage position and rotate the rod to the ~~UNLOCK~~ PINNED position. * (SEE BOX IN PARA 5) CN-1

NOTE: The source carrier transfer rod must be in the ~~UNLOCK~~ PINNED position to actuate an interlock switch. The interlock switch must be actuated in order to move the POP robot out of the bunker when the Radiation Protection System is activated. CN-1

7. Have ~~MAINT~~ TIRH personnel lock the source carrier transfer rod in the ~~UNLOCK~~ PINNED position. CN-1

WARNING: THE TRANSFER YOKE DOOR SHALL BE LEFT IN THE FULL UP POSITION AND SHALL NOT BE LOWERED.

3.0 Transfer of Source Carrier From MCS to Bunker Storage Position

1. Move the POP robot/MCS to the transfer ~~(HOME)~~ position via the application program. CN-1

2. Have ~~MAINT~~ TIRH personnel remove the lock on the source carrier transfer rod. CN-1

   NOTE: ~~MAINT~~ TIRH controls this key. CN-1

3. Position the source carrier transfer rod to the LOCK position by rotating in the CCW direction.

4. Push the source carrier transfer rod forward (full IN) extending the source carrier into the MCS until the circumferential mark on the source carrier transfer rod is even with the steel side plate on the bunker face.

5. Rotate the source carrier transfer rod in the CW direction to the UNLOCK position. ~~Verify that the shoulder bolts on the MCS are centered on the right side of the slots in the source carrier as viewed through the CCTV monitor.~~ CN-1

6. Pull the source carrier transfer rod to its full OUT storage position ~~(do not rotate),~~ as verified on the CCTV monitor. CN-1

7. ~~Position~~ ROTATE the source carrier transfer rod CW to the ~~UNLOCK~~ PINNED position. ~~The rod should be in the correct position, per STEP 6.~~ CN-1

   NOTE: The source carrier transfer rod must be in the ~~UNLOCK~~ PINNED position to actuate an interlock switch. The interlock switch must be actuated in order to move the POP robot out of the bunker when the Radiation Protection System is activated. CN-1

8. Have ~~MAINT~~ TIRH personnel lock the source carrier transfer rod in the ~~UNLOCK~~ PINNED position. CN-1

   NOTE: ~~MAINT~~ TIRH controls this key.

9. Move the POP robot/MCS away from the ~~HOME~~ TRANSFER position via application program. CN-1

   WARNING: ROBOT MUST MOVE HORIZONTALLY EAST (X-) IN ORDER TO CLEAR THE TRANSFER YOKE DOOR.

10. * ~~MANRE to~~ Lower the transfer yoke door to the fully DOWN position. Verify via CCTV monitor. CN-1

    NOTE: Transfer yoke door in full DOWN position provides required radiation shielding when source carrier is in bunker storage position.

11. RAISE THE CAMERA OUT OF THE BUNKER APPROXIMATELY 4 FT. TURN OFF THE LIGHT AND CCTV MONITOR. CN-1

* PRIOR TO LOWERING THE TRANSFER YOKE DOOR, VERIFY THAT THE TRANSFER ROD IS FULLY RETRACTED, PINNED AND LOCKED. CN-1