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**REMOVAL ACTION NUMBER 9 - BUILDING 65 THORIUM
OVERPACKING PROJECT PROCEDURE PACKAGE**

04/29/96

DOE-0841-96
DOE-FN EPAS
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PROCEDURE



Department of Energy

**Ohio Field Office
Fernald Area Office**

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APR 29 1996

DOE-0841-96

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**REMOVAL ACTION NUMBER 9 - BUILDING 65 THORIUM OVERPACKING PROJECT
PROCEDURE PACKAGE**

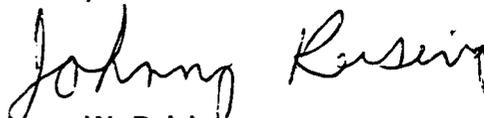
- Reference:
- 1) Letter, J.W. Reising to J.A. Saric and T. Schneider, "Removal Action Number 9 - Building 65 Thorium Overpacking Project Information Package," dated October 11, 1996.
 - 2) Letter, J.A. Saric to J.W. Reising, "Phase VII Removal Actions and Reporting Requirements," dated February 28, 1996.
 - 3) Letter, T. Schneider to J.W. Reising, DOE-FEMP, MSL 531-0297, "Approval - RA Update & Reporting Requirement Changes," dated January 31, 1996.

Enclosed are four project specific procedures for the Building 65 Thorium Overpacking Project, scheduled to be conducted as part of Removal Action Number 9, "Removal of Waste Inventories." The update of procedures, documents, and summaries as required for Removal Action Number 9, in accordance with the Amended Consent Agreement (ACA), reflect activities associated with the Building 65 Thorium Overpacking Project. The annual update of Removal Action Number 9 procedures was revised to project specific submittal by the above reference. The enclosed procedures should be added to the June 1995 procedure submittal, and the project specific information package provided by the above reference.

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If you have any questions or require additional information on this project, please contact John H. Trygier at (513) 648-3154.

Sincerely,



Johnny W. Reising
Fernald Remedial Action
Project Manager

FN:Trygier

Enclosure: As Stated

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Fernald Environmental Management Project Fernald Environmental Restoration Management Corp. REMIEDIATION SUPPORT OPERATIONS DOCUMENT SYSTEM		Page 1 of 25 Revision No. 2 Revision Date: 03-25-96
THORIUM OVERPACKING PROJECT PROCEDURE	Thorium Overpacking Project Emergency Events Procedure	64-C-100 TECHNICAL PROCEDURE
(Signature on File) Authorization: T.N. Huey, TOP Operations Manager	UNCONTROLLED Supersedes: Rev. 1	Issue Date: 09-11-95

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~~CONTROLLED~~ 3/29/96 vt

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1.0 PURPOSE

- 1.1 This procedure provides instruction to Thorium Overpacking Project (TOP) personnel at the Fernald Environment Management Project (FEMP) for emergency response actions to be taken during abnormal events or conditions.

2.0 SCOPE

- 2.1 This procedure applies to FEMP employees assigned to the Thorium Overpacking Project, Department of Energy (DOE) employees, and visitors at the FEMP who are present in the TOP facilities at the time of an abnormal event or condition.
- 2.2 The requirements contained in this document apply only to the area inside and immediately around Building 64/65.
- 2.3 This procedure is used in conjunction with IM-7006, "Incident Building Evacuation Manual" and EM-0020, "Building Emergency Procedure".

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

- 3.1.1 D10-00-020, "Remediation Support Operations Division Document System"

3.2 Reference Documents

- 3.2.1 DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities"
- 3.2.2 IM-7006, "Incident Building Evacuation Manual"
- 3.2.3 EM-0020, "Building Emergency Procedure"
- 3.2.4 EM-0002, "Drills and Exercises"
- 3.2.5 EM-0010, "Event Notification and Occurrence Reporting"
- 3.2.6 64-C-103, "Thorium Overpacking Project Troubleshooting Response Procedure"
- 3.2.7 M-136, "Operations Manager's Standing Orders for Thorium Overpacking Project (TOP) System"
- 3.2.8 TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan"
- 3.2.9 TOP-HPP-001, "Health Physics Plan for the Thorium Overpacking Project"
- 3.2.10 JSA 367, "Thorium Overpacking Project Job Safety Analysis"
- 3.2.11 JSA 404, "Manual Retrieval of the RCBU"
- 3.2.12 RM-0021, "Safety Performance Requirements Manual"

3.0 APPLICABLE DOCUMENTS (cont.)

3.2 Reference Documents (cont.)

3.2.13 DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65"

3.2.14 PL-3020, "FEMP Emergency Plan"

4.0 DEFINITIONS

- 4.1 Airlock - The primary means of entry into Building 65 and the Annex from Building 64. Its purpose is to control the air leakage from Building 65.
- 4.2 All Clear Signal - A 3-3 horn signal sounded over the Plant Alarm System (PAS) that precedes an announcement of ALL CLEAR.
- 4.3 Assistant Emergency Duty Officer (AEDO) - The Emergency Management Authority onsite when the Emergency Operational Center (EOC) is not operational. Also the AEDO is the Incident Commander and the FEMP emergency response activities.
- 4.4 Building Evacuation Siren - A rising and falling electronic emergency signal, activated by the Communications Center to alert building occupants to evacuate.
- 4.5 Continuous Air Monitor (CAM) - Alpha radiation air monitoring system with real-time measurement capabilities. CAMs on the TOP are equipped with visual and audible alarms which are set at appropriate airborne radioactivity levels. CAMs are safety significant components as defined in the Safety Analysis Report, Section 4.
- 4.6 Emergency - Any significant deviation from planned or expected behavior or course of events or conditions, which could endanger or adversely affect workers, public, property, and/or environment.
- 4.7 Emergency Message System (EMS) - A one-way speaker system used by Communication Center Personnel to transmit instructions and/or information to site personnel following the sounding of an alarm signal.
- 4.8 Emergency Response Team (ERT) - A group of professional and volunteer personnel trained for emergency response to fire, hazardous material release, radiological release, on medical emergencies.
- 4.9 Employees - All persons employed or contracted by Fernald Environmental Restoration Management Corporation (FERMCO), and the DOE Site office normally assigned to work areas at the FEMP Facility.
- 4.10 Explosion - Violent expansion, usually accompanied by noise, caused by a sudden release of energy from a rapid chemical reaction or release of highly compressed gases or vapors.

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4.0 DEFINITIONS (cont.)

- 4.11 Fire/Ambulance Signal - The 2-2 horn signal will be sounded only when additional ERT Personnel are needed. The announcement over the EMS will give the location of the fire/ambulance run for the additional ERT Personnel.
- 4.12 Hazardous Material Release - Any unplanned spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of closed containers in an unpermitted area).
- 4.13 High Efficiency Particulate Air (HEPA) Filter - A pleated fibrous medium filter that has a particulate efficiency of at minimum 99.97 percent (%) for 0.3 micrometer particulate of DOP aerosol.
- 4.14 Non-Time Critical Emergency Event - These emergency events require a timely response to ensure no adverse affects to the workers or damage to equipment. In addition, these events have no affect outside the confinement area.
- 4.15 Plant Alarm System (PAS) - The sitewide horn alarm system used by the Communication Center to transmit the Emergency Response (2-2), and Supervisor Alert (3-3) signals.
- 4.16 Powered Air-Purifying Respirator (PAPR) - A respirator that is equipped with a blower to provide clean air to the wearer.
- 4.17 Radiation Detection Alarm (RDA) System - Air horns and rotating red lights that are activated when the radiation level exceeds 50 Mr/hr.
- 4.18 RCBU - Remote Control Base Unit is the vehicle used to handle thorium containers.
- 4.19 RCMHS - Remote Control Material Handling System, which includes the Remote Control Base Unit (RCBU) and the Remote Operation Console (ROC).
- 4.20 Remote Operating System (ROS) - The trailer that houses the Remote Operation Console (ROC) for the RCMHS and associated video equipment.
- 4.21 Subcontractors - Direct employees of companies other than FERMCO, who are assigned to work at the FEMP Facility, or vendors who require access to the FEMP to fulfill contractual obligations.
- 4.22 SUPERVISORY HALT Switch - A switch used by the Support Operator to halt operation of the RCBU in an emergency or at the end of the shift. The SUPERVISORY HALT Switch is a safety significant component as defined in the Safety Analysis Report, Section 4.
- 4.23 Time Critical Emergency Event - These emergency events require immediate rapid response to avoid adversely affecting the workers, public, property, and/or environment.
- 4.24 Visitors - Any persons other than FERMCO and DOE Employees, Subcontractor or Vendor Personnel who have been properly authorized and issued temporary or permanent credentials for access to the FEMP.

5.0 RESPONSIBILITIES

5.1 TOP Supervisor is responsible for the following:

- 5.1.1 Directing the activities of personnel in emergency situations and calls for assistance.
- 5.1.2 Informing the AEDO of existing conditions and cooperating with the AEDO to resolve the emergency situation.
- 5.1.3 Conducting the periodic training of:
 - A. Assigned employees in the location, use the fire and evacuation alarm system controls, and building exits.
 - B. Assigned employees in the provisions of this procedure.
 - C. New and newly relocated employees in the location, and basic use of fire extinguishers, safety shower/eye bubblers in the TOP facilities.
 - D. Employees with regard to immediate actions to be taken for all credible types of emergencies that could occur in their building.
 - E. Assigns employee/alternate to turn off equipment and utilities in the event of an emergency shutdown.
 - F. Ensures that physically challenged employees are assisted during evacuations, if necessary.
 - G. Assigns/designates employees to perform specific tasks relating to an individual building during an emergency situation.

5.2 TOP Operators are responsible for the following:

- 5.2.1 Notifying nearby personnel to evacuate danger areas and proceed in accordance with this procedure.
- 5.2.2 Becoming familiar with the provisions of this procedure for reporting emergencies.
- 5.2.3 Proceeding in accordance with this procedure in emergency situations.
- 5.2.4 Becoming familiar with the location and use of emergency items.
- 5.2.5 Becoming familiar with and carrying out the response to the emergency signals in use at the FEMP.
- 5.2.6 Participating in emergency procedure drills conducted in accordance with EM-0002, "Drills and Exercises".
- 5.2.7 Notifying the Supervisor or the AEDO of emergency or non-routine events immediately.

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5.0 RESPONSIBILITIES (cont.)

5.3 Radiological Controls Technicians (RCTs) are responsible for the following:

- 5.3.1 Informing the Shift Supervisor of any changes in radiological control or air monitors, including the Continuous Air Monitors (CAMs).
- 5.3.2 Operating and maintaining radiological monitoring equipment including the CAMs, portable instruments and the control points.
- 5.3.3 Notifying the Shift Supervisor of any CAM Alarms and any changes in their operation status.
- 5.3.4 Informing the Shift Supervisor of any unusual dosimetry readings.
- 5.3.5 Conducting surveys and releasing the TOCs and other equipment transferred through the Airlock from Building 65 to Building 64.
- 5.3.6 Assisting in the maintaining control of the access doors on the Airlock.
- 5.3.7 Assisting the Shift Supervisor performing daily briefings and event critiques.

6.0 GENERAL

- 6.1 Warnings, Cautions, and Notes shall precede the Item, Step, Sub-Step, Section, or Sub-Section to which they apply.
- 6.2 To report an emergency or summon Emergency Response Team (ERT) in an event involving a medical emergency, fire or explosion, personnel shall initiate an alarm by pulling the lever on the nearest Fire Alarm Box or use a portable radio or telephone 648-6511 and report to the Communication Center. Refer to "Fire Extinguishers/Alarms Location (Building 64 and 65)" (See Figure 1) for fire pull alarm locations.

NOTE: Personnel monitoring is required for drills.

- 6.3 When an emergency occurs in a building and evacuation is ordered, all employees will bypass the Personal Contamination Monitors (PCM).
- 6.4 When an emergency has been declared for any reason (such as, fire, explosion, hazardous material release), the rescue of persons from an evacuated building or area shall be undertaken only by the ERT.
- 6.5 The Shift Supervisor can use the "Supervisor Emergency Check List" (See Attachment A), to ensure that all necessary actions are completed and documented in the appropriate log books.
- 6.6 When an alarm sounds, personnel shall follow instructions broadcast over the Emergency Message System (EMS), portable radio, and/or Supervisors' directions.
- 6.7 Project personnel shall refer to the evacuation routes as illustrated in "Building 64/65/Annex Rally Point" (See Figure 2).

6.0 GENERAL (cont.)

- 6.8 Pulling a lever on fire alarm boxes located throughout the site transmits a coded signal identifying the box location to the communication center.
- 6.9 The 2-2 signal will only precede an announcement for additional personnel. The 3-3 signal precedes an announcement of general interest or All Clear.
- 6.10 Unusual events that threaten the physical integrity of Building 65 or the Annex (such as a broken window or a vehicle collision with a roll-up door) require that overpacking of thorium drums be suspended until Building 65 differential pressure is evaluated and determined to be satisfactory per 3.2.9, TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan" and 3.2.14, DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65"
- 6.11 The periodic surveillance of Building 65 differential pressure required by 3.2.9, TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan" must be completed with satisfactory results before overpacking of thorium drums can commence. It is the assessor's responsibility to inform operations of any unsatisfactory result or deteriorating trend of Building 65 differential pressure surveillance.

7.0 HEALTH AND SAFETY REQUIREMENTS

- 7.1 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a Supervisor. The Supervisor shall immediately report the circumstance of possible radioactive materials intake to S&H Radiological Control Department for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow up urine sample. When the suspect isotope is thorium, the involved personnel shall report to the Dosimetry Section of the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Department.
- 7.2 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by S&H.
- 7.3 Hazards associated with the Thorium Overpacking Project in Building 64/65 are identified in appropriate JSAs and RWPs. Recommended safe job practices are summarized below.

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7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.3.1 Elevated radiation fields - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.3.2 Thorium contamination - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.3.3 Heat Stress - Physiological monitoring of workers for control of heat stress or established work/rest regimen is implemented per JSA 367. A change/cool area is established with a supply of drinking water. The cool area will be established at the control point/change out area in Building 64.
- 7.3.4 Cuts, scrapes and abrasions - Leather palm gloves will be worn, as required in JSAs 367 and 404, when performing RCBU recovery or while handling sharp objects.
- 7.4 All personnel in the Thorium Overpacking Project have the right and responsibility to refuse to perform an activity that is felt to be unsafe.
- 7.5 A pre-job brief and walkthrough should be conducted by the Supervisor for non-routine work activities. This briefing should consist of reviewing the work permits and steps of the procedure that are to be performed. The ALARA principle will be applied.
- 7.6 Personal Safety Equipment shall be operable and ready for use during emergencies as specified by the SOP, JSAs, and RWPs as appropriate.
- 7.7 Personal entering the area in or around Building 64/65 are responsible for complying with the requirements as specified in postings, RWPs, and TOP Safety Documents.

8.0 PROCEDURE

8.1 Emergency Shutdown of TOP Overpacking Equipment and Operations

NOTE 1: This section describes the immediate actions required to be taken in the event of a Time Critical Emergency Event.

NOTE 2: Non-Time Critical Emergency Events, such as a Loss of Power, requires timely shutdown of equipment and operations per TOP operations procedures.

OPERATOR

- 8.1.1 Notify the Shift Supervisor of the problem.
- 8.1.2 Ensure that all Airlock Doors (Roll-up and Personnel) are closed, except when personnel are leaving. Personnel should exit through the personnel door.

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8.0 PROCEDURE (cont.)

8.1 Emergency Shutdown of TOP Overpacking Equipment and Operations (cont.) .

OPERATOR (cont.)

8.1.3 IF overpacking equipment is operating in Building 65 or the Annex during Remote Operations,
THEN perform the following actions:

- A. IF the RCBU is lifting a load (TOC or drum),
THEN lower the load onto the floor, placing the container in a stable position,
AND activate the RCMHS or SUPERVISORY HALT Switch to turn off the RCBU.
- B. IF the RCBU is not lifting a load,
THEN activate the RCMHS or SUPERVISORY HALT Switch to turn off the RCBU.
- C. Turn off and remove the Supervisor and Operator Keys on the Remote Operating Console (ROC).

8.1.4 IF overpacking equipment is operating in Building 65 or the Annex during Manned Operations,
THEN turn off any overpacking equipment (Fork Truck or Vacuum),
AND proceed to the Airlock.

8.1.5 IF overpacking equipment is operating in the Airlock,
THEN turn off any overpacking equipment,
AND proceed to the Satellite Clothing Area in Building 64.

8.1.6 IF overpacking equipment is operating in Building 64, Remote Operating Station (ROS), or the immediate area around Building 64/65,
THEN turn off any overpacking equipment,
AND follow instructions from the Supervisor or the Emergency Message System (EMS).

8.2 Hazardous Material Release (Outside Building 65)

NOTE 1: The release of hazardous material outside the confinement of the Building 65 structure is time critical because of the need to take immediate action to secure the area and contain the material.

NOTE 2: This event involves any incident or discovery of loose radiological contamination outside the confinement system (Building 65 structure).

OPERATOR

8.2.1 Notify the Shift Supervisor of the problem.

8.2.2 Perform emergency shutdown of equipment causing the event or in the area of the event per 8.1.

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8.0 PROCEDURE (cont.)**8.2 Hazardous Material Release (Outside Building 65) (cont.)****SUPERVISOR**

- 8.2.3 Ensure that the RCT is aware of the problem.
- 8.2.4 Notify the AEDO of the event.
- 8.2.5 Ensure that appropriate actions are initiated to stabilize the situation and protect personnel, equipment, the environment, and the public.
- 8.2.6 Ensure that all actions taken by Operators have been completed per this procedure.

8.3 Hazardous Material Release (Inside Building 64)

NOTE: The release of hazardous material inside the confinement of the Building 64 structure is a time critical event because the emergency shutting down of operations shall be required. Isolating the contaminated area shall be performed rapidly.

OPERATOR

- 8.3.1 Ensure that the Shift Supervisor is aware of the problem.
- 8.3.2 Shut down equipment in the affected area.
- 8.3.3 Leave the affected area, staying clear of the contamination.
- 8.3.4 Close all Doors to Building 65, the Airlock and Building 64.
- 8.3.5 Perform activities as directed by Shift Supervisor and RCT

SUPERVISOR

- 8.3.6 Ensure that RCT is aware of the problem.
- 8.3.7 Evaluate options available to contain contamination with RCT.
- 8.3.8 Perform actions to stabilize the situation that are covered by operating procedures.
- 8.3.9 IF actions are not covered by operation procedure, THEN isolate the contamination and secure the area to protect personnel, equipment, the environment, and the public.
- 8.3.10 Ensure that all actions taken by Operators have been completed per this procedure.

8.0 PROCEDURE (cont.)

8.4 HEPA Building Exhaust Failure When Six Units Are Operating

NOTE 1: The loss of one or more HEPA Ventilation Units, when only six Units are operating, is time critical because of the need to take immediate action to shutdown operations in Building 65, the Annex, and the Airlock.

NOTE 2: A loss of HEPA Ventilation Unit is when the unit goes into alarm in the Remote Operation Station (ROS) or during the loss of power to the unit.

OPERATOR

8.4.1 Notify the Shift Supervisor of the problem.

8.4.2 Perform emergency shutdown of equipment in Building 65, the Annex and the Airlock per 8.1 (SAR requirements).

SUPERVISOR

8.4.3 Ensure that the RCT is aware of the problem.

8.4.4 Notify the AEDO of the event.

8.4.5 Ensure that appropriate actions are initiated to stabilize the situation and protect personnel, equipment, the environment, and the public.

8.4.6 Ensure that all actions taken by Operators have been completed per this procedure.

8.5 SUPERVISORY HALT Switch Failure

NOTE 1: The failure of the SUPERVISORY HALT Switch is time critical because of the need to take immediate actions to shutdown the RCMHS.

NOTE 2: The SUPERVISORY HALT Switch must be functional during any remote operations utilizing the RCMHS. If not functional, any activities being performed must be stopped immediately and not resume until the function is available (SAR 5.5.1.1).

OPERATOR

8.5.1 IF the SUPERVISORY HALT Switch fails to operate when activated, THEN activate the RCMHS Halt Switch on the ROC.

8.5.2 IF the RCMHS Halt Switch also fails, THEN activate Parking Brake, AND Turn the Operator and Supervisor Keys OFF.

8.5.3 Notify the Shift Supervisor of the problem.

8.0 PROCEDURE (cont.)8.5 SUPERVISORY HALT Switch Failure (cont.)**SUPERVISOR**

- 8.5.4 Ensure that appropriate actions were initiated to secure the operation.
- 8.5.5 Ensure that all actions taken by Operators have been completed per this procedure.
- 8.5.6 Notify the Process Engineer or Maintenance to initiate repairs as necessary.
- 8.5.7 Ensure that the reduced operation status of the RCBU is recorded in appropriate logs and status boards.

8.6 Medical Emergency

NOTE 1: A Medical Emergency is a time critical event because of the need to take immediate action to shut down operations in the area of the injury and get quick medical attention for the employee.

NOTE 2: A Medical Emergency is any illness or injury of personnel in the area.

OPERATOR

- 8.6.1 Notify the Shift Supervisor of the involved employee of illness or injury.
- 8.6.2 Request assistance from the nearest person if the Supervisor is not available.
- NOTE:** Someone shall stay with the ill or injured person at all times, unless the second person's safety is jeopardized by doing so.
- 8.6.3 IF the ill or injured person cannot be moved without causing further injury,
THEN stay with the person until relieved by the another employee or the medical team.
- NOTE:** Medical treatment and removal of affected personnel takes precedence over personnel monitoring for contamination. Therefore, deviation from procedures, including simultaneously opening both Airlock Rollup Doors, for contamination control and personnel monitoring is acceptable to facilitate prompt medical attention.
- 8.6.4 IF the ill or injured person is in Building 65, Annex or Airlock and
IF the person can be moved,
THEN assist the person in moving out of the contaminated area.

8.0 PROCEDURE (cont.)

8.6 Medical Emergency (cont.)

OPERATOR (cont.)

NOTE: A RCT should be present to assist in removal of injured persons anti-C clothing.

- 8.6.5 Assist the injured or ill person to doff his/her anti-C clothing, if required.
- 8.6.6 Perform emergency first aid (if qualified).
- 8.6.7 Direct the medical team, upon arrival, to the injured or ill person.
- 8.6.8 Perform emergency shutdown of equipment in the area of the event.

SUPERVISOR

- 8.6.9 Notify the Communication Center by radio, telephone 6511, and/or pulling lever on the nearest Fire Alarm Box.
- 8.6.10 Inform Communication Center of the type of injury or illness, location, name, and any other requested information.
- 8.6.11 Direct other Operators in the area to assist in the event.
- 8.6.12 Ensure that appropriate actions are taken to direct and inform the medical team of circumstances of the injury or illness.
- 8.6.13 Accompany the injured or ill employee to medical to assist in gathering and documenting required information.
- 8.6.14 Ensure that all actions taken by Operators have been completed per this procedure.

8.7 Fire and Explosion

NOTE 1: Fire and Explosion events are time critical events because of the need to take immediate action to shut down operations in the area of the event and alerting emergency response of the situation to minimize damage to the equipment or facility.

NOTE 2: An event where smoke is detected coming from equipment shall be handled the same as a fire, except evacuation of the facility is not required.

OPERATOR

- 8.7.1 Notify the Shift Supervisor of the problem.
- 8.7.2 Perform emergency shutdown of the equipment involved in the event or in the area of the event per 8.1 or as directed by the Shift Supervisor and if the shutdown does not affect your own safety. **000016**

8.0 PROCEDURE (cont.)

8.7 Fire and Explosion (cont.)

OPERATOR (cont.)

- 8.7.3 IF a Fire Alarm Box is in the area,
THEN pull lever on nearest Fire Alarm Box.
- 8.7.4 IF a Fire Alarm Box is not in the area,
THEN ensure that the Supervisor has notified the Communication Center.
- 8.7.5 IF it becomes evident that the smoke did not stop by emergency shutdown actions,
THEN inform all personnel, by radio, to evacuate of the facility.
- 8.7.6 Evacuate to Rally Point No. 3 (See Figure 2).

SUPERVISOR

- 8.7.7 Immediately contact the Communication Center by radio, telephone 6511, or pulling the lever on the nearest Fire Alarm Box.
- 8.7.8 Inform Communication Center of the type of event (smoke, fire or explosion), location, and any other requested information.
- 8.7.9 Direct the AEDO and/or the Emergency Response Team (ERT), upon arrival, to the location of the event.
- 8.7.10 Ensure that appropriate actions are taken to direct and inform the ERT of circumstances of the event.
- 8.7.11 Ensure that all actions taken by Operators have been completed per this procedure.
- 8.7.12 IF a facility evacuation is required,
THEN report to Rally Point No. 3 and perform the following:
 - A. Perform a rally point head count.
 - B. Report head count results to Communications (4444).

8.8 Emergency Shutdown Announcement (3-3 Signal)

NOTE: An Emergency Shutdown Announcement is a time critical event because of the need to take immediate action to shut down operations in the area to support a site emergency.

OPERATOR

- 8.8.1 Inform the Shift Supervisor that you have received an announcement for an emergency shutdown.
- 8.8.2 Perform emergency shutdown of equipment in all operating areas per 8.1.
- 8.8.3 Follow instructions given by the Supervisor and/or the EMS.

8.0 PROCEDURE (cont.)**8.8 Emergency Shutdown Announcement (3-3 Signal) (cont.)****SUPERVISOR**

- 8.8.4 Inform the Communication Center that a message has been received to perform emergency shutdown and that Thorium Overpacking operations have been shut down.
- 8.8.5 Ensure that all actions taken by Operators have been completed per this procedure.
- 8.8.6 Follow instructions given over the EMS.
- 8.9 HEPA Building Exhaust Failure When Seven or More Units Are Operating

NOTE 1: The loss of one HEPA Ventilation Units, when 8 Units are operating, is a non-time critical event because the shutting down of operations may not be required. Checking and correcting the problem with the failed HEPA unit shall be performed rapidly to avoid the future possibility of emergency operations shutdown.

NOTE 2: A loss of HEPA Ventilation Unit is when the unit goes into alarm in the Remote Operation Station (ROS) or during the loss of power to the unit.

OPERATOR

- 8.9.1 Notify the Shift Supervisor of the problem.
- 8.9.2 Perform a visual inspection of the HEPA Unit and verify alarm.

SUPERVISOR

- 8.9.3 Ensure that RCT is aware of the problem.
- 8.9.4 Request maintenance to inspect the HEPA Unit and perform repairs as necessary.
- 8.9.5 Ensure that the reduced operation status of the HEPA Unit is recorded in appropriate logs and status boards.
- 8.9.6 Evaluate HEPA flow capacity for continued overpacking operations per reference 3.2.14, (DPT-ED-0001).

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8.0 **PROCEDURE** (cont.)

8.10 **Remote Control Material Handling System (RCMHS) Failure/Alarm**

NOTE 1: The following applicable RCMHS failure/alarm response events are non-time critical events because it does not immediately affect workers, public, equipment or environment. Checking and correcting the problem with the failed RCMHS shall be performed rapidly to avoid further damage to the RCMHS and the future possibility of an emergency event or emergency operations shutdown.

NOTE 2: All RCMHS failure/alarm events will necessitate the discontinuation of remote thorium overpacking operations to facilitate the required maintenance of the vehicle and/or controls.

OPERATOR

8.10.1 **Applicable RCMHS Failures/Alarms**

- A. Controller/Communications Electronics Failure
- B. Hydraulic Control Failure
- C. Steering Failure
- D. Brake Failure
- E. Low Engine Oil Pressure
- F. High Engine Water Temperature
- G. High Engine Oil Temperature
- H. Low Brake Fluid Level
- I. Low Hydraulic Oil Level.

8.10.2 Notify the Shift Supervisor of the problem.

8.10.3 IF the RCBU is lifting a load,
THEN lower the load onto the floor,
AND place the container in a stable position.

8.10.4 IF the RCMHS can be safely driven remotely,
THEN move the vehicle to the Maintenance Area in the Annex,
AND secure the RCMHS per operating procedures.

8.10.5 IF the RCMHS cannot be safely driven remotely,
THEN secure the RCMHS in place per operating procedures.

SUPERVISOR

8.10.6 Request assistance from maintenance and/or Process Engineer to inspect the RCMHS and perform trouble shooting steps per Procedure 64-C-103, "Thorium Overpacking Project Troubleshooting Response Procedure".

8.10.7 Ensure that the reduced operation status of the RCMHS is recorded in appropriate logs and status boards.

8.10.8 Initiate a corrective maintenance plan on the RCMHS, if required.

8.0 PROCEDURE (cont.)**8.11 Continuous Air Monitor (CAM) Failure/Alarm during Manned Operation in Building 65 and Annex**

NOTE: During remote operations, CAM Alarm is expected, therefore not an event. However, manned operation in Building 65 or the Annex cannot be performed until the Alarm is cleared, and CAM display indicated airborne thorium concentration is less than 100 DAC.

OPERATOR

- 8.11.1 Place tools, equipment, and materials in a safe configuration.
- 8.11.2 Exit the area by entering the Airlock.
- 8.11.3 Secure the Airlock to Annex Access doors.
- 8.11.4 Notify the Supervisor of the event.
- 8.11.5 Perform normal doffing of outer shoes covers anti-Cs and gloves and exit to the radiological control point.

SUPERVISOR

- 8.11.6 Ensure that RCT is aware of activities being performed in Building 65 and the Annex during the event.
- 8.11.7 Notify the AEDO of the event.
- 8.11.8 Ensure that the reduced operation status of the CAM Unit is recorded in appropriate logs and status boards.

8.12 TOP Auxiliary Equipment Failure

NOTE: The failure of auxiliary equipment (such as Fork Trucks, Vacuums, Scale, Impact Wrenches) is a non-time critical event because the shutdown of operations may not be required. Checking and correcting the problem with the equipment shall be performed rapidly to avoid the future possibility of emergency operations shutdown.

OPERATOR

- 8.12.1 Notify the Shift Supervisor of the problem.
- 8.12.2 Perform a visual inspection of the equipment to determine cause of the failure.

SUPERVISOR

- 8.12.3 Request maintenance to inspect the failed equipment and perform repairs as necessary.
- 8.12.4 Ensure that the reduced operation status of the equipment is recorded in appropriate logs and status boards.

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8.0 PROCEDURE (cont.)**8.13 Loss of Power (Electric)**

NOTE: The loss of power is a non-time critical event because equipment shutdown will be performed automatically. Loss of electric power to the Building 64/65 area will result in shutdown of the HEPA Building Ventilation System, RCMHS, CAMs, personnel contamination monitors, and security cameras.

OPERATOR

- 8.13.1 Notify the Shift Supervisor of the problem.
- 8.13.2 IF the airlock overhead doors are open,
THEN close the doors using the manual chain closer.
- 8.13.3 IF manned operations were being performed in Building 65 or the Annex,
THEN move to the Airlock and follow normal PPE doffing and personnel monitoring procedures, if required.
- 8.13.4 Perform a visual inspection of all equipment to ensure it is in a safe configuration.

SUPERVISOR

- 8.13.5 Notify the AEDO of the loss of power to the facility.
- 8.13.6 Ensure that the reduced operation status of the equipment is recorded in appropriate logs and status boards.
- 8.13.7 Conduct an in-place accountability.

8.14 Personal Protective Equipment (PPE) Failure

NOTE 1: A PPE failure event is a non-time critical event because the shutdown of operations may not be required. However, the affected person is required to immediately move out of the contaminated area to avoid contact with the contamination.

NOTE 2: A PPE failure event includes the tearing or wetting of Anti-C Clothing, or respirator (PAPR) failure, or other failures of personal monitoring equipment.

OPERATOR

- 8.14.1 Notify the Shift Supervisor of the problem.
- 8.14.2 Notify the RCT in the area of the problem.

NOTE 1: A RCT should be available during the doffing of failed Anti-C clothing to monitor possible areas of contamination.

NOTE 2: Failed Anti-C clothing requires performing the normal contamination monitoring procedure.

- 8.14.3 IF the PPE failure involves Anti-C clothing,
THEN move to the closest doffing area and follow the RCT instruction.

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8.0 PROCEDURE (cont.)**8.14 Personal Protective Equipment (PPE) Failure (cont.)****OPERATOR (cont.)**

NOTE: PAPR failure includes lose of power to the blower, or hose failure.

8.14.4 IF the PPE failure involves a PAPR respirator, THEN move to the closest doffing area and follow the RCT instruction.

SUPERVISOR

8.14.5 Ensure that RCT is aware of the problem and is present to perform monitoring of the person.

8.14.6 IF there is any personnel contamination, THEN notify the AEDO of the problem.

8.14.7 Record event in the Supervisor's Log.

8.15 Tornado Warning Announcement

NOTE 1: A Tornado Warning Announcement is made over the EMS when a tornado has been sighted in or near the vicinity of the FEMP.

NOTE 2: A Tornado Warning Announcement is a non-time critical event because the shutdown of operations should be per this operating procedure. In addition, evacuation to a safe area should be performed without bypassing personnel contamination monitors.

OPERATOR

8.15.1 Inform the Shift Supervisor that you have received an announcement for a Tornado Warning.

8.15.2 Perform normal shutdown of equipment in all operating areas, per specific operating procedures.

WARNING

To prevent injury, avoid glass areas, large roof spans, corridors with openings to South or West windward side of building, and load bearing walls.

8.15.3 Evacuate temporary structures (for example, Building 64/65, ROS Trailer, Break Trailer or Smoking Shelter) and seek shelter inside Building 12 in the hall.

8.15.4 IF you cannot evacuate to Building 12 and are outside, THEN lie face down (if outside) in the nearest depression (such as a ditch) and protect head with hands.

8.15.5 Await instructions from the Supervisor or the All Clear Message over the EMS.

8.0 PROCEDURE (cont.)**8.15 Tornado Warning Announcement (cont.)****SUPERVISOR**

- 8.15.6 Ensure that all actions taken by Operators have been completed per this procedure.
- 8.15.7 If possible, take accountability of all personnel in the area.
- 8.15.8 Evacuate and seek shelter per 8.15.3, 8.15.4, and 8.15.5.
- 8.15.9 Follow instructions given over the EMS.

8.16 Severe Weather Warning (High Winds)

NOTE 1: A Severe Weather Warning Announcement is announced over the EMS when high winds, thunderstorms, and/or lightning has been sighted in or near the vicinity of the FEMP.

NOTE 2: A Severe Weather Warning Announcement is a non-time critical event because the shutdown of operations should be per this operating procedure. In addition, evacuation to a safe area should be performed without bypassing personnel contamination monitors.

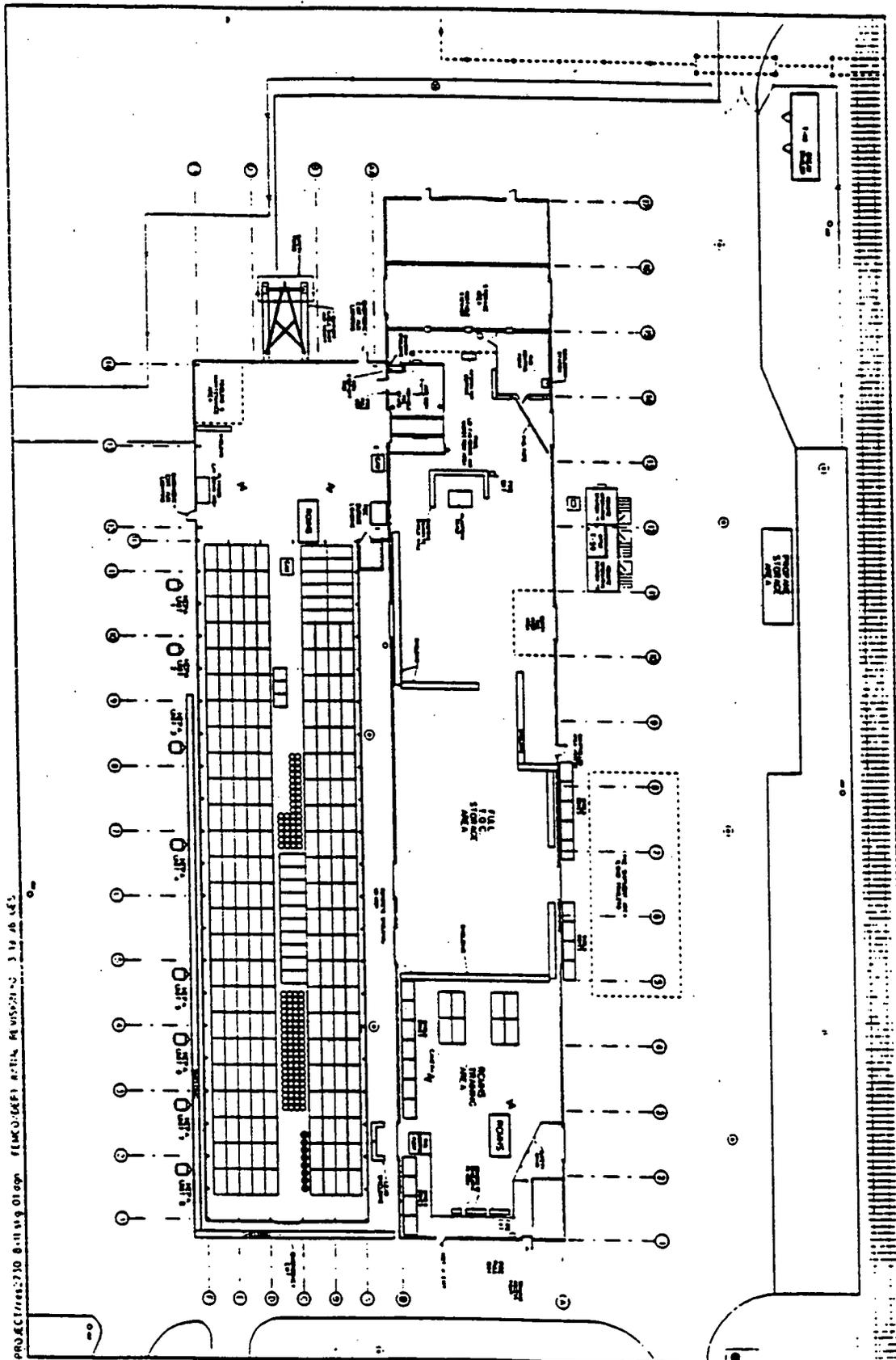
OPERATOR

- 8.16.1 Inform the Shift Supervisor that you have received an announcement for a Severe Weather Warning.
- 8.16.2 Perform normal shutdown of equipment in Building 65 and the Annex areas per specific operating procedures.
- 8.16.3 Ensure that all Airlock overhead and personnel doors are closed, except when personnel are leaving.
- 8.16.4 IF inside Building 65 or the Annex,
THEN evacuate to the Airlock.
- 8.16.5 IF loose material/equipment is located outside,
THEN move material/equipment into Building 64.
- 8.16.6 Close and secure windows, doors, and other openings through which wind or rain could enter.
- 8.16.7 Await instructions from the Supervisor or over the EMS.

SUPERVISOR

- 8.16.8 Ensure that all actions taken by Operators have been completed per this procedure.
- 8.16.9 Follow instructions given over the EMS.

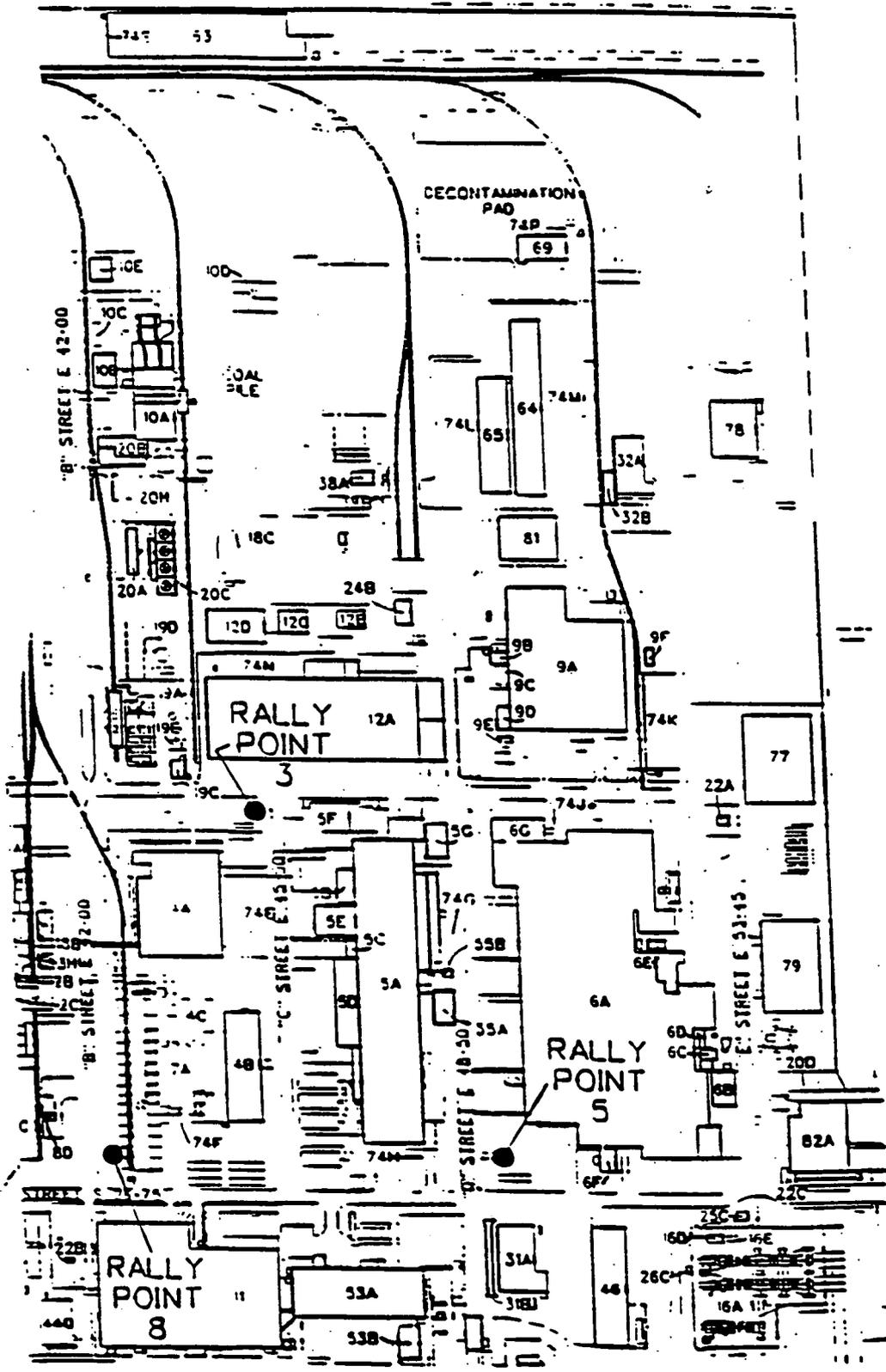
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FIRE EXTINGUISHERS/ALARMS LOCATION (BUILDING 64 AND 65)
Figure 1

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BUILDING 64/65/ANNEX RALLY POINTS



BUILDING 64/65/ANNEX RALLY POINTS Figure 2

SUPERVISOR EMERGENCY CHECK LIST
SUPERVISOR EMERGENCY CHECK LIST

WHO WHAT WHY WHEN WHERE

- WHAT HAPPENED?
- WHO IS IN CHARGE?
- ANY INJURIES?
- ANY EQUIPMENT DAMAGE?
- ALL PERSONNEL ACCOUNTED FOR?
- DETAILS CONCERNING CASUALTY?
 - LEAK RATE/AMOUNT LEAKED, ETC?
 - EXACT LOCATION OF LEAK?
 - ANY ABNORMAL NOISES OR OTHER INDICATIONS NOTED?
- IMMEDIATE ACTIONS TAKEN?

FOR A SPILL, THE SWIMS PROCEDURE:

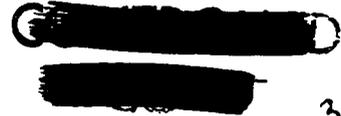
- STOP THE SOURCE OF THE SPILL, IF ACTION CAN BE PERFORMED SAFELY.
 - WARN OTHERS.
 - ISOLATE THE AFFECTED AREA.
 - MINIMIZE YOUR EXPOSURE.
 - SECURE OR REDIRECT VENTILATION.
- ASSISTANCE REQUIRED?
 - RECOMMENDATIONS FOR MANAGEMENT?

RECORD OF ISSUE/REVISIONS

<u>DATE</u>	<u>REV. NO.</u>	<u>DESCRIPTION AND AUTHORITY</u>
09-11-95	0	New procedure requirement for Thorium Overpacking Project Recovery Events Procedure per Request No. P95-0242, initiated by F. Ito.
02-07-96	1	Procedure revised to update the program requirements and change the procedure title to the "Thorium Overpacking Project Emergency Events Procedure", per Request No. P96-0030, initiated by T. Huey.
03-25-96	2	Procedure revised to update the program requirements and to incorporate TCNs 0607, 0609, and 0610 per Request No. P96-0127, initiated by T. Huey.

Fernald Environmental Management Project Fernald Environmental Restoration Management Corp. REMEDATION SUPPORT OPERATIONS DOCUMENT SYSTEM		Page 1 of 40 Revision No. 2 Revision Date: 03-26-96
REMEDATION SUPPORT OPERATIONS PROCEDURE	Thorium Overpacking Project Manned Operations Procedure	64-C-101
		TECHNICAL PROCEDURE
(Signature on File) Authorization: T.N. Huey, TOP Operations Manager		Supersedes: Rev. 1 Issue Date: 01-17-96

UNCONTROLLED TABLE OF CONTENTS



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1.0 PURPOSE

1.1 This procedure provides instructions to Thorium Overpacking Project (TOP) operations personnel for the safe manned operations needed to support thorium overpacking.

2.0 SCOPE

2.1 This procedure shall apply to the TOP Operations Personnel assigned and qualified to those positions required to perform the Thorium Overpacking Project.

2.2 The requirements contained in this procedure apply only to the areas inside and immediately around the Building 64/65 Facility.

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

3.1.1 D10-00-020, "Remediation Support Operations Division Document System"

3.1.2 DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities"

3.2 Reference Documents

3.2.1 64-C-102, "Thorium Overpacking Project Remote Operations Procedure"

3.2.2 64-C-100, "Thorium Overpacking Project Emergency Events Procedure"

3.2.3 64-C-103, "Thorium Overpacking Project Troubleshooting Response Procedure"

3.2.4 OP-0004, "FERMCO Lockout/Tagout (Hazardous Energy and Material Control) Procedure"

3.2.5 FEMP-2404, "Thorium Overpacking Project Final Safety Analysis Report"

3.2.6 TOP-QAJSP-0001, "Quality Assurance Job Specific Plan (QAJSP) for the Thorium Overpacking Project"

3.2.7 TOP-RCMHS-S0001, "Remote Controlled Material Handling System Performance Specification for the Building 65 Thorium Overpacking Project"

3.2.8 20-C-912, "Checking Scale Operation"

3.2.9 20-C-606, "Hazardous Material Spill Clean-Up"

3.2.10 MCA-I-015, "Overpacking Thorium in Building 65"

3.2.11 RM-0021, "Safety Performance Requirements Manual"

3.0 APPLICABLE DOCUMENTS (cont.)

3.2 Reference Documents (cont.)

- 3.2.12 M-136, "Operations Manager's Standing Orders for Thorium Overpacking Project (TOP) System"
- 3.2.13 TOP-TSR-001, "Technical Safety Requirements for the Thorium Overpacking Project"
- 3.2.14 PL-3044, "Traffic Management Plan"
- 3.2.15 01-C-602, "Low Level Radioactive Waste (LLRW) Shipment Preparation"
- 3.2.16 20-C-302, "Portable Air Filtration Device Operation"
- 3.2.17 50-C-112, "Preparation of Documentation for Shipment of Low Level Radioactive Waste (LLRW) to the Nevada Test Site (NTS)"
- 3.2.18 TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan"
- 3.2.19 TOP-HPP-001, "Health Physics Plan for the Thorium Overpacking Project"
- 3.2.20 3097-601-012MNL, "B3097 RCMHS"
- 3.2.21 RC-DPT-038, "Alpha CAM Operation, Victoreen Model 758"
- 3.2.22 QP-12.03, "Certification of Waste Containers and Filling With LLRW For Shipment to NTS"
- 3.2.23 QP-12.04, "Certification of LLRW Packages, Pre-Load Inspections Through Loaded Transport Vehicle Inspection, For Shipment to the Nevada Test Site"
- 3.2.24 JSA 367, "Thorium Overpacking Project Job safety Analysis"
- 3.2.25 JSA 404, "Manual Retrieval of the RCBU"
- 3.2.26 PT-0004, "Packaging and Loading Radioactive Material for Offsite Shipment"
- 3.2.27 DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65"

4.0 DEFINITIONS

- 4.1 Access Doors - Refers to both the Airlock to Annex or Airlock to Building 64 Personnel and Rollup Doors.
- 4.2 Airlock - The primary means of entry into Building 65 and the Annex from Building 64. Its purpose is to control the air leakage from Building 65.
- 4.3 Check - Confirm that a specified activity has occurred or a stated condition exists. If the activity or condition does not exist, the Shift Supervisor shall be notified to investigate the condition.

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4.0 DEFINITIONS (cont.)

- 4.4 Close Circuit Television (CCTV) - The stationary cameras (not attached to the RCBU) that are used to assist the Remote Control Operator with operation of the RCMHS.
- 4.5 Continuous Air Monitor (CAM) - Alpha radiation air monitoring system with real time measurement capabilities. CAMs on the TOP are equipped with visual and audible alarms which are set at appropriate airborne radioactivity levels. CAMs are safety significant components as defined in the Safety Analysis Report, Section 4.
- 4.6 Deteriorated Drums - Those drums which can be visibly identified as likely to fail, via collapse, bottom release, etc., and therefore, represent a potential for a release of thorium into the working environment.
- 4.7 Drum/Plywood Handler - An RCBU attachment tool that is capable of grabbing, holding, lifting, turning, and releasing one drum. It is also capable of lifting and holding plywood separators.
- 4.8 Drum Stack - The stack containing the next drum to be loaded. This applies to a set of drums not actually in a stack (in the aisle).
- 4.9 Ensure - Make certain that an activity has taken place or a condition exists, per specified requirements (by actions if necessary).
- 4.10 Failed Drum - Visible thorium material spilled from a drum either prior to or after the drum is handled. Handling plywood containing visible loose thorium materials is also classified as a failed drum.
- 4.11 Fork Tine - An RCBU attachment tool, typically used on forklift trucks, that is capable of lifting and lowering the TOC, base and/or lid. It is also capable to move other equipment, such as TOC Stands, that will be used in this operation.
- 4.12 High Efficiency Particulate Air (HEPA) Filter - A pleated fibrous medium filter that has a particulate efficiency of at minimum 99.97 percent (%) for 0.3 micrometer particulate of DOP aerosol.
- 4.13 Loose Material Cleanup Tool - An RCBU attachment tool that is capable of retrieving loose material from flat surfaces using a shovel and scraper.
- 4.14 Manned - Thorium overpacking activities which are NOT performed remotely by the RCMHS.
- 4.15 Plywood Separator - Plywood used to set the upper drums on top of bottom drums. Its purpose was to provide a flat surface to stack the drums in Building 65.
- 4.16 Potential Generation of Airborne Thorium - Operations that have the potential for generation of airborne thorium: drum handling, plywood handling, and other materials with loose thorium materials, and vehicle traffic in areas having visible loose contamination.

4.0 DEFINITIONS (cont.)

- 4.17 RCBU Attachment Tools - Tools used for remote operation by installing them on the RCBU vehicle, including the Drum/Plywood Handler, Fork Tines, and Loose Material Cleanup Tool.
- 4.18 Remote - Thorium overpacking activities which are performed remotely using the RCMHS.
- 4.19 Remote Control Base Unit (RCBU) - Remote controlled forklift truck use as part of the Remote Control Material Handling System (RCMHS).
- 4.20 Remote Control Material Handling System (RCMHS) - The remote thorium overpacking equipment, which includes the Remote Operation Console (ROC) and the Remote Control Base Unit (RCBU).
- 4.21 Remote Control Operator - The Primary Operator of the Remote Operating Console (ROC).
- 4.22 Remote Operating Station (ROS) - The operating station containing the controls for operating the RCBU remotely and assorted Support System.
- 4.23 SUPERVISORY HALT Switch - A safety switch used by the Support Operator to halt operation of the RCBU in an emergency or when the vehicle responses is not as directed by the Remote Control Operator. The SUPERVISORY HALT Switch is a safety significant component as defined in the Safety Analysis Report, Section 4.
- 4.24 Support Operator - The Operator in the ROS, operating the Camera Control Console and, Secondary Camera Console, the SUPERVISORY HALT Switch and assisting the Remote Control Operator.
- 4.25 Technical Safety Requirements (TSR) - The requirements that are needed to ensure that the safety-significant Systems/Structures/Components (SSCs) and administrative controls required by the TOP Safety Analysis report are provided and operable.
- 4.26 TOC - Thorium Overpack Container used to overpack Thorium drums.
- 4.27 TOC Insert - A container that is set on a Thorium Overpacking Container (TOC) base to facilitate disposal of loose thorium waste from deteriorated drums.
- 4.28 Verify - Confirm that a specified activity has occurred or a stated condition exists. If the activity or condition do not exist, take action to make the condition exist.
- 4.29 Visual Monitoring System (VMS) - The VMS provides the remote control operator the visual capabilities to remotely maneuvering and navigating the RCBU to retrieve drums, TOCs, plywood and loose material in Building 65.

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5.0 RESPONSIBILITIES

5.1 The Operations Manager is responsible to the Project Manager and the Vice-President of Waste Programs Management for the following:

- 5.1.1 Those duties and responsibilities outlined in M-136, "Operations Manager's Standing Orders for Thorium Overpacking Project (TOP) System".
- 5.1.2 Emphasizing safety in the day-to-day operations by taking an active role in resolving safety issues and daily walkthrough of the work area.
- 5.1.3 Providing technical direction for resolution of safety and processing issues and events.
- 5.1.4 Providing routine daily instructions to shift personnel through Daily Orders.
- 5.1.5 Ensuring that operations are conducted per formal approved instructions and procedures.
- 5.1.6 Ensuring that Facility Owner responsibilities for Building 64/65 are completed per site procedures.

5.2 The Shift Supervisor is responsible to the Operations Manager for the following:

- 5.2.1 Those duties and responsibilities outlined in M-136.
- 5.2.2 Act as Alternate Facility Owner.

5.3 The TOP Operators, consisting of both HAZWATs and MVOs, are responsible to the Shift Supervisor for the following:

- 5.3.1 Those duties and responsibilities outlined in M-136 for the position they are assigned by the Supervisor.
- 5.3.2 Immediately stopping any activity that the operator feels is unsafe.
- 5.3.3 Maintaining a clean and safe work area.
- 5.3.4 Taking corrective actions during unusual or emergency situations.
- 5.3.5 Informing the Shift Supervisor of any problems immediately.
- 5.3.6 Ensuring that LP cylinders in use in the Annex and Building 65 are limited to no more than the standard size (33½ lbs.) (SAR Requirement). The size of the cylinder will be verified by ensuring that only properly stamped LP cylinders are installed on the RCBU or LP Fork lift truck in the Annex and Building 65.

5.4 The field Radiological Control Technician (RCT) is responsible to the Shift Supervisor for the following:

- 5.4.1 Informing the Shift Supervisor of any changes in radiological control or air monitors, including the Continuous Air Monitors (CAMs).

5.0 RESPONSIBILITIES (cont.)

- 5.4.2 Operating and maintaining radiological monitoring equipment including the CAMs, portable instruments and the control points.
- 5.4.3 Notifying the Shift Supervisor of any CAM Alarms and any changes in their operation status.
- 5.4.4 Informing the Shift Supervisor of any unusual dosimetry readings.
- 5.4.5 Conducting surveys and releasing the TOCs and other equipment transferred through the Airlock from Building 65 to Building 64.
- 5.4.6 Assisting in the maintaining control of the access doors on the Airlock.
- 5.4.7 Assisting the Shift Supervisor performing daily briefings and event critiques.
- 5.5 Performance/Quality Assurance is responsible for certification of waste overpacking per references 3.2.22 and 3.2.23.

6.0 GENERAL

- 6.1 Warnings, Cautions, and Notes shall precede the Section, Sub-Section, Item, Step, or Sub-Step to which they apply.
- 6.2 The CAM must be operating for at least two hours and not alarming prior to personnel entry into the Annex or Building 65. If either CAM is not functioning, manned activities within Building 65 and the Annex must be stopped and personnel leave the area (TSR Requirement, LCO 2). Access to maintain and/or troubleshoot any problem may take place, under the control of the Radiological Work Permit (RWP), using appropriate portable instrumentation (SAR 5.5.1.2). CAM functionality checks will be performed at the beginning of the shift by the RCT. The RCT shall inform the Supervisor on the status of this equipment when changes occur.
- 6.3 No personnel shall be permitted inside Building 65 or the Annex when the RCBU is being operated remotely (SAR Requirement).
- 6.4 Vehicles that are fueled by propane must have cylinders that are limited to no more than the standard size (33 1/2 pounds) (SAR Requirement). The size of the cylinder will be verified by ensuring that only properly stamped LP cylinders are installed on the RCBU or LP Fork lift truck in the Annex and Building 65.
- 6.5 Operators shall immediately report any problem, including alarms, equipment failure, etc., to the Supervisor. Those problems that are identified as "Emergency", per Procedure 64-C-100, "Thorium Overpacking Project Emergency Events Procedure", shall be responded to per that procedure. Those problems that are not identified in Procedure 64-C-100, shall be responded to per 64-C-103 "Thorium Overpacking Project Troubleshooting Response Procedure".

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6.0 GENERAL (cont.)

- 6.6 If a step cannot be performed as it is currently written in this procedure, or if a procedure does not exist for an action, the Operator shall stop the performance of the procedure, notify the Shift Supervisor, and place the system/equipment in a safe, stable condition.
- 6.7 The Airlock has four access doors, two roll-up overhead doors, used to move TOCs or large equipment, and two personnel doors. There is one of each type of door to the Annex and Building 64. Personnel entering the Airlock from Building 64 or the Annex are responsible for ensuring that only one door is open at a time.
- 6.8 Instrumentation and Equipment that require scheduled preventive maintenance or calibration verification are equipped with stickers indicating the date when the next calibration/maintenance checks are to be performed. These stickers are to be checked prior to use and if found to be past due for inspection shall not be used until completed.
- 6.9 Admission of personnel into the Building 64/65, including the Airlock and Annex, shall be granted by authorization of the Shift Supervisor during operation. Emergency admission shall be authorized by the AEDO.
- 6.10 Per the ACCIP (reference 3.2.18), the following actions will be taken during operations:
- 6.10.1 After a drum failure has occurred, overpacking activities within Building 65 and the Annex will be stopped for a surveillance period of a minimum of 2 hours.
- 6.10.2 Before opening the Airlock to Annex Rollup Door, ensure that the surveillance period of 6.10.1 has been completed since the Operator handled a failed drum, and that both Airlock to Building 64 Access Doors are shut.
- 6.10.3 Before opening the Airlock to Building 64 Personnel Door, ensure that both Airlock to Annex Access Doors are shut.
- 6.10.4 Before opening the Airlock to Building 64 Rollup Door, ensure that both Airlock to Annex Access doors are shut and that the Airlock to Annex Rollup Door has been shut for thirty or more minutes if operations having a Potential Generation of Airborne Thorium have occurred within the last 2 hours in Building 65 and the Annex.
- 6.10.5 All drum failures must be documented in the Supervisor's Log, with the time the movement of the drum was completed.
- 6.11 Verification of overpacking containers shall be conducted by Performance/Quality Assurance per references 3.2.22 and 3.2.23.
- 6.12 The Shift Supervisor shall contact FERMCO Meteorology (x4230) at the start of each shift for warnings of extreme weather conditions, present and daily forecasted hourly average wind speed and gusts. Conditions shall be recorded in the Supervisor's Log and Attachment C.

6.0 GENERAL (cont.)

- 6.13 RCT's shall ensure that the Building 65 CAM sample head is located in the general vicinity of the active drum stack. This should be performed at the time of the CAM filter change.
- 6.14 Unusual events that threaten the physical integrity of Building 65 or the Annex (such as a broken window or a vehicle collision with a roll-up door) require that overpacking of thorium drums be suspended until Building 65 differential pressure is evaluated and determined to be satisfactory per 3.2.18, TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan" and 3.2.27, DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65".
- 6.15 The periodic surveillance of Building 65 differential pressure required by 3.2.18, TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan" must be completed with satisfactory results before overpacking of thorium drums can commence. It is the assessor's responsibility to inform operations of any unsatisfactory result or deteriorating trend of Building 65 differential pressure surveillance.

7.0 HEALTH AND SAFETY REQUIREMENTS

- 7.1 Any circumstances which could have resulted in an intake of radioactive materials by inhalation, injection, or absorption shall immediately be reported to a Supervisor. The Supervisor shall immediately report the circumstances of possible radioactive materials intake to S&H Radiological Control Division for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow-up urine sample. When the suspect isotope is other than Uranium, the involved personnel shall report to the Dosimetry Section of the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Department.
- 7.2 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by S&H.
- 7.3 All personnel involved in the Thorium Overpacking Project have the right and responsibility to refuse to perform an activity that is felt to be unsafe or stop any and all activities for any safety concern.

7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.4 The two CAMs must be operating for at least two hours and not alarming prior to personnel entry into the Annex or Building 65. If either CAM is not functioning, manned activities within Building 65 and the Annex must be stopped and personnel leave the area (TSR Requirement, LCO 2).
- 7.5 No personnel shall be permitted inside Building 65 or the Annex when the RCBU is being operated remotely (SAR Requirement).
- 7.6 Vehicles that are fueled by propane must have cylinders that are limited to no more than the standard size (33 1/2 pound) (SAR Requirement).
- 7.7 All personnel performing work activities relative to this procedure must complete the following prior to starting work:
- 7.7.1 Understand this and other applicable procedures associated with the work to be performed.
- 7.7.2 Follow the requirements of the work permits and procedures associated with the work to be performed.
- 7.7.3 If the work to be perform is non-routine, a pre-job brief and walkthrough should be conducted by the supervisor. This briefing should consist of review the work permits and the steps of the procedure that are to be performed.
- 7.8 The chemicals of concern in Building 65 and the Annex are thorium compounds. Thorium is principally an inhalation and external radiation hazard. For this reason personnel air monitoring and respirator protection (PAPR) are required in airborne thorium areas.
- 7.9 The external radiation hazard is principally due to gamma radiation. Both the drums being overpacked and the full TOCs will be sources of gamma radiation. For this reason personnel dosimeters are required to be worn at all times. In Building 65 and the annex a Self Reading Pocket Dosimeter (SRPD) will also be worn to track personnel exposures daily.
- 7.10 Personnel entering any area in or around Building 64/65 are responsible for complying with requirements as specified on postings, RWPs, RCT, and all TOP safety documentation.
- 7.11 Personnel safety equipment shall be operational and readily available for emergencies, as specified in SOPs, RWPs and JSAs as appropriate.
- 7.12 All tasks are to be pre-planned, ensuring that all equipment is in good working condition. Equipment in poor condition can increase the time in performing a task, thereby increasing exposure to radiation, which violates project As Low As Reasonably Achievable (ALARA) goals.
- 7.13 Personnel required to wear double anti-C clothing must be trained on the symptoms of heat stress. When temperatures exceed 80 degrees Fahrenheit, IH shall be contacted to determine maximum stay times for the activity being performed.

7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.14 Be aware of the pinch points during RCBU tool attachment changes and during the handling of the TOC container. Keep hands, fingers, and feet out of these areas.
- 7.15 Non-tinted safety glasses with rigid side shields must be worn inside Building 64/65.
- 7.16 All electric hand tools shall be plugged into outlets containing GFCI.
- 7.17 Hearing protection shall be worn in areas where noise levels are determined to exceed 85 dBA over an 8 hour TWA.
- 7.18 When checking fluid levels and filters on the RCBU, be cautious of high temperature surfaces. Wear leather palm gloves if working close to these surfaces. Also watch contact with anti-C clothing for burn holes.
- 7.19 Be careful working around hydraulic fluid/equipment. There may be stored pressure in the hydraulic system which can be dangerous when working around hydraulically controlled parts of the RCBU and Forklift trucks. Care should be taken to make sure all hydraulic connections are made correctly and completely.
- 7.20 Hazards associated with the Thorium Overpacking Project in Building 64/65 are identified in appropriate JSAs and RWPs. Recommended safe job practices are summarized below.
- 7.20.1 Elevated radiation fields - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.20.2 Thorium contamination - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.20.3 Heat Stress - Physiological monitoring of workers for control of heat stress or established work/rest regimen will be implemented per JSA 367. A change/cool area will be established with a supply of drinking water. The cool area will be established at the control point/change out area in Building 64.
- 7.20.4 Cuts, scrapes and abrasions - Leather palm gloves will be worn, as required in JSAs 367 and 404, when performing RCBU recovery or while handling sharp objects.

8.0 PROCEDURE8.1 Pre-Operational Inspections**WARNING 1**

The CAMs must be operating for at least two hours, operational and not alarming prior to entering the Annex to perform inspections.

WARNING 2

Radiation exposure and thorium contamination is possible in the Annex and/or Building 65. Simultaneously opening Airlock doors to Building 64 and the Annex may allow airflow from the Annex into Building 64, potentially spreading contamination to Building 64.

NOTE: HEPA Startup/Inspections and Building 64 Forklift Truck Inspections shall be performed at the same time Pre-Operational Inspections are performed using the "HEPA Unit Startup Checklist" (See Attachment A) and "HEPA Building Exhaust System Shift Inspection Logsheet" (See Attachment B). RCMHS Functional Checks and Annex Forklift Inspections shall be performed after Section 4 is complete.

- 8.1.1 Ensure that all criteria for entry, as stated in 6.0, have been met before entering Building 65 Annex and/or Airlock.
- 8.1.2 IF there were no overpacking activities performed on the preceding shift, THEN complete the "Building 64/65 Pre-Start Checklist", (See Attachment C), all sections.
- 8.1.3 IF there were overpacking activities performed on the preceding shift, THEN complete all of Attachment C, except Section 1.

NOTE: The Shift Supervisor shall be vigilant for unpredicted weather conditions. Weather conditions shall be determined, at a minimum, at the start of shift per 6.12.

- 8.1.4 IF the wind speed increases, THEN the Shift Supervisor shall contact FERMCO Meteorology to request the current average wind speed.
- 8.1.5 IF the average wind speed exceeds 30 mph, or wind gusts exceed 45 mph, THEN overpacking activities within Building 65 must be discontinued.

NOTE: Unusual events that threaten the physical integrity of Building 65 or the Annex (such as a broken window or a vehicle collision with a roll-up door) require that overpacking of thorium drums be suspended until Building 65 differential pressure is evaluated and determined to be satisfactory per reference 3.2.18 (ACCIP) and reference 3.2.27 (DPT-ED-0001).

- 8.1.6 To ensure that average wind speed is less than 30 mph and with gusts are less than 45 mph the Supervisor shall call and log the weather forecast for the shift per 6.12.

8.0 PROCEDURE (cont.)**8.2 HEPA Building Exhaust System Operations**

NOTE: All eight HEPA Units are normally operating.

8.2.1 IF only fewer than six HEPA units are operational or available for operation,
THEN no overpacking activities are allowed in Building 65, Annex, and Airlock.

8.2.2 IF the HEPA System is not in operation,
THEN perform the following:

- A. Obtain Attachment A to document startup actions.
- B. Perform Startup Actions per Attachment A.
- C. Sign and return Attachment A to the Supervisor for review.

NOTE: Any Unsatisfactory findings found during inspection shall be reported to the Supervisor immediately and documented on Attachment B.

8.2.3 IF the HEPA System is in operation,
THEN complete Attachment B at the following frequencies.

- A. Always make the first inspection at the beginning of an operating shift.
- B. IF there is only one shift per day operating,
THEN perform the second inspection near the end of an operating shift.
- C. IF there is an operating shift following the current shift,
THEN perform the second inspection near the middle of an operating shift.

8.2.4 Evaluate HEPA Flow capacity for overpacking as follows:

NOTE: To maintain air flow per limit of 3.2.18 (ACCIP), schedule maintenance to replace the HEPA filter when its d/p reads 1.8 in. w.c. and replace the prefilter when its d/p reads 1.2 in. w.c.

- A. IF eight HEPA Units are running,
THEN overpacking can continue.
- B. IF six or seven HEPA Units are running,
THEN overpacking can continue if the differential pressure assessment of Building 65, for the current conditions, determines that differential pressure is satisfactory as defined in 3.2.27, DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65".
- C. IF five or fewer HEPA Units are running,
THEN overpacking must cease.

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8.0 PROCEDURE (cont.)**8.2** HEPA Building Exhaust System Operations (cont.)

- 8.2.5** IF there are no overpacking activities to be performed on the next shift,
THEN all or several HEPA units as determined by the Supervisor may be shut down as follows:

NOTE: After pushing the Stop Button, the ROS HEPA Panel Trouble Light will be activated and the Low d/p alarms will sound on the local HEPA Unit Control Panel.

- A. Push the STOP Button on the local HEPA Unit Control Panel.
- B. Push the ACKNOWLEDGE Button for the d/p alarms, on the local HEPA Unit Control Panel.
- C. Ensure the blower stops following activation of the Stop Button.

NOTE: After placing the Main Power Switch to the OFF position, the local HEPA Unit Control Panel light should go out.

- D. Turn OFF the Main Power Switch on the HEPA Unit Control Panel.
- E. Record the unit(s) that have been shut down on Attachment B and the Equipment Status Board.

8.3 Remote Control Material Handling System (RCMHS) Operations**8.3.1** Prepare the RCBU for Manned Pendant Control Operation

- A. IF the unit is currently shutdown per 64-C-102, section 8.9,
THEN skip 8.3.1.B.
- B. IF the RCBU is in standby per 64-C-102, section 8.8,
THEN perform the following to Shutdown the RCBU:
 - 1. Depress the RCBU HALT Switch on the RCBU On Board Controller.
 - 2. Turn the RCBU Key Operated Switch to the OFF position.
- C. Remove the RCMHS Vehicle Pendant from the storage box.
- D. Disconnect the battery conditioner box harness (#1), the binary outputs harness (#2), and the proportional outputs harness (#3) bulkhead connectors for the Remote Operating Console (ROC) per reference 3.2.20.
- E. Connect the RCBU Pendant Control harnesses (#1, #2, and #3) to the Conditioner box (#1) and Binary Outputs Box (#2) and Proportional Box (#3) bulkhead connectors per reference 3.2.20.
- F. Verify that the Pendant Ignition Off Button is pushed down, ensuring that the pendant is not activated.

8.0 PROCEDURE (cont.)

8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)

8.3.1 Prepare the RCBU for Manned Pendant Control Operation (cont.)

- G. Verify that the Sideshift, Tilt, Lift, Gear, and Steering Toggle Switches are in the Neutral (Center) position.
- H. Verify that the Parking Brake Toggle Switch and the Brake Toggle Switch are in the ON position.
- I. Verify that the Throttle Control Switch is set on Idle.
- J. Turn the RCBU Key Operated Power Switch to the ON position.
- K. Pull the RCBU HALT Switch Up after approximately 15 seconds.
- L. Verify that the RCBU LPG cylinder fuel line is connected.
- M. Verify that the RCBU LPG cylinder valve is in the Open position.

8.3.2 Prepare to Start the RCBU using the Pendant Controller

CAUTION

Be aware of obstacles in the area, such as walls, drums, and equipment. Also stand as far away from the vehicle as the pendent cable allows.

- A. Pull Up the Pendant Ignition Off Button to energize pendant and valves.
- B. Depress the Engine Start Button until the engine starts.

8.3.3 Verify Operation of Pendant Control Switches

NOTE: In cold weather, the vehicle may require warm up time to allow the parking brake to release.

- A. Rotate Throttle Control Switch toward ACCEL (accelerate) position, listening for motor RPM increase.
- B. Move the Sideshift Toggle Switch momentarily to the Left position, then the Right position.
- C. Return Side Shifter on RCBU back to center and position switch in center (neutral) position.
- D. Move the Tilt Toggle Switch momentarily to the Back position, then the Forward position.
- E. Return mast to the vertical position and position switch in center (neutral) position.
- F. Move the Lift Toggle Switch momentarily to the Up position, then the Down position.

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8.0 PROCEDURE (cont.)

8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)

8.3.3 Verify Operation of Pendant Control Switches (cont.)

G. Return the lift to a down position and position switch in center (neutral) position.

H. Move the Parking Brake Toggle Switch to the OFF position.

I. Move the Brake Toggle Switch to the TRAVEL position.

NOTE: Make sure there are no obstacles in the front or back of the RCBU before performing 8.3.3.J and 8.3.3.K.

J. Move the RCBU forward by moving the Gear Toggle Switch to FWD (Forward) and the Throttle Control.

1. Test Brake Toggle Switch to the ON position, stopping RCBU.

2. Return Brake Toggle Switch to the OFF position.

K. Move the RCBU backward by moving the Gear Toggle Switch to REV (Reverse) and the Throttle Control.

1. Test Brake Toggle Switch to the ON position, stopping RCBU.

2. Return Brake Toggle Switch to the OFF position.

L. Move the steering tires by positioning the Steering Toggle Switch Left, then to the Right.

M. IF brake system failure, loss of pendant control, or electrical fire occurs,
THEN push down the Ignition Off Button to stop the RCBU.

N. Verify emergency stop pendant stop function is operating properly by pushing down the Ignition Off Switch.

O. Pull up the Ignition Off Button to energize the Pendant and valves.

P. Restart engine by pushing the Engine Start Button.

8.3.4 Maneuver RCBU using the pendant controls.

8.3.5 Maneuver RCBU function switches as necessary to attach and remove RCBU attachment tools.

8.3.6 Prepare to Shut down the RCBU using the Pendant Controller

A. Move RCBU to the desired location for next activity or shutdown.

B. Move the Brake Toggle Switch to the ON position.

C. Move the Parking Brake Toggle Switch to the ON position.

8.0 PROCEDURE (cont.)

8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)

8.3.6 Prepare to Shut down the RCBU using the Pendant Controller

- D. Push Down the Pendant Ignition Off Button.
- E. Push Down the RCBU HALT Switch on the RCBU.
- F. Turn the RCBU Key Operated Power Switch to the OFF position.

8.3.7 Prepare the RCBU for Remote Control Operation

- A. Disconnect the RCBU Pendant Control harnesses (#1, #2, and #3) from the Conditioner Box (#1) and Binary Outputs Box (#2) and Proportional Box (#3) bulkhead connectors per reference 3.2.20.
- B. Connect the battery conditioner box harness (#1), the Binary Outputs Harness (#2), and the proportional outputs harness (#3) bulkhead connectors to the Remote Operating Console (ROC) per reference 3.2.20.
- C. Place the RCBU Vehicle Pendant into the storage box.
- D. IF Remote Operations are to resume on the current shift, THEN perform the following:
 - 1. Turn the RCBU Key Operated Switch to the ON position.
 - 2. Pull the RCBU HALT Switch Up after approximately 15 seconds.
- E. IF Remote Operations will not resume on the current shift, THEN Close the isolation valve of the LPG cylinder.

8.3.8 Prepare to Install the Drum/Plywood Handler to the RCBU

- A. IF the tool is being changed after remote operation, THEN install the Pendant Controller on the RCBU per 8.3.1 through 8.3.5.
- B. IF the Fork Tines are attached to the RCBU, THEN remove the Fork Tines per 8.3.13.
- C. Move the RCBU to the Drum/Plywood Handler Attachment Cradle.

8.3.9 Install the Drum/Plywood Handler to the RCBU

- A. Move the Parking Brakes Toggle Switch to the ON position.
- B. Maneuver the sideshifter left/right until the sideshifter upper frame channel aligns with the left and right upper hooks of the rotator.

8.0 PROCEDURE (cont.)**8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)****8.3.9 Install the Drum/Plywood Handler to the RCBU (cont.)**

C. Level the mast tilt to engage the upper hooks.

NOTE: The sideshifter upper frame channel interlocks into the rotator's upper hooks.

D. Lift the mast, lifting the drum/plywood handler approximately six inches.

E. Perform 8.3.9.E and 8.3.9.F for both quick change hooks on rotator.

F. Pull out the locking pin, located in the lower hole of the quick change hook on the lower back side of the rotator.

G. Slide the quick change hook in the Up position and install the locking pin in the top hole.

H. Remove the quick release connectors caps on the hydraulic hoses to the drum handler and the RCBU.

I. Connect the quick release connectors on the hydraulic hoses, connecting the hydraulic system.

J. Remove the caps on the electrical connectors.

K. Connect the electrical connector located in the center of the rotator.

L. Lift the mast, lifting the drum/plywood handler out of the tool rack.

M. Maneuver the RCBU away from the tool rack.

N. Shut down the RCBU and install Remote Controller per 8.3.6 and 8.3.7.

8.3.10 Remove the Drum/Plywood Handler Attachment

A. Configure the grippers on the Drum/Plywood Handler remotely, per 8.2 of Procedure 64-C-102, "Thorium Overpacking Project Remote Operations Procedure".

B. Install the Pendant Controller on the RCBU per 8.3.1 through 8.3.5.

C. Move the RCBU to the Drum/Plywood Handler Attachment Cradle.

D. Maneuver the drum/plywood handler onto the tool rack.

E. Move the Parking Brake Toggle Switch to the ON position.

F. Disconnect the electrical connector, installing the protective cap to the connector.

8.0 PROCEDURE (cont.)**8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)****8.3.10 Remove the Drum/Plywood Handler Attachment (cont.)**

- G. Disconnect the quick release connectors on the hydraulic hoses, installing the protective caps on both ends.
- H. Perform 8.3.10.I and 8.3.10.J for the left and right Quick Change Hooks on the rotator.
- I. Pull out the locking pin located in the upper hole of the Quick Change Hook on the lower back side of the rotator.
- J. Slide the Quick Change Hook in the Down position and install the locking pin in the bottom hole.
- K. Lower the mast until the sideshifter's upper frame channel clears the rotator's upper hooks.
- L. Back the RCBU away from the drum/plywood handler.
- M. IF the Fork Tines are being installed,
THEN proceed to 8.3.11.

8.3.11 Prepare to Install the Fork Tine Attachment to the RCBU

- A. IF the tool is being changed after remote operation,
THEN install the Pendant Controller on the RCBU per 8.3.1 through 8.3.5.
- B. IF the Drum/Plywood Handler is attached to the RCBU,
THEN remove the Drum/Plywood Handler per 8.3.10.
- C. Move the Fork Tines cart to the RCBU, or the RCBU to the Fork Tine cart.

8.3.12 Install the Fork Tines to the RCBU

- A. Move the Parking Brakes Toggle Switch to the ON position.
- B. Maneuver the sideshifter left/right with the forks.
- C. Level the mast tilt to engage the upper hooks.
- D. Remove the C-clamps, releasing the forks from the cart.

NOTE: The sideshifter upper frame channel interlocks into the Fork's upper hook.

- E. Lift the mast, lifting the forks approximately six inches.
- F. Perform 8.3.12.G and 8.3.12.H for each fork's quick change hook.
- G. Pull out the locking pin, located in the lower hole of the quick change hook on the lower back side of the rotator.

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8.0 PROCEDURE (cont.)

8.3 Remote Control Material Handling System (RCMHS) Operations (cont.)

8.3.12 Install the Fork Tines to the RCBU (cont.)

- H. Slide the quick change hook in the Up position and install the locking pin in the top hole.
- I. Lift the mast, lifting the forks off of the tool cart.
- J. Maneuver the RCBU away from the tool cart.
- K. Lower the forks until they are on the ground.
- L. Shut down the RCBU and install Remote Controller per 8.3.6 and 8.3.7.

8.3.13 Remove the Fork Tine Attachment

- A. Install the Pendant Controller on the RCBU per 8.3.1 through 8.3.5.
- B. Move the RCBU to the Fork Tine cart or position the cart under the Fork Tines.
- C. Move the Parking Brake Toggle Switch to the ON position.
- D. Lower the forks onto the cart.
- E. Attach forks to the cart using C-clamps.
- F. Perform 8.3.13.G and 8.3.13.H for the left and right Quick Change Hooks on the rotator.
- G. Pull out the locking pin located in the upper hole of the Quick Change Hook on the lower back side of the rotator.
- H. Slide the Quick Change Hook in the Down position and install the locking pin in the bottom hole.
- I. Lower the mast until the sideshifter's upper frame channel clears the fork's upper hooks.
- J. Back the RCBU away from the drum/plywood handler.
- K. IF the Drum/Plywood Handler is being install,
THEN proceed to 8.3.8.

8.4 Empty Thorium Overpacking Container (TOC) Preparation for Loading

8.4.1 Move empty TOCs into Building 64, TOC Preparation Area.

8.4.2 IF the TOC is wet,
THEN towel dry the TOC using a dry cloth,
AND dispose of the towels as directed by the Supervisor.

8.0 PROCEDURE (cont.)

8.4 Empty Thorium Overpacking Container (TOC) Preparation for Loading (cont.)

8.4.3 Check the exterior of the TOC for any signs of damage.

A. IF the TOC has any structural damage (such as bent steel),
THEN place an Information Tag through a bolt hole stating "Do Not Use" until evaluated per PT-0007.

1. Set the TOC on the East Pad for further evaluation.

B. IF the TOC has any paint damage (such as scrapes or rust),
THEN clean the damaged area and repaint surface per Table 1 in PT-0004, "Packaging and Loading Radioactive Material for Offsite Shipment".

1. Set the TOC to the side, inside Building 64 until paint dries.

8.4.4 Unbolt the TOC lid from the base.

8.4.5 Lift the lid off the TOC using a manned forklift truck.

8.4.6 Inspect the gasket surface on the lid for any material that would hinder sealing the TOC while the forklift truck is holding the lid.

8.4.7 Remove the bolts and gasket material stored inside the TOC.

8.4.8 Remove and discard the shipping gasket.

8.4.9 Stick the gasket material on the gasket surface of the lid while the forklift truck is holding the lid.

8.4.10 Check the TOC base interior for any signs of damage or water.

A. IF water is inside the TOC,
THEN towel dry the base surface.

B. Check that TOC lid guides are in good condition.

8.4.11 Prepare the TOC Base with the following:

A. Install one absorbent pad (4 foot by 6 foot minimum) in the TOC base.

B. IF the TOC being prepared is for failed drums or loose material,
THEN install a TOC Insert, with the upper two front boards removed, into the TOC base.

1. Place the two boards removed on the TOC lid after the lid is placed back on the TOC.

8.0 PROCEDURE (cont.)

8.4 Empty Thorium Overpacking Container (TOC) Preparation for Loading (cont.)

8.4.11 Prepare the TOC Base with the following: (cont.)

- C. IF the TOC being prepared is for drums, THEN install a sheet of 1/8" to 1/4" plywood (4 foot by 6 foot) in the TOC base to secure the absorbent pad.
- D. Protect the TOC gasket during lid movement to prevent damage.

8.4.12 Place the TOC lid back onto the TOC base.

8.4.13 Move the prepared TOC to the scale.

8.4.14 Record Tare Weight of the container under the TOC serial number.

8.4.15 Move the prepared TOC to the designated storage area inside Building 64.

8.5 Transfer and Handling of an Empty TOC Container

WARNING

Ensure that the Airlock Doors to both the Annex and Building 64 are not open simultaneously. This event may allow airflow from the Annex to Building 64, potentially spreading contamination to Building 64.

8.5.1 Transfer a Prepared TOC into the Airlock using the Manned Building 64 Forklift Truck as follows:

- A. Retrieve a prepared TOC and move it to the Building 64 Airlock Rollup Door.
- B. Verify permission granted by Supervisor to access the Airlock.
- C. Verify that all other Airlock Doors are Closed.
- D. Verify that Roller TOC Stand is empty and in position to receive an empty TOC.
- E. IF there is a full TOC on the TOC Stand that is ready to be removed from the Airlock, THEN remove the full TOC, per 8.7.12, before attempting to position the empty TOC on the TOC Stand.
- F. IF the Roller TOC Stand is not in position (near the Building 64 Airlock Door), THEN inform the Supervisor that the TOC Stand needs to be moved prior to opening the overhead door.

8.0 PROCEDURE (cont.)**8.5 Transfer and Handling of an Empty TOC Container (cont.)****8.5.1 Transfer a Prepared TOC into the Airlock using the Manned Building 64 Forklift Truck as follows: (cont.)**

- G. Open the Building 64 Airlock Rollup Door.
- H. Place the empty TOC on the Roller TOC Stand.
- I. Close the Building 64 Airlock Rollup Door.

8.5.2 Transfer a Prepared TOC from the Airlock to the Annex using the Manned Building 65 Forklift Truck as follows:

- A. Verify permission granted by Supervisor to access the Airlock.
- B. Verify that all other Airlock Doors are Closed.
- C. Open the Building 65 Airlock Rollup Door.
- D. Remove the empty TOC from the Roller TOC Stand.
- E. Move the empty TOC to the area designated for storage of prepared TOCs.
- F. IF a full TOC is not ready to be moved out of the Annex,
THEN ensure that the roller TOC Stand is positioned near the Building 64 Airlock Rollup Door.
- G. Close the Building 65 Airlock Rollup Door.
- H. IF a full TOC is ready (8.6 completed) to be moved out of the Annex,
THEN go to 8.7.

8.6 Full TOC Preparation for Transfer to the Airlock**WARNING**

Good ALARA practices are a must while working with a full TOC. Minimize time in the vicinity of the full TOC to minimize personnel exposure.

- 8.6.1 Verify that the Annex entry requirements are met for personnel entry.
- 8.6.2 Verify permission granted by Supervisor to access the Airlock and Annex.
- 8.6.3 Verify that all other Airlock Doors are Closed.
- 8.6.4 Enter the Airlock, closing Building 64 Airlock Door.
- 8.6.5 Enter the Annex, closing the Building 65 Airlock Door.

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8.0 PROCEDURE (cont.)

8.6 Full TOC Preparation for Transfer to the Airlock (cont.)

- 8.6.6 Clean the TOC lid bolting seating surface on the TOC base.
- 8.6.7 Install four lid bolts using an impact wrench, one in each corner of the TOC, ensuring that the TOC Lid and Base Bolting Flanges make metal-to-metal contact.
- 8.6.8 Decontaminate, by gross wipedown, all external surfaces of the TOC, especially the base exterior.
- 8.6.9 IF there is any visible material on the floor around the TOC, THEN clean up material.
- 8.6.10 IF there is more than one TOC needing to be prepared, THEN repeat 8.6.6 through 8.6.9 until all are complete.
- 8.6.11 After completion of this task, check that all Airlock Doors are closed and exit the Annex.

8.7 Transfer and Handling of a Full TOC Container

WARNING

Good ALARA practices are a must while working with a full TOC. Minimize time in the vicinity of the full TOC to minimize personnel exposure.

- 8.7.1 Verify that the Annex entry requirements are met for personnel entry.
- 8.7.2 Verify permission granted by Supervisor to access the Airlock and Annex.
- 8.7.3 Verify that all other Airlock Doors are Closed.
- 8.7.4 Enter the Airlock, closing Building 64 Airlock Door.
- 8.7.6 Verify that personnel have left the Airlock after doffing Anti-C clothing.
- 8.7.5 Enter the Annex, closing the Building 65 Airlock Door.
- 8.7.7 Open the Building 65 Airlock Rollup Door.
- 8.7.8 Verify the position of the Roller TOC Stand at the Building 65 Airlock Door.
- 8.7.9 IF an empty prepared TOC is on the Roller TOC Stand, THEN move the TOC into the Annex per 8.5.2.

8.0 PROCEDURE (cont.)**8.7 Transfer and Handling of a Full TOC Container (cont.)**

8.7.10 Transfer a Full TOC from the Annex to the Airlock using the Manned Building 65 Forklift Truck as follows:

WARNING

Never lift a full TOC by the TOC lid straps. Lift only under the TOC Base.

- A. Move the full TOC from the Annex TOC Stand to the Roller TOC Stand.
- B. Push the Roller TOC Stand into the Airlock until it is near the Building 64 Airlock Rollup Door to shut.
- C. Close the Building 65 Airlock Rollup Door.

8.7.11 Inform the RCT that the TOC is ready for radiological survey.

NOTE 1: The RCT performs the survey and informs the Supervisor whether the TOC need further decontamination, or if the TOC is ready to be transferred out of the Airlock.

NOTE 2: The Shift Supervisor gives permission to remove the decontaminated full TOC and to open the Building 64 Airlock Rollup Door.

8.7.12 Transfer a Clean/Full TOC into Building 64 using the Manned Building 64 Forklift Truck as follows:

- A. Verify that all other Airlock Doors are closed.
- B. Open the Building 64 Airlock Rollup Door.
- C. Retrieve and Move the full TOC out of the Airlock.
- D. Close the Building 64 Airlock Rollup Door.

8.7.13 Move the Full TOC to the TOC Bolting Stand.

8.7.14 Install the remaining bolts in the TOC using an impact wrench, ensuring that the TOC Lid and Base bolting flanges make metal-to-metal contact.

8.7.15 Remove a section of the four TOC lid straps using a shear, disabling the straps.

8.7.16 Move the Full TOC to the scale to prepare for Storage/Shipment.

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8.0 PROCEDURE (cont.)

8.8 Full TOC Preparation for Storage/Shipment

- 8.8.1 Obtain the "Thorium Overpack Work Sheet" (See Attachment D) from the Shift Supervisor for the TOC being prepared.
- 8.8.2 Obtain the bar-code label from the Supervisor.
- 8.8.3 Ensure that Sections 1 through 4 on Attachment D have been completed by the ROS Support Operator and Supervisor.
- 8.8.4 Place the bar-code label in the upper left hand corner of the visible long side of the TOC.

NOTE: Gross Weight of the TOC must not exceed 8,000 pounds.

- 8.8.5 Record the Gross Weight of the TOC container in Section 5 of Attachment D.
- 8.8.6 IF the container weighs more than 8,000 pounds, THEN perform actions per Procedure 64-C-103, "Thorium Overpacking Project Infrequent Events Procedure".
- 8.8.7 Complete Sections 5 and 6 of Attachment D.
- 8.8.8 Move full TOC to the TOC Storage Area.
- 8.8.9 Record the location of the TOC on Attachment D.
- 8.8.10 Return the complete, signed Attachment D to the Shift Supervisor.

8.8.11 Prepare TOCs for Shipment

- A. Move the designated full TOC from the storage area inside Building 64 to the laydown area outside Building 64.
- B. Place the full TOC onto trailers for transport to the loading dock after RCT has complete required surveys.

8.9 Packaging Contaminated Plywood/Trash for Shipment

WARNING
Good ALARA Practices are a must while handling contaminated plywood. Minimize contact with loose material by vacuuming the surface thoroughly before handling.

NOTE 1: No more than 250 sheets of plywood are allowed to be accumulated in the Annex (SAR requirement).

NOTE 2: Broken up plywood sheets can be packaged per 8.10.

- 8.9.1 Verify that the Annex entry requirements are met for personnel entry.

8.0 PROCEDURE (cont.)**8.9 Packaging Contaminated Plywood/Trash for Shipment (cont.)**

- 8.9.2 Verify permission granted by Supervisor to access the Airlock and Annex.
- 8.9.3 Verify that all other Airlock Doors are Closed.
- 8.9.4 Enter the Airlock, closing Building 64 Airlock Door.
- 8.9.5 Enter the Annex, closing the Building 65 Airlock Door.
- 8.9.6 Remove any loose thorium material per 8.10.
- 8.9.7 Prepare to move Plywood to Container as follows:
- A. Place plastic wrapping material over the TOC Stand, large enough to wrap a stack of plywood.
 - B. Wrap plywood in plastic and tape joints.
 - C. Move wrapped plywood to the Airlock for the RCT to monitor.
 - D. WHEN approved by the RCT,
THEN move the wrapped plywood to the container.
- 8.9.8 Open the doors to the container.
- 8.9.9 Two Operators shall lift and carry the plywood to the container.
- 8.9.10 Close the container door when all plywood is loaded.
- 8.9.11 IF the container is full,
THEN prepare the container for shipment offsite per site procedures.
- 8.9.12 After completion of this task, check that all Airlock Doors are closed and exit the Annex.

8.10 Loose Thorium Material Cleanup**WARNING**

Good ALARA Practices are a must while working around drums and TOCs containing Thorium Material. Minimize time in the vicinity of drums and TOCs to minimize personnel exposure.

NOTE: It is important that the proper preparations be done prior to personnel entry into Building 65 in an effort to reduce personnel exposure and meet ALARA goals for the project.

- 8.10.1 Verify that the Annex entry requirements are met for personnel entry.

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8.0 PROCEDURE (cont.)**8.10 Loose Thorium Material Cleanup (cont.)**

8.10.2 Verify permission granted by Supervisor to access the Airlock and Annex.

8.10.3 Verify that all other Airlock Doors are Closed.

8.10.4 Enter the Airlock, closing Building 64 Airlock Door.

8.10.5 Enter the Annex, closing the Building 65 Airlock Door.

NOTE: Normally, Manual Loose Material Cleanup will follow a Remote Loose Material Cleanup. Therefore, a TOC Insert should be located in the area for disposal of the loose material.

8.10.6 IF a TOC with a TOC Insert is not located in the area,
THEN hand carry a drum to the cleanup area.

8.10.7 Perform cleanup and dispose of the cleanup material in the TOC Insert or drum.

8.10.8 IF a drum is used to collect material,
THEN secure a lid on the drum.

8.10.9 IF a TOC Insert is used to collect material,
THEN install front boards as necessary to keep the level of material in the TOC Insert below the top of the front board.

8.10.10 Check that all Airlock Doors are closed and exit the Annex after completion of this task.

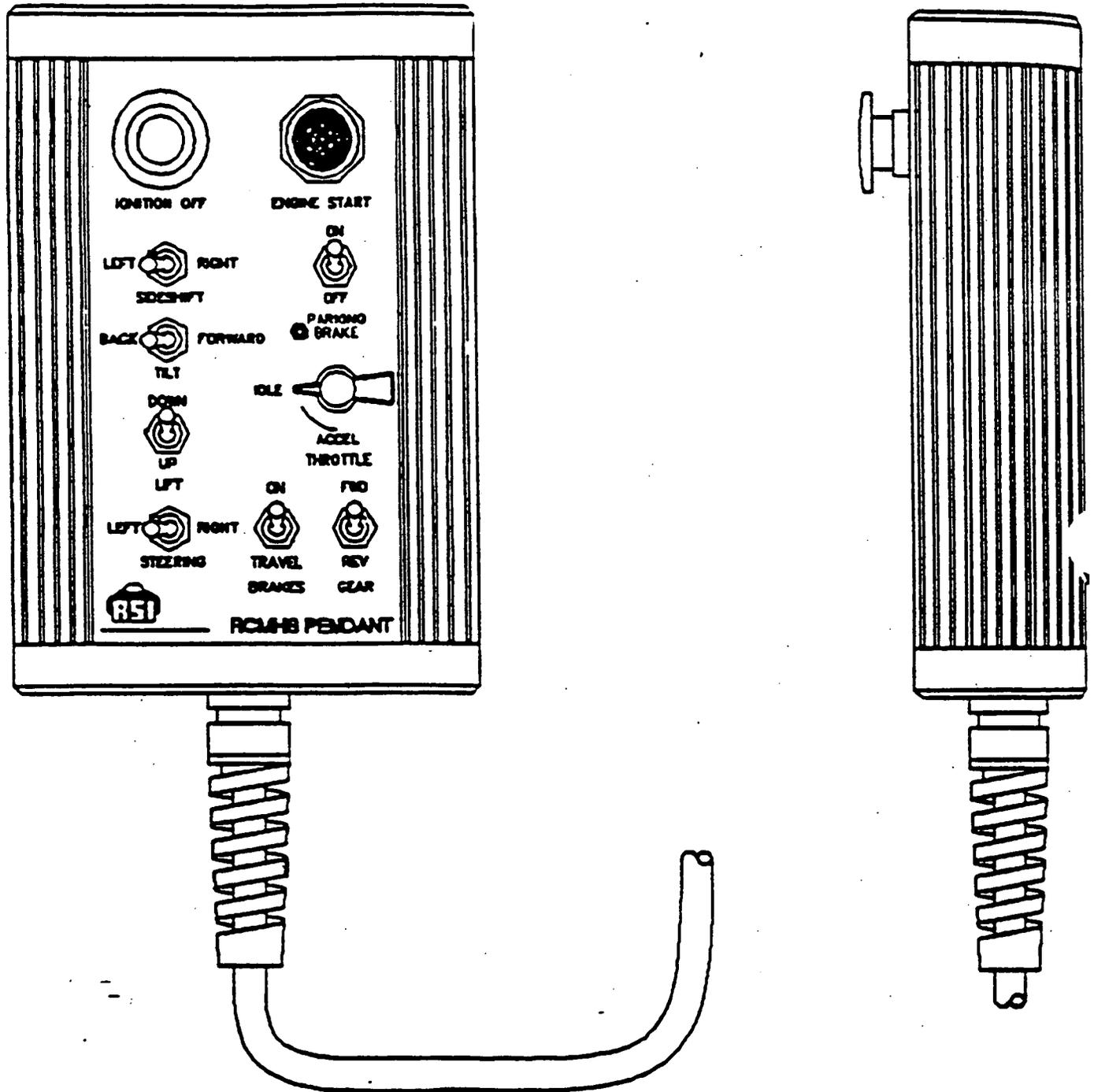
8.11 Routine Shutdown/Securing of Building 64/65

NOTE 1: Routine Shutdown/Securing of Building 64/65 shall be conducted when there are no activities scheduled to be performed on the next shift.

NOTE 2: Shutting down the HEPA Building Exhaust Units shall be conducted per 8.2.4. The Supervisor shall determine which units will be left operating.

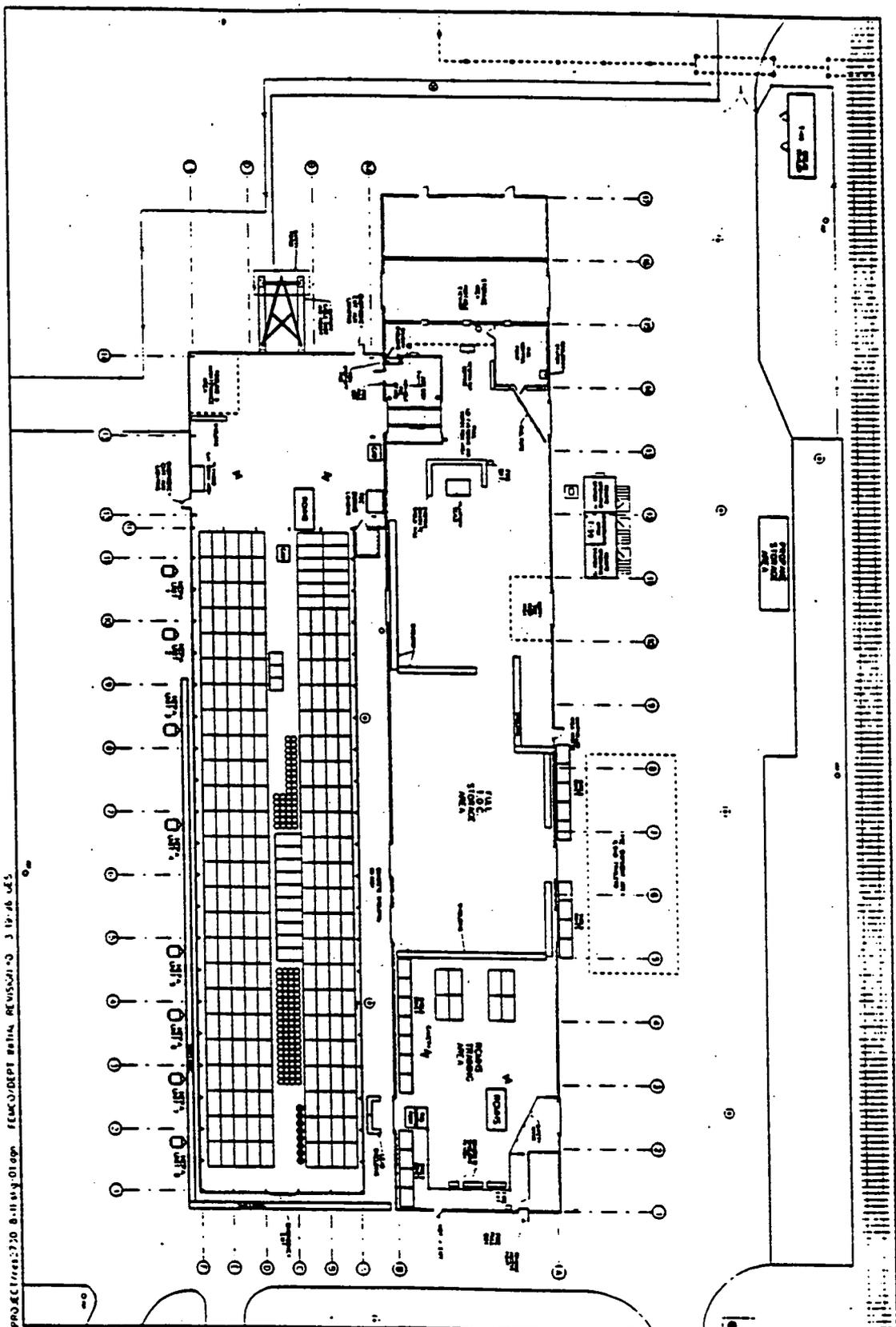
8.11.1 Complete the "Building 64/65 Shutdown Checklist" (See Attachment E) all sections.

RCMHS VEHICLE PENDANT LAYOUT



RCMHS VEHICLE PENDANT LAYOUT
Figure 1

000057



PROJECT: 64-270 B-11143-01000 FEMCO/DEPT BETHA REVISION: 3 19-76 U.S.

GENERAL ARRANGEMENT OF THORIUM OVERPACK PROJECT IN BUILDINGS 64 & 65 (SYG-DFC9770-01)

LEGEND:
• GENERAL AREA BLD. OR SAMPLE
○ AREA MONITORING BLD. OR SAMPLE

BUILDING 64/65 LAYOUT
Figure 2

000058

HEPA UNIT STARTUP CHECKLIST

Time: _____

Date: _____

HEPA UNIT POSITION								STARTUP ACTIONS	EXPECTED RESPONSE/CONDITION
1	2	3	4	5	6	7	8		
								Check HEPA Unit for Exterior Damage	No Damage, Holes
								Check Unit Inlet Duct and Inlet Valve	No Holes/Openings in Duct/Valve OPEN
								Check UNIT PM DOP Test Sticker on HEPA Housing	Date Not Expired and Attached
								Check Main Local Power Receptacle Switch	Unit Plugged in and in ON position
								Turn ON Main Power on HEPA Unit Control Panel	Unit Energized, Light On
								Check Prefilter Low d/p Setting	0.2 inches of water
								Check Prefilter High d/p Setting	1.5 inches of water
								Check HEPA-Filter Low d/p Setting	1.0 inches of water
								Check HEPA Filter High d/p Setting	4.0 inches of water
								Push START button on HEPA Unit Control Panel	Blower Starts
								Check Exhaust for Visible Discharge	No visible material from exhaust
								Record d/p readings on HEPA Inspection Logsheets	None
								Check Local Unit Control Panel trouble lights	None Lit
								Check ROS HEPA Panel Trouble Light 'PUSH TO TEST'	Red Light comes ON when Pushed

HEPA Unit Position Number	1	2	3	4	5	6	7	8
HEPA Unit Equipment Number								

Comments: _____

Facility Monitor: _____

Supervisor Review: _____

Badge No.: _____ Date: _____

Badge No.: _____ Date: _____

HEPA BUILDING EXHAUST SYSTEM SHIFT INSPECTION LOGSHEET

DATE: _____ SHIFT: _____

HEPA Position Number	Inspection Item	Satisfactory Response	1st Inspection		2nd Inspection	
			SAT	UNSAT	SAT	UNSAT
Time of Inspection		Record Start Time				
1	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
2	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
3	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
4	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
5	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					

HEPA BUILDING EXHAUST SYSTEM SHIFT INSPECTION LOGSHEET (cont.)

HEPA Position Number	Inspection Item	Satisfactory Response	1st Inspection		2nd Inspection	
			SAT	UNSAT	SAT	UNSAT
6	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
7	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
8	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
BU1	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					
BU2	Operation Status	OP / SD / SB				
	Prefilter d/p	Between 0.2 and 1.5 d/p				
	HEPA Filter d/p	Between 1.0 and 4.0 d/p				
	Unit Physical Condition	No Exterior Damage				
	Local Panel Alarm Status	No High or Low d/p Alarms				
	Visible Discharge from Exhaust	No Visible Discharge				
	Comments					

Facility Monitor: _____
 Facility Monitor: _____
 Supervisor Review: _____

Badge No. _____ Date: _____
 Badge No. _____ Date: _____
 Badge No. _____ Date: _____

THORIUM OVERPACKING PROJECT BUILDING 64/65 PRE-START CHECKLIST

Date: _____

1. Perform the following Building Security Actions/Checks:

CHECK	INSPECTION/ACTION ITEM
	Unlock all Building 64 Personnel Doors
	Check Security Video over period the Building was Unattended
	Check All Airlock Doors Closed

2. Perform the following Safety Equipment Checks/Actions:

CHECK	INSPECTION/ACTION ITEM
	Check Portable Safety Shower/Eye Wash Station
	Check Stock of Anti-C Clothing (incl. gloves, shoe covers)
	Check Supply of ready to use (PAPR) Respirators and Batteries
	Check Supply of Breathing Zone (BZ) Samplers
	Check Supply of (SRPD) Dosimeters
	Move Anti-C for Laundry to Pickup Area
	Check condition of Rad. Con. Barriers
	Check with RCT if any RWP or Barrier Changes have been made

3. Perform the following Communication Checks:

CHECK	INSPECTION/ACTION ITEM
	Check Radio Batteries, Fully Charged
	Distribute Radio
	Check Radio on Channel 6 and Turned On

4. Ensure that the following Operations Checks are made Prior to Airlock/Annex/Building 65 Entry:

CHECK	INSPECTION/ACTION ITEM
	CAMs Operating, Operational and Not Alarming (RCT Check per 3.2.20)
	HEPA Building Exhaust Units Operating, Checklist Complete

5. Ensure that the following Operations Checks are made Prior to Startup

CHECK	INSPECTION/ACTION ITEM
	All Manned Forklift Trucks Inspection Complete per 3.2.11
	TOC Scale Check Complete per 3.2.8
	RCMHS System Functional Checks Complete per 3.2.1

6. Current Wind Speeds/Direction: _____ mph _____ direction

7. Ready to Start Overpacking Operation:

Shift Supervisor: _____ Badge No.: _____ Time: _____

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**THORIUM OVERPACKING PROJECT
THORIUM OVERPACK WORK SHEET**

1a. Thorium Overpack Container (TOC) Inventory Number: _____ (Assigned after TOC is Lidded)

1b. Thorium Overpack Container (TOC) Serial Number: _____

2. TOC Preparation Visual Checks: (also recorded on Video Tape)

CHECK	INSPECTION ITEM	WEIGHT
	Verify that Absorbent Pad installed on TOC Bottom	
	Verify that Plywood installed on top of Absorbent Pad (if No Insert)	
	Verify that TOC Insert installed on top of Absorbent Pad	
	Verify TOC Base in Good Condition to receive Drums/Debris.	

3. TOC Content Visual Inventory Information: (also recorded on Video Tape)

DRUM INFORMATION

DRUM MARKINGS			WEIGHTS (lbs.)				DRUM SIZE			DRUM CONDITION			COMMENTS
OX	HY	Lot, Other or No Markings	N/A	Gross	Tare	Net	35	55	Other	Good	Bottom Failure	Total Failure	

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THORIUM OVERPACKING PROJECT THORIUM OVERPACK WORK SHEET (cont.)

DEBRIS/FAILED DRUM INFORMATION (TOC Insert Used)

DRUM MARKINGS			ESTIMATED QUANTITY (gallons/scoops)	DRUM SIZE (gal.)			COMMENTS
OX	HY	Lot, Other or No Markings		35	55	Other	

4. TOC Overpacking Signatures:

ROC Support Operator: _____ Badge No.: _____ Date: _____

Reviewing Supervisor: _____ Badge No.: _____ Date: _____

5. Full TOC Visual Checks:

CHECK	INSPECTION ITEM
	All bolts installed and tightened/flange metal-to-metal.
	All container labels attached and correct.
	Condition of Paint and Structure of TOC Lid/Base.
	TOC Lid Lifting Straps Disabled using Metal Shears.

THORIUM OVERPACKING PROJECT
THORIUM OVERPACK WORK SHEET (cont.)

6. Full TOC Information

TOC Inventory Number	
TOC Serial Number	
TOC Lot Number	0000-716-T-090-_____
TOC Container Number	

Gross Weight	
TOC Tare Weight	
TOC Mat. Prep. Weight	
Net Weight	

7. TOC Storage Location

ROW NUMBER									STACK						LEVEL		
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	B	M	T

8. TOC Overpacking Signatures:

TOC Prep. Operator: _____ Badge No.: _____ Date: _____

Reviewing Supervisor: _____ Badge No.: _____ Date: _____

000065

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**THORIUM OVERPACKING PROJECT
BUILDING 64/65 SHUTDOWN CHECKLIST**

Date: _____

1. Perform the following Operations Shutdown Actions/Checks:

CHECK	INSPECTION/ACTION ITEM
	Shutdown HEPA Building Exhaust Units
	RCMHS Shutdown Checklist Complete (Keys in Lock Box)
	Shutdown all Manned Forklift Trucks (LPG Cylinder Valve Closed)
	Check all monitors and VCRs Off (except security system)
	Check All Airlock Doors Closed

2. Ensure that the following are in storage for recharging batteries:

CHECK	INSPECTION/ACTION ITEM
	Electric Forklift Trucks Plugged in
	Radio Batteries in Charger
	PAPR Respirator Blower Batteries in Charger

3. Perform the following Building Security Actions/Checks:

CHECK	INSPECTION/ACTION ITEM
	Lock all Building 64 Personnel Doors
	Check Security Video Recording and set on 72 hour mode
	Remember to lock ROS Trailer Doors upon exiting

4. Thorium Overpacking Operation Shutdown Complete:

Shift Supervisor: _____ Badge No.: _____ Time: _____

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RECORD OF ISSUE/REVISIONS

<u>DATE</u>	<u>REV. NO.</u>	<u>DESCRIPTION AND AUTHORITY</u>
10-09-95	0	Procedure requirement for "Startup and Operation (MANNED) Building 65 Thorium Overpacking Project", per Request No. P95-0243, initiated by M. Slaughter.
01-17-96	0	Procedure reissued to comply with current program requirements for "Startup and Operation (MANNED) Building 65 Thorium Overpacking Project", per Request No. P95-0395, initiated by M. Slaughter.
03-06-96	1	Procedure revised to conform to current program requirements per Request No. P96-0097, initiated by T. Huey.
03-26-96	2	Procedure revised to conform to current program requirements and to incorporate TCN-0624, per Request No. P96-0126, initiated by T. Huey.

000067

Fernald Environmental Management Project Fernald Environmental Restoration Management Corp. REMEDIAATION SUPPORT OPERATIONS DOCUMENT SYSTEM		Page 1 of 43 Revision No. 2 Revision Date: 03-26-96
REMEDIAATION SUPPORT OPERATIONS PROCEDURE	Thorium Overpacking Project Remote Operations Procedure	64-C-102 TECHNICAL PROCEDURE
(Signature on File) Authorization: T. Huey, TOP Operations Manager	Supersedes: Rev. 1	Issue Date: 01-17-96

UNCONTROLLED

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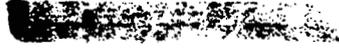
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1.0 PURPOSE

1.1 This procedure provides instructions to Thorium Overpacking Project (TOP) operations personnel for the safe Remote Operations needed to support thorium overpacking.

2.0 SCOPE

2.1 This procedure shall apply to the TOP Operations Personnel assigned and qualified to those positions required to perform the Thorium Overpacking Project.

2.2 This requirement contained in this procedure applies only to Remote Operations in the area inside Building 65 and Building 64 training area.

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

- 3.1.1 D10-00-020, "Remediation Support Operations Division Document System"
- 3.1.2 DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities"

3.2 Reference Documents

- 3.2.1 64-C-101, "Thorium Overpacking Project Manned Operations Procedure"
- 3.2.2 64-C-100, "Thorium Overpacking Project Emergency Events Procedure"
- 3.2.3 64-C-103, "Thorium Overpacking Project Troubleshooting Response Procedure"
- 3.2.4 OP-0004, "FERMCO Lockout/Tagout (Hazardous Energy and Material Control) Procedure"
- 3.2.5 FEMP-2404, "Thorium Overpacking Project Final Safety Analysis Report", Rev. 1
- 3.2.6 TOP-QAJSP-0001, Rev. 2, "Quality Assurance Job Specific Plan (QAJSP) for the Thorium Overpacking Project"
- 3.2.7 TOP-RCMHS-S0001, Rev. 2, "Building 65 Remote Controlled Materials Handling System"
- 3.2.8 MCA-I-015, "Overpacking Thorium in-Building 65"
- 3.2.9 RM-0021, "Safety Performance Requirements Manual"
- 3.2.10 M-136, "Operations Manager's Standing Orders for Thorium Overpacking Project (TOP) System"
- 3.2.11 TOP-TSR-001, "Technical Safety Requirements for the Thorium Overpacking Project"

3.0 APPLICABLE DOCUMENTS (cont.)

3.2 Reference Documents (cont.)

- 3.2.12 TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan"
- 3.2.13 TOP-HPP-001, "Health Physics Plan for the Thorium Overpacking Project"
- 3.2.14 3097-601-012MNL, "B3097 RCMHS"
- 3.2.15 RC-DPT-038, "Alpha CAM Operation, Victoreen Model 758"
- 3.2.16 QP-12.03, "Certification of Waste Containers and Filling With LLRW For Shipment to NTS"
- 3.2.17 QP-12.04, "Certification of LLRW Packages, Pre-Load Inspections Through Loaded Transport Vehicle Inspection, For Shipment to the Nevada Test Site"
- 3.2.18 JSA 367, "Thorium Overpacking Project Job safety Analysis"
- 3.2.19 JSA 404, "Manual Retrieval of the RCBU"
- 3.2.20 DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65"

4.0 DEFINITIONS

- 4.1 Access Doors - Refers to both the Airlock to Annex or Airlock to Building 64 Personnel and Rollup Doors.
- 4.2 Airlock -The primary means of entry into Building 65 and the Annex from Building 64. Its purpose is to control the air leakage from Building 65.
- 4.3 Check - Confirm that a specified activity has occurred or a stated condition exists. If the activity or condition does not exist, the Shift Supervisor shall be notified to investigate the condition.
- 4.4 Close Circuit Television (CCTV) - The stationary cameras (not attached to the RCBU) that are used to assist the Remote Control Operator with operation of the RCMHS.
- 4.5 Continuous Air Monitor (CAM) - Alpha radiation air monitoring system with real time measurement capabilities. CAMs on the TOP are equipped with visual and audible alarms which are set at appropriate airborne radioactivity levels. CAMs are safety significant components as defined in the Safety Analysis Report, Section 4.
- 4.6 Deteriorated Drums - Those drums which can be visibly identified as likely to fail, via collapse, bottom release, etc., and therefore, represent a potential for a release of thorium into the working environment.
- 4.7 Drum/Plywood Handler - An RCBU attachment tool that is capable of grabbing, holding, lifting, turning, and releasing one drum. It is also capable of lifting and holding plywood separators.

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4.0 DEFINITIONS (cont.)

- 4.8 Drum Stack - The stack containing the next drum to be loaded. This also applies to a set of drums not actually in a stack (but in the aisle).
- 4.9 Ensure - Make certain that an activity has taken place or a condition exists, per specified requirements (by actions if necessary).
- 4.10 Failed Drum - Visible thorium material spilled from a drum either prior to or after the drum is handled. Handling plywood containing visible loose thorium material is also classified as a failed drum.
- 4.11 Fork Tine - An RCBU attachment tool, typically used on forklift trucks, that is capable of lifting and lowering the TOC, base and/or lid. It is also capable to move other equipment, such as TOC stands, that will be used in the operation.
- 4.12 High Efficiency Particulate Air (HEPA) Filter - A pleated fibrous medium filter that has a particulate efficiency of at minimum 99.97 percent (%) for 0.3 micrometer particulate of DOP aerosol.
- 4.13 Loose Material Cleanup Tool - An RCBU attachment tool that is capable of retrieving loose material from flat surfaces using a shovel and scraper.
- 4.14 Manned - Thorium Overpacking activities which are NOT performed remotely by the RCMHS.
- 4.15 Plywood Separator - Plywood used to set the upper drums on top of bottom drums. Its purpose was to provide a flat surface to stack the drums in Building 65.
- 4.16 RCBU Attachment Tools - Tools used for remote operation by installing them on the RCBU vehicle, including the Drum/Plywood Handler, Fork Tines, and Loose Material Cleanup Tool.
- 4.17 Remote - Thorium Overpacking activities which are performed remotely using the RCMHS.
- 4.18 Remote Control Base Unit (RCBU) - Remote controlled fork lift truck used as part of the Remote Controlled Materials Handling System (RCMHS).
- 4.19 Remote Control Material Handling System (RCMHS) - The remote thorium overpacking equipment, which includes the Remote Operation Console (ROC) and the Remote Control Base Unit (RCBU).
- 4.20 Remote Control Operator - The Primary-Operator of the "Remote Operating Console (ROC)" (See Figure 1).
- 4.21 Remote Operating Station (ROS) - The operating station containing the controls for operating the RCBU remotely and appropriate support system.

4.0 DEFINITIONS (cont.)

- 4.22 SUPERVISORY HALT Switch - A safety switch used by the Support Operator to halt operation of the RCBU in an emergency or when the vehicle responses is not as directed by the Remote Control Operator. The SUPERVISORY HALT Switch is a safety significant component as defined in the Safety Analysis Report, Section 4.
- 4.23 Support Operator - The second Operator in the ROS, operating the Camera Control Console, Secondary Camera Console and SUPERVISORY HALT Switch and assisting the Remote Control Operator.
- 4.24 Technical Safety Requirements (TSR) - The requirements that are needed to ensure that the safety-support system/structure/components SSCs and administration controls required by the TOP Safety Analysis Report are provided and operable.
- 4.25 TOC - Thorium Overpack Container used to overpack Thorium drums.
- 4.26 TOC Insert - A container that is set on a Thorium Overpacking Container (TOC) base to facilitate disposal of loose thorium waste from deteriorated drums.
- 4.27 Verify - Confirm that a specified activity has occurred or a stated condition exists. If the activity or condition do not exist, take action to make the condition exist.
- 4.28 Visual Monitoring System (VMS) - The VMS provides the remote control operator the visual capabilities to remotely maneuvering and navigating the RCBU to retrieve drums, TOCs, plywood, and loose material in Building 65.

5.0 RESPONSIBILITIES

- 5.1 The Operations Manager is responsible to the Project Manager and the Vice President of Waste Programs Management for the following:
- 5.1.1 Those duties and responsibilities outlined in M-136, "Operations Manager's Standing Orders for Thorium Overpacking Project (TOP) System".
- 5.1.2 Emphasizing safety in the day-to-day operations by taking an active role in resolving safety issues and daily walkthrough of the work area.
- 5.1.3 Providing technical direction for resolution of safety and processing issues and events.
- 5.1.4 Providing routine daily instructions to shift personnel through Daily Orders.
- 5.1.5 Ensuring that operations are conducted per formal approved instructions and procedures.
- 5.1.6 Ensuring that Facility Owner responsibilities for Building 64/65 are completed per site procedures.

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5.0 RESPONSIBILITIES (cont.)

5.2 The Shift Supervisor is responsible to the Operations Manager for the following:

5.2.1 Those duties and responsibilities outlined in M-136.

5.2.2 Act as Alternate Facility Owner.

5.3 The TOP Operators, consisting of both HAZWATs and MVOs, are responsible to the Shift Supervisor for the following:

5.3.1 Those duties and responsibilities outlined in M-136 for the position they are assigned by the Supervisor.

5.3.2 Immediately stopping any activity that the Operator feels is unsafe.

5.3.3 Maintaining a clean and safe work area.

5.3.4 Taking corrective actions during unusual or emergency situations.

5.3.5 Informing the Shift Supervisor of any problems immediately.

5.3.6 The Remote Operator and Support Operator shall record overpacking operations on videotape to assist in waste certification. Tapes of past operations shall be turned over to TOP Document Control periodically.

5.4 The field Radiological Control Technician (RCT) is responsible to the Shift Supervisor for the following:

5.4.1 Informing the Shift Supervisor of any changes in radiological control or air monitors, including the Continuous Air Monitors (CAMs).

5.4.2 Operating and maintaining radiological monitoring equipment including the CAMs, portable instruments, and the control points.

5.4.3 Notifying the Shift Supervisor of any CAM Alarms and any changes in their operation status.

5.4.4 Informing the Shift Supervisor of any unusual dosimetry readings.

5.4.5 Conducting surveys and releasing the TOCs and other equipment transferred through the Airlock from Building 65 to Building 64.

5.4.6 Assisting in the maintaining control of the access doors on the Airlock.

5.4.7 Assisting the Shift Supervisor performing daily briefings and event critiques.

5.5 Performance/Quality Assurance is responsible for certification of waste overpacking per references 3.2.16 and 3.2.17.

6.0 GENERAL

- 6.1 Warnings, Cautions, and Notes shall precede the Item, Step, Sub-Step, Section, and Sub-Section to which they apply.
- 6.2 The SUPERVISORY HALT Switch, on the "RCMHS Camera Control Console" (See Figure 2), must be functional during any Remote operations. (TSR Requirement, LC01) If not functional, these activities must be stopped immediately and not resume until function is available (SAR 5.5.1.1). A confirmatory testing and operation of the SUPERVISORY HALT Switch shall be performed as part of the daily functionality check at the start of each shift (See Figure 4). This test must also be performed after any maintenance is performed on the RCMHS.
- 6.3 The Continuous Air Monitor (CAM) must be operating for at least two hours and not alarming prior to personnel entry into the Annex or Building 65. If either CAM is not functioning, manned activities within Building 65 and the Annex must be stopped and personnel leave the area (TSR Requirement, LC02). Access to maintain and/or troubleshoot any problem may take place, under the control of the Radiological Work Permit (RWP), using appropriate portable instrumentation (SAR 5.5.1.2). CAM functionality checks will be performed at the beginning of the shift by the RCT. The RCT shall inform the Supervisor on the status of this equipment when changes occur.
- 6.4 No personnel shall be permitted inside Building 65 or the Annex when the RCBU is being operated remotely (SAR Requirement).
- 6.5 Vehicles that are fueled by propane must have cylinders that are limited to no more than the standard size (33 1/2 pounds) (SAR Requirement). The size of the cylinder will be verified by ensuring that only properly stamped LP cylinders are installed on the RCBU or LP Fork lift truck in the Annex and Building 65.
- 6.6 The Remote Control Operator shall be rotated to another work station periodically. (SAR Requirement) No Remote Control Operator shall spend more than two continuous hours at the controls when the RCMHS is operating (Human Factors Engineering Requirement). The Remote Control Operator shall be rotated out of this position for at least an hour before resuming control of this position.
- 6.7 Operators shall immediately report any problem, including alarms, equipment failure, etc., to the Supervisor. Those problems that are identified as "Emergency", per Procedure 64-C-100, "Thorium Overpacking Project Emergency Events Procedure", shall be responded to per that procedure. Those problems that are not identified in Procedure 64-C-100, shall be responded to per 64-C-103 "Thorium Overpacking Project Troubleshooting Response Procedure".
- 6.8 If a step cannot be performed as it is currently written in this procedure, or if a procedure does not exist for an action, the Operator shall stop the performance of the procedure, notify the Shift Supervisor, and place the system/equipment in a safe, stable condition.

6.0 GENERAL (cont.)

- 6.9 The Airlock has four access doors, two roll-up overhead doors, used to move TOCs or large equipment, and two personnel doors. There is one of each type of door to the Annex and Building 64. Personnel entering the Airlock from Building 64 or the Annex are responsible for ensuring that only one door is open at a time.
- 6.10 Instrumentation and Equipment that require scheduled preventive maintenance or calibration verification are equipped with stickers indicating the date when the next calibration/maintenance checks are to be performed. These stickers are to be checked prior to use and if found to be past due for inspection shall not be used until completed.
- 6.11 The Remote Operating Station (ROS) shall be kept clear of distractions when the RCMHS is being operated. Shift Supervisor shall restrict visitor access into the trailer and ensure that administrative duties do not distract ROS Operations Personnel.
- 6.12 The ROS shall be continuously manned by two qualified RCMHS Operators (Remote Control Operator and Support Operator) whenever the RCMHS is in a remote operation mode.
- 6.13 Per the ACCIP (reference 3.2.18), the following actions will be taken during operations:
 - 6.13.1 After a drum failure has occurred, overpacking activities within Building 65 and the Annex will be stopped for a surveillance period of a minimum of 2 hours.
 - 6.13.2 Before opening any Airlock to Annex Rollup Door, ensure that the surveillance period of 6.10.1 has been completed since the operator handled a failed drum, and that both Airlock to Building 64 Access Doors are shut.
 - 6.13.3 Before opening the Airlock to Building 64 Personnel Door, ensure that both Airlock to Annex Access Doors are shut.
 - 6.13.4 Before opening the Airlock to Building 64 Rollup Door, ensure that both Airlock to Annex Access doors are shut and that the Airlock to Annex Rollup Door has been shut for thirty or more minutes if operations having a Potential Generation of Airborne Thorium have occurred within the last 2 hours in Building 65 and the Annex.
 - 6.13.5 All drum failures must be documented in the Supervisor's Log, with the time the movement of the drum was completed.
- 6.14 Verification of overpacking containers shall be conducted by Performance/Quality Assurance per references 3.2.16 and 3.2.17. Video tape of remote overpacking operations will be available within the TOP Document Control System to assist in this verification.

6.0 GENERAL (cont.)

- 6.15 Unusual events that threaten the physical integrity of Building 65 or the Annex (such as a broken window or a vehicle collision with a roll-up door) require that overpacking of thorium drums be suspended until Building 65 differential pressure is evaluated and determined to be satisfactory per reference 3.2.12 (ACCIP) and reference 3.2.20 (DPT-ED-0001).
- 6.16 The periodic surveillance of Building 65 differential pressure required by reference 3.2.12 (ACCIP) must be completed with satisfactory results before overpacking of thorium drums can commence. It is the assessor's responsibility to inform operations of any unsatisfactory result or deteriorating trend of Building 65 differential pressure surveillance.

7.0 HEALTH AND SAFETY REQUIREMENTS

- 7.1 Any circumstances which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to the Shift Supervisor. The Shift Supervisor shall immediately report the circumstances of possible radioactive materials intake to S&H Radiological Control Division for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow-up urine sample. When the suspect isotope is other than uranium, the involved personnel shall report to the Dosimetry Section of the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Department.
- 7.2 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by S&H.
- 7.3 All personnel involved in the Thorium Overpacking Project have the right and responsibility to refuse to perform an activity that is felt to be unsafe or stop any and all activities for any safety concern.
- 7.4 The Continuous Air Monitor (CAM) must be operating for at least two hours and not alarming prior to personnel entry into the Annex or Building 65. If either CAM is not functioning, manned activities within Building 65 and the Annex must be stopped and personnel leave the area. (TSR Requirement, LCO 2)
- 7.5 No personnel shall be permitted inside Building 65 or the Annex when the RCBU is being operated remotely (SAR Requirement).

7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.6 Vehicles that are fueled by propane must have cylinders that are limited to the standard size (33 1/2 pounds) (SAR Requirement).
- 7.7 All personnel performing work activities relative to this procedure must complete the following prior to starting work:
- 7.7.1 Understand this and other applicable procedures associated with the work to be performed.
 - 7.7.2 Follow the requirements of the work permits and procedures associated with the work to be performed.
 - 7.7.3 Ensure that all appropriate monitoring equipment is in place and operational as directed by the SOPs, RWPs and JSAs prior to entry into a contaminated area or starting work.
 - 7.7.4 If the work to be perform is non-routine, a pre-job brief and walkthrough should be conducted by the Supervisor. This briefing should consist of reviewing the work permits and the steps of the procedure that are to be performed.
- 7.8 Personnel safety equipment shall be operational and readily available for emergencies as specified by the SOPs, RWPs, and JSAs as appropriate.
- 7.9 Personnel entering any area in or around Building 64/65 are responsible for complying with requirements as specified on postings, RWPs, RCT, and all TOP safety documentation.
- 7.10 All tasks are to be pre-planned, ensuring that all equipment is in good working condition. Equipment in poor condition can increase the time in performing a task, thereby increasing exposure to radiation, which violates project As Low As Reasonably Achievable (ALARA) goals.
- 7.11 Be aware of the pinch points during RCBU tool attachment changes and during the handling of the TOC container. Keep hands, fingers, and feet out of these areas.
- 7.12 Non-tinted safety glasses with rigid side shields must be worn inside any structure, including Building 64/65.
- 7.13 When checking fluid levels and filters on the RCBU, be cautious of high temperature surfaces. Wear leather palm gloves if working close to these surfaces. Also watch contact with anti-C clothing for burn holes.
- 7.14 Be careful working around hydraulic fluid/equipment. There may be stored pressure in the hydraulic system which can be dangerous when working around hydraulically controlled parts of the RCBU and Forklift trucks. Care should be taken to make sure all hydraulic connections are made correctly and completely.

7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.15 Hazards associated with the Thorium Overpacking Project in Building 64/65 are identified in appropriate JSAs and RWPs. Recommended safe job practices are summarized below.
- 7.15.1 Elevated radiation fields - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.15.2 Thorium contamination - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.15.3 Heat Stress - Physiological monitoring of workers for control of heat stress or established work/rest regimen will be implemented per JSA 367. A change/cool area will be established with a supply of drinking water. The cool area will be established at the control point/change out area in Building 64.
- 7.15.4 Cuts, scrapes and abrasions - Leather palm gloves will be worn, as required in JSAs 367 and 404, when performing RCBU recovery or while handling sharp objects.

8.0 PROCEDURE

8.1 Pre-Operational Inspections

- 8.1.1 Ensure that all Pre-Operational Inspections are completed per 8.1 of Procedure 64-C-101, "Thorium Overpacking Project Manned Operations Procedure".

8.2 Remote Control Material Handling System (RCMHS) Operations

8.2.1 Pre-operation Inspection of the RCMHS

NOTE: "RCMHS System Functional Checklist" (See Attachment A, Sections 1, 2 and 3) requires an inspector to enter the Annex. Completion of the checklist will be done by the Remote Control Operator, in the ROS, who will be in visual and radio contact with the inspector in the Annex.

- A. Prepare RCBU for Remote Functional Check by completing Sections 1, 2, 3, and 4 of Attachment A.

WARNING

To prevent possible personnel exposure and/or injury and equipment damage, do not perform any remote operations of the RCBU until the Annex is cleared of all personnel and the Airlock doors to the Annex are closed.

- B. Complete Sections 5 through 9 of Attachment A.

1. Note any deficiencies and corrective action taken on the checklist.

8.0 PROCEDURE (cont.)

8.2 Remote Control Material Handling System (RCMHS) Operations (cont.)

8.2.1 Pre-operation Inspection of the RCMHS (cont.)

- 2. Document the results of the testing of the SUPERVISORY HALT Switch as shown on the "RCMHS Camera Control Console" (See Figure 2) at the start of each work shift in which the RCMHS will be operated remotely (TSR requirement).
- 3. IF the SUPERVISORY HALT Switch does not stop the RCBU in a Safe Configuration within six feet of travel after the switch is manually activated, THEN perform the following:
 - a. Immediately notify the Shift Supervisor.
 - b. Do not restart or operate the RCMHS until the SUPERVISORY HALT Switch has been inspected, except for retesting to confirm switch operability.

8.2.2 Startup of Operation of the RCMHS

WARNING

To prevent personnel exposure and/or injury and equipment damage, do not perform any remote operations of the RCBU until the Annex is cleared of all personnel and the Airlock doors to the Annex are closed.

- A. IF starting RCMHS at the beginning of a shift or after maintenance, THEN ensure that pre-operational inspections per 8.2.1 are complete.
- B. Verify that correct attachment is installed on the RCBU for the task to be performed.
- C. IF the wrong attachment is currently installed on the RCBU, THEN install the correct attachment per 8.3 of Procedure 64-C-101.
- D. Verify that NO personnel are located inside the Annex and Building 65.
- E. Verify that the Airlock doors to the Annex are closed.
- F. Verify that the VCR for the cameras are loaded with a tape and are turned on. Note the time the tape was started on the tape label and in the Video tape log.
- G. Verify that the Supervisor and Operator Keys have been inserted into the ROC (See Figure 1).

8.0 PROCEDURE (cont.)**8.2 Remote Control Material Handling System (RCMHS) Operations (cont.)****8.2.2 Startup of Operation of the RCMHS (cont.)**

H. Turn the Supervisor and Operator Keys to the ON position.

I. Push the Engine Start Button to start the RCBU.

8.2.3 Prepare to Remove the Drum/Plywood Handler Attachment from the RCBU

A. IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

B. Move the RCBU to the Tool Changing Area in the Annex (See Figure 3).

C. Ensure that the drum grippers are in a fully Retracted position.

D. Ensure that the drum grippers are in the Closed position.

E. Place the RCMHS in Standby per 8.8.

8.2.4 Prepare to Remove the Fork Tine Attachment from the RCBU

A. IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

B. Move the RCBU to the Tool Changing Area in the Annex.

C. Lower the Forks onto the Holding Cart.

D. Place the RCMHS in Standby per 8.8.

8.3 Transfer and Handling of an Empty TOC Container

8.3.1 IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

8.3.2 Verify that the fork tines are installed on the RCBU.

A. IF the RCBU is not equipped with the fork tines,
THEN move the RCBU to the Tool Changing Area.

B. Place the RCBU in Standby per 8.8.

C. Install fork tines to RCBU per 8.3 of Procedure 64-C-101.

8.3.3 Move RCBU to the empty TOC.

8.3.4 Move TOC to a location that will require the shortest amount of travel distance to the drums to be retrieved.

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8.0 PROCEDURE (cont.)

8.3 Transfer and Handling of an Empty TOC Container (cont.)

NOTE: Ensure that the VCR is recording when working with a full TOC.

8.3.5 IF there is a full TOC in the area,
THEN transfer the empty TOC lid to the full TOC base.

A. Record the TOC number in Section 1 of the "Thorium Overpack Work Sheet" (See Attachment B) for the full TOC base.

8.3.6 IF there is no full TOC to transfer the lid,
THEN remove the lid from the TOC base and place in the Annex, away from the overpacking activity, taking care to protect the TOC Lid gasket.

8.4 Retrieval and Packaging Thorium Waste Drums into TOC Container

NOTE: A surveillance interval of two hours must have been completed since it was determined that a drum failure occurred.

8.4.1 Ensure that the VCRs are recording and that sufficient video tape is available to complete the packaging of one TOC during 8.4 of this procedure.

8.4.2 IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

8.4.3 IF a TOC Base is not available to receive drums,
THEN move a TOC Base into the area per 8.3.

8.4.4 IF the drum to be loaded is the first drum,
THEN check and record verification that the plywood (or TOC Insert) and absorbent pad have been installed in the empty TOC Base.

8.4.5 Record this information in Section 2 of Attachment B.

8.4.6 Verify that the drum/plywood handler is installed on the RCBU.

A. IF the RCBU is not equipped with the drum/plywood handler,
THEN move the RCBU to the Tool Changing Area.

B. Place the RCBU in Standby per 8.8.

C. Install the drum/plywood handler to RCBU per 8.3 in Procedure 64-C-101.

8.4.7 Verify that the drum gripper arms are retracted prior to moving the RCBU.

8.4.8 Move the RCBU to the area where the drums are to be retrieved and overpacked.

8.0 PROCEDURE (cont.)**8.4 Retrieval and Packaging Thorium Waste Drums into TOC Container (cont.)**

- 8.4.9 Inspect the drum to be lifted for storage configuration, markings and condition using the VMS (RCBU) and the CCTV (Stationary) Cameras.
- 8.4.10 Record the drum size, markings, and condition in 3 or 4 of Attachment B for the full TOC base.
- 8.4.11 Position the drum gripper to hold the drum around the middle, between drum chimes.

CAUTION

Care must be taken to minimize contact with drums around the drum being retrieved. Both the RCBU angle of retrieval and how far the drum gripper is opened are critical to ensuring a drum is not inadvertently moved.

- 8.4.12 Open the drum gripper until it will just pass the sides of the drum.
- 8.4.13 Position the support plate at the estimated elevation of the plywood or the floor.
- 8.4.14 Move the RCBU until the support plate is nearly in contact with the bottom of the drum.
- 8.4.15 Place the Support Plate Toggle Switch in NEUTRAL after contact with the drum is made.
- 8.4.16 Extend the drum gripper until it is centered around the drum and between the drum chimes.
- 8.4.17 IF the drum can not be fully grasped between the grippers (due to stack spacing), THEN grasp the drum with the tips of the gripper, AND retract the gripper until the drum is in a position that allows the grippers to be positioned to fully enclose the drum.
- 8.4.18 Adjust the mast vertical position so that the drum can be gripped evenly.
- 8.4.19 Ensure that the Gripper Pressure is set on MEDIUM.

CAUTION

During the gripping and lifting of the drum being retrieved, if there are any signs of drum failure, discontinue action and discuss recovery options with the Supervisor. At minimum a TOC Insert should be ready to receive the failing drum.

- 8.4.20 Close the drum gripper and watch for signs of drum failure.

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8.0 PROCEDURE (cont.)

8.4 Retrieval and Packaging Thorium Waste Drums into TOC Container (cont.)

8.4.21 Lift the drum approximately one inch by raising the mast and watch for signs of the drum bottom failure.

8.4.22 IF the bottom of the drum starts to fail,
THEN lower the drum back onto the plywood or concrete surface.

A. Tilt the mast Forward so that the drum is supported by the surface while the drum is being retracted over the support plate.

B. Retract the drum gripper until the drum is fully retracted and on the support plate.

C. Place the Support Plate Toggle Switch in the UP position.

8.4.23 IF there is no sign of drum failure,
THEN retract the drum gripper until the drum is fully retracted and on the support plate.

8.4.24 Place the Support Plate Toggle Switch in the UP position.

8.4.25 Raise the mast to clear the drum stack and/or TOC base.

8.4.26 Move the RCBU back from the drum stack.

8.4.27 IF the drum was removed from a stack,
THEN lower the mast to the height of the TOC base.

8.4.28 Move the RCBU to the TOC base.

8.4.29 IF the drum shows no sign of failure,
THEN perform the following steps:

A. Place the Support Plate Toggle Switch in the DOWN position.

B. Extend the drum gripper out fully.

C. Move the RCBU to position the drum over the area of the TOC the drum is to be placed.

D. Lower the mast until the drum is resting on the TOC base.

E. Open the Drum Gripper, releasing drum.

F. Move RCBU back from the TOC.

G. Retract the drum gripper.

8.0 PROCEDURE (cont.)8.4 Retrieval and Packaging Thorium Waste Drums into TOC Container (cont.)

8.4.30 IF the drum has a bottom drum failure or shows signs of bottom failure, THEN perform the following steps:

- A. Rotate the drum to the left or right depending on which side shows the least amount of deterioration.
- B. Extend the drum gripper out fully.
- C. Move the RCBU to position the drum over the area of the TOC the drum is to be placed.
- D. Lower the mast until the drum top is resting on the TOC base.
- E. Open the Drum Gripper, releasing drum.
- F. Move RCBU back from the TOC.
- G. Rotate the drum gripper to an upright position.
- H. Retract the drum gripper.

8.4.31 IF the drum shows signs of both top and bottom failure, THEN perform the following steps:

- A. Move drum over the top of a TOC base equipped with a TOC Insert with side panel removed.
- B. Lower the mast until as low as the TOC front panel will allow.
- C. Place the Support Plate Toggle Switch in the DOWN position.
- D. Extend the drum gripper out fully.
- E. Move the RCBU to position the drum over the area of the TOC the drum is to be placed.
- F. Open the Drum Gripper, releasing drum.
- G. Move RCBU back from the TOC.
- H. Retract the drum gripper.

8.4.32 Check the area using the VMS and CCTV cameras for an accumulation of spilled Thorium material in the area as a result of the drum retrieval.

- A. IF an accumulation of loose material is visible, THEN clean up the loose material per 8.7, AND have the Supervisor record the time of the drum failure.
- B. IF an accumulation of loose material is not visible, THEN continue to 8.4.33.

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8.0 PROCEDURE (cont.)

8.4 Retrieval and Packaging Thorium Waste Drums into TOC Container (cont.)

8.4.33 IF there is room in the TOC for additional drums,
THEN repeat 8.4.

8.4.34 IF the TOC is full,
THEN go to 8.5.

8.5 Transfer and Handling of a Full TOC Container

8.5.1 IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

8.5.2 Verify that the fork tines are installed on the RCBU.

A. IF the RCBU is not equipped with the fork tines,
THEN move the RCBU to the Tool Changing Area.

B. Place the RCBU in Standby per 8.8.

C. Install fork tines to RCBU per 8.3 of Procedure 64-C-101.

D. Ensure that the VCR is recording when working with a full TOC.

8.5.3 IF there is an empty TOC staged to be loaded,
THEN transfer the lid from the empty TOC to the full TOC.

A. Record the TOC number in Section 1 of Attachment B for the full TOC base.

B. Sign Section 4 of Attachment B and give to the Supervisor for review and routing for final preparation.

8.5.4 IF there is no empty TOC in the area,
THEN go to 8.3 to move an empty TOC into the area and transfer the lid.

8.5.5 Lift the full TOC (under the base) and move it to an Annex Stationary TOC Stand.

8.6 Retrieval and Staging of Contaminated Plywood/Trash for Packaging

NOTE: A surveillance interval of two hours must have been completed since it was determined that a drum failure occurred.

8.6.1 IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.

8.0 PROCEDURE (cont.)

8.6 Retrieval and Staging of Contaminated Plywood/Trash for Packaging (cont.)

- 8.6.2 Verify that the drum/plywood handler is installed on the RCBU.
- A. IF the RCBU is not equipped with the drum/plywood handler, THEN move the RCBU to the Tool Changing Area.
 - B. Place the RCBU in Standby per 8.8.
 - C. Install drum/plywood handler to RCBU per 8.3 of Procedure 64-C-101.
- 8.6.3 Verify that the plywood staging area is ready to receive plywood sheets.
- 8.6.4 Move the RCBU to the center of the plywood to be retrieved.
- 8.6.5 Inspect the condition of the plywood and amount of loose contamination on the plywood using the VMS cameras.
- 8.6.6 Ensure that the support plate is in the Down position.
- 8.6.7 Position the mast so that the support plate is just below the edge of the plywood.
- 8.6.8 Tilt the mast forward slightly to ease support plate insertion under the plywood.
- 8.6.9 Move the RCBU toward the plywood sheet until plate is one to three inches under the plywood.
- 8.6.10 Raise the mast to lift the side of the plywood off the drums.
- 8.6.11 IF the RCBU can be moved forward, THEN move the RCBU until the plate is under the plywood.
- 8.6.12 IF the RCBU cannot be moved forward, THEN place the Support Plate Toggle Switch in the Neutral Position
- 8.6.13 Lower the mast slowly so that the plywood moves back onto the support plate.
- 8.6.14 Raise the support plate to the drum gripper, gripping the plywood.
- 8.6.15 IF the support plate is not fully under the plywood, THEN move the RCBU back approximately one foot, pulling the plywood out from the drum stack.
- A. Lower the support plate to release the plywood.
 - B. Move the RCBU forward until the support plate is fully under the plywood.
 - C. Raise the support plate, regripping the plywood.

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8.0 PROCEDURE (cont.)

8.6 Retrieval and Staging of Contaminated Plywood/Trash for Packaging (cont.)

- 8.6.16 Raise the mast, lifting the plywood off the stack of drums.
- 8.6.17 Move the RCBU, carrying the plywood to the Plywood Staging Area in the Annex.
- 8.6.18 Place the plywood on the stack of plywood as follows:
 - A. Lower the mast until the support plate rests on the top of the surface where the plywood is to be stacked.
 - B. Place the support plate in the neutral position.
 - C. Raise the mast approximately six inches.
 - D. Move the RCBU backwards until the support plate is clear of the plywood.
- 8.6.19 IF there is an accumulation of loose contamination on the top of the plywood,
THEN vacuum the loose contamination during a subsequent manned entry per 8.9 of Procedure 64-C-101.

8.7 Loose Thorium Material Cleanup

NOTE: This section includes the steps to be performed for remote loose material cleanup. It may be necessary to use 8.10 of Procedure 64-C-101 with this procedure to complete the cleanup of loose material. Loose material may include broken plywood sheet that can not be recovered per 8.6.

- 8.7.1 IF the RCMHS is not operating,
THEN start operation of the RCMHS per 8.2.2.
- 8.7.2 IF a TOC base equipped with a TOC Insert is not located in the area to be cleaned,
THEN move a TOC equipped with an Insert into the area per 8.3.
- 8.7.3 Verify that the drum/plywood handler is installed on the RCBU.
 - A. IF the RCBU is not equipped with the drum/plywood handler,
THEN move the RCBU to the Tool Changing Area.
 - B. Place the RCBU in Standby per 8.8.
 - C. Install the drum/plywood handler to RCBU per 8.3 of Procedure 64-C-101.

8.0 PROCEDURE (cont.)**8.7** Loose Thorium Material Cleanup (cont.)**8.7.4** Installation of the Loose Material Cleanup Tool to the Drum/Plywood Handler

NOTE: The Sweeper Plate part of the cleanup tool is designed to be held with the drum gripper and operated using the gripper extend and mast controls. The Spillage Container part of the cleanup tool is designed to be held and operated by the support plate.

- A. Move the RCBU to the Loose Material Cleanup Tool.
 - B. Extend the gripper arms out fully.
 - C. OPEN the gripper fully.
 - D. Ensure that the Support Plate Switch is in the Neutral position.
 - E. Lift the mast so that the support plate is clear of the floor.
 - F. Align the gripper with the Sweeper Plate.
 - G. Align the support plate with the Spillage Container.
 - H. Move the RCBU forward so that the support plate is in full contact with the spillage container.
 - I. Align grippers so that the Sweeper Plate attachment is centered.
 - J. Ensure that the gripper pressure is set on MED (Medium).
 - K. Close the grippers, holding the Sweeper Plate assemble.
 - L. Lift the mast to lift the cleanup tool out of the tool rack.
 - M. Perform a functional test of the Loose Material Cleanup Tool per "RCMHS System Functional Checklist" (See Section 7 of Attachment A).
 - N. Ensure that the VCR is recording when loading loose material/failed drums into a TOC insert.
- 8.7.5** Move the RCBU to the area with loose material.
- 8.7.6** Lower the support plate by putting the Support Plate Switch to DOWN.
- 8.7.7** Return the Support Plate Switch to the Neutral position.
- 8.7.8** Place the Support Plate Release Toggle Switch in the ON position.

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8.0 PROCEDURE (cont.)**8.7** Loose Thorium Material Cleanup (cont.)

8.7.9 Lower the mast so that the spillage container is in contact with the ground and is level.

8.7.10 Move the RCBU to the debris, pushing the spillage container into the material.

8.7.11 Stop the RCBU when the material is in the spill container.

8.7.12 Lower the mast again until the Sweeper Plate is in contact with the surface.

NOTE: When the gripper arms are in their full retract position, the Sweeper Plate holds the Spillage Container in an upright position to prevent spillage of the material.

8.7.13 Fully retract the grippers to pull loose material into the Spillage Container.

8.7.14 Place the Support Plate Release Toggle Switch in the OFF position.

8.7.15 Lift the mast, lifting the Spillage Container off the surface.

NOTE: The gripper arms will restrict how far you can enter the TOC Insert.

8.7.16 Move the RCBU to the TOC Insert until the Spillage Container is over the TOC.

8.7.17 Lower the mast so that the Spillage Container is close to the top surface in the TOC Insert.

8.7.18 Extend the grippers, allowing the Spillage Container to tip and dump the material into the TOC Insert.

8.7.19 Raise the mast so that the Spillage Container clears the TOC Insert.

8.7.20 IF the surface of the material is at the level of the front board, THEN perform the following to install an additional board.

A. Secure the operation of the RCBU.

B. Enter the area and install a board into the TOC guides.

C. Restart RCBU after personnel have exited.

8.7.21 Repeat 8.7.5 through 8.7.20 as necessary to clean up as much as the loose material as possible.

8.7.22 Record the approximate quantity of material (in gallons) placed in the TOC Insert in Section 3 of Attachment B.

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8.0 PROCEDURE (cont.)

8.7 Loose Thorium Material Cleanup (cont.)

8.7.23 IF the Supervisor directs that manual cleanup is necessary, THEN go to 8.9 of Procedure 64-C-101.

8.7.24 Remove the Loose Material Cleanup Tool as follows:

- A. Verify that the Gripper Extend Toggle Switch is in the extended position.
- B. Move the RCBU to the Loose Material Cleanup Tool holder, aligning the Sweeper Plate.
- C. Lower the mast so that the Sweeper Plate is on the tool rack.
- D. OPEN the grippers fully.
- E. Retract the grippers fully.
- F. Move the RCBU back from the tool stand, releasing the Support Plate from the Spillage Container's slot.

8.8 Placing the RCMHS in Standby

NOTE 1: The RCMHS is to be placed in Standby primarily when personnel are entering the Annex and Building 65, and when RCBU tool changes are made. Other occasions where this mode may be used is when there is inadequate manpower to operate the RCMHS.

NOTE 2: Placing the RCMHS in Standby should only be done if the unit will resume operation in less than six hours because of discharging the battery on the RCBU.

8.8.1 IF operating the RCMHS, THEN ensure that the RCBU load has been placed in a Safe Configuration.

8.8.2 Move the RCBU out of Building 65.

8.8.3 Depress the RCMHS or SUPERVISORY HALT Switch to turn RCBU off.

8.8.4 Turn the Supervisor and Operator Keys to the OFF position.

8.8.5 Turn off the VCR, recording the date and time it was secured on the tape label and in the video tape log. If tapes are changed, filled tapes are to be submitted to TOP Document Control.

8.8.5 IF the ROS is going to be left unattended, THEN remove the Supervisor and Operator Keys.

8.8.6 Store the Supervisor and Operator Keys in the Facility Lock Box located in the Supervisor Section of the ROS Trailer.

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8.0 PROCEDURE (cont.)

8.8 Placing the RCMHS in Standby (cont.)

8.8.7 Restart RCMHS after placing in Standby as follows:

- A. Ensure that Supervisor and Operator Keys are in the ROC.
- B. Turn the Supervisor and Operator Keys to the ON position.
- C. Push the Engine Start button, restarting the RCBU.

8.9 Routine Shutdown of the RCMHS

NOTE: The RCMHS should normally be placed in Shutdown at the end of each shift. Other occasions may be when the time operations will be resumed is uncertain or greater than six hours, and if maintenance needs to be performed on the unit.

8.9.1 IF operating the RCMHS,

THEN ensure that the RCBU load has been set down.

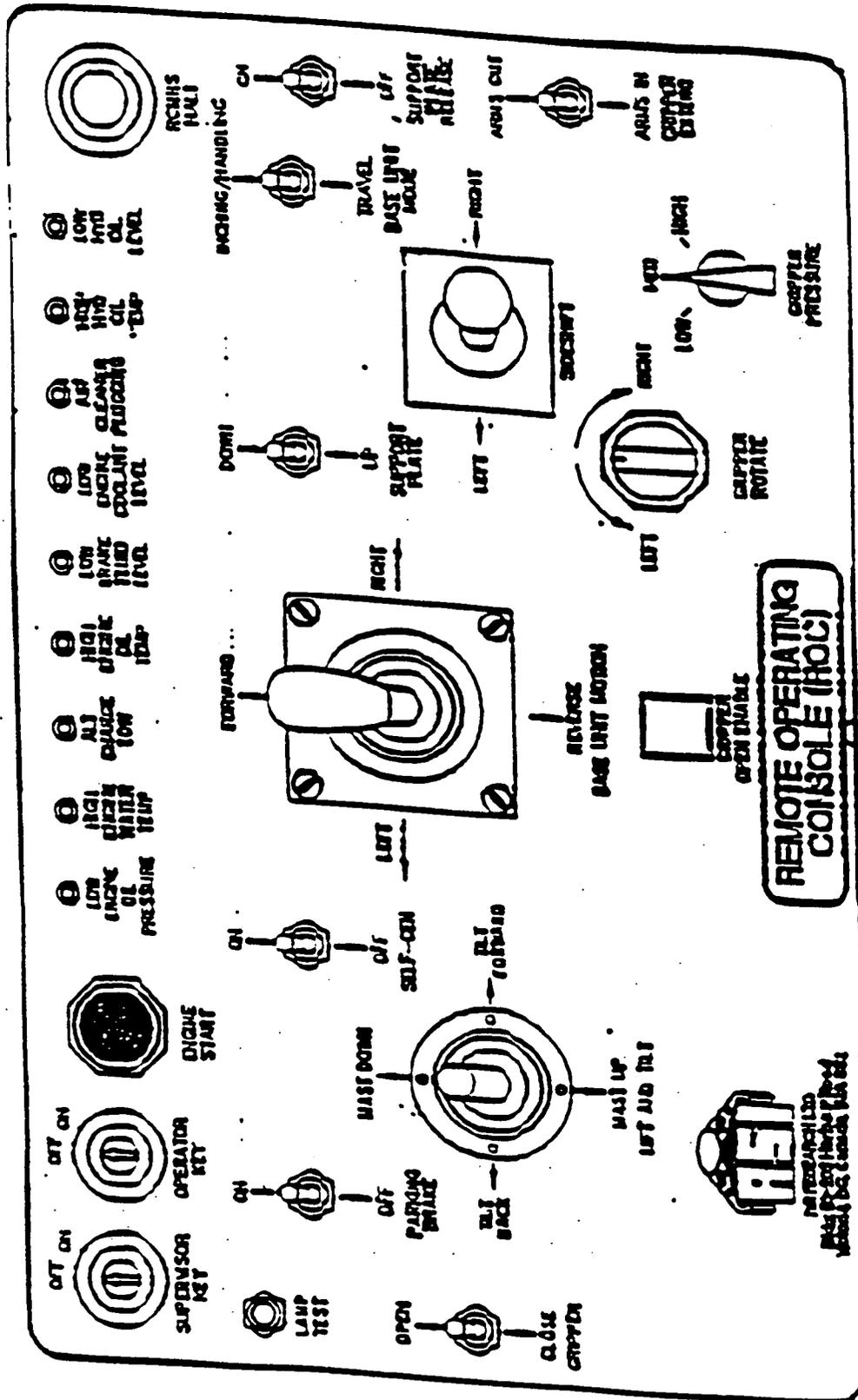
8.9.2 IF the RCMHS is in Standby,

THEN restart the RCMHS per 8.8.7.

8.9.3 Move the RCBU to the START line of the SUPERVISORY HALT Switch Area in the Annex.

8.9.4 Perform Actions and complete the "RCMHS Shutdown Checklist" (See Attachment C).

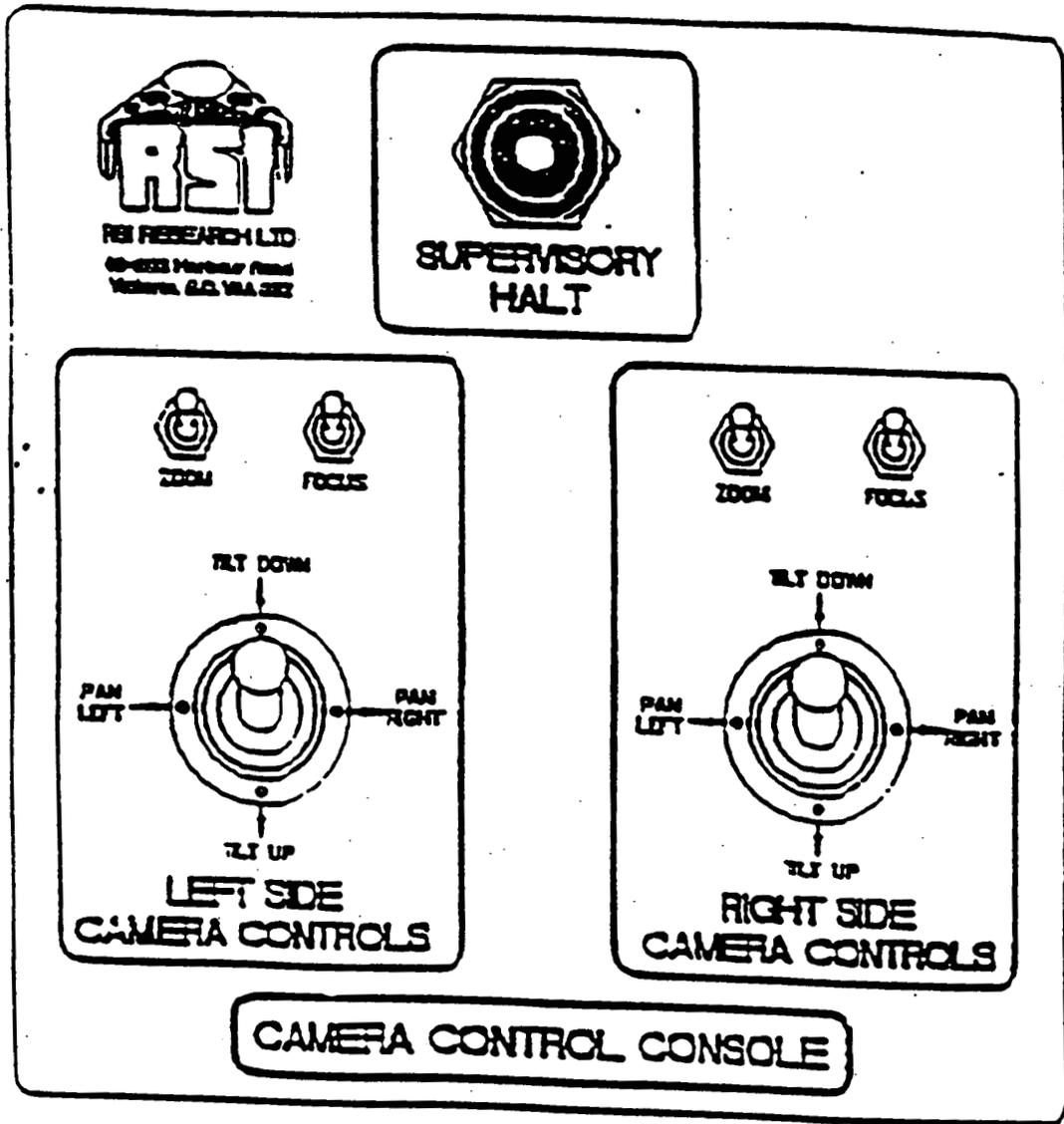
REMOTE OPERATING CONSOLE (ROC)



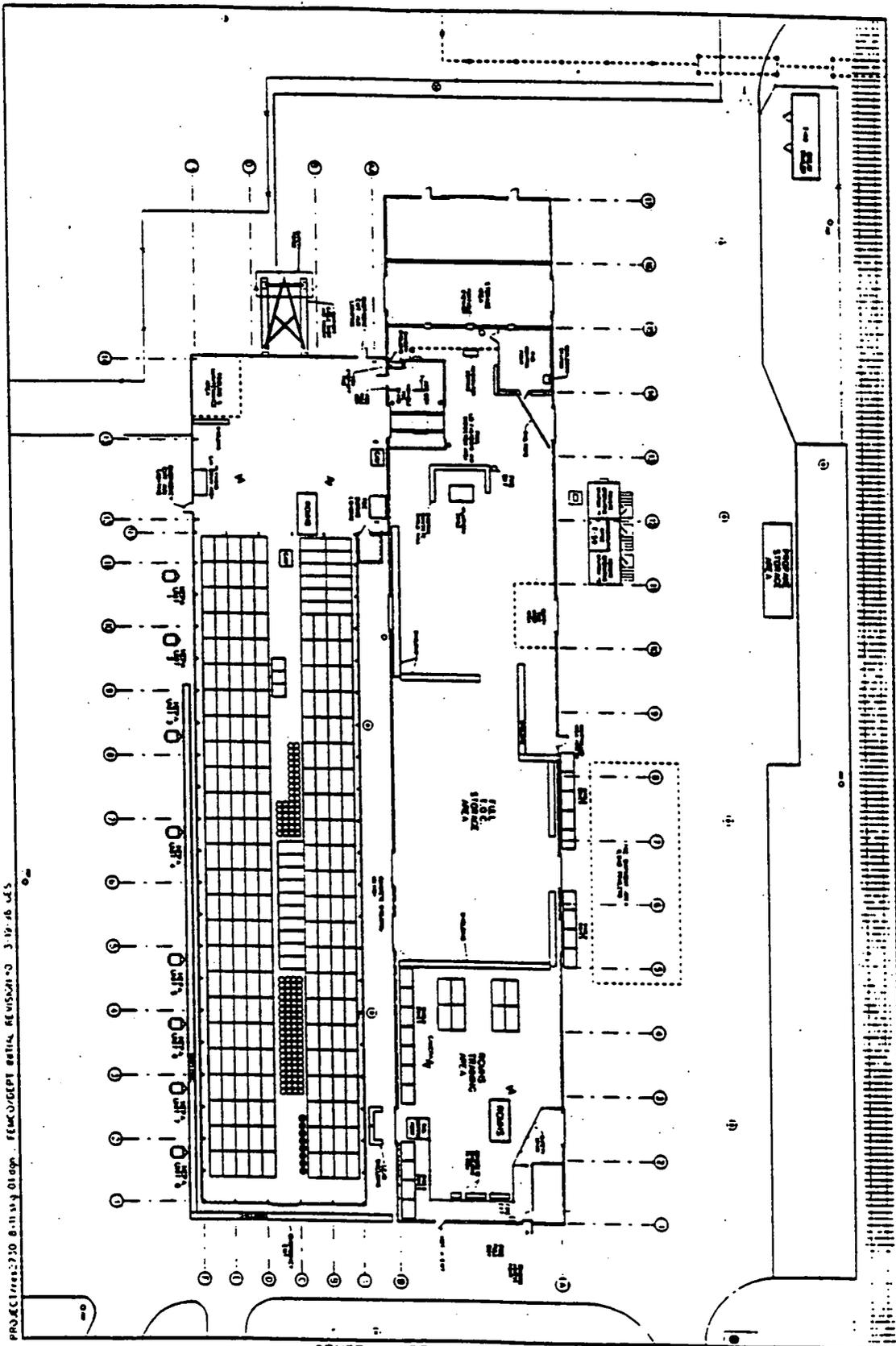
REMOTE OPERATING CONSOLE (ROC)
Figure 1

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RCMHS CAMERA CONTROL CONSOLE



RCMHS CAMERA CONTROL CONSOLE
Figure 2 000094



GENERAL ARRANGEMENT OF THORIUM
 OVERPACK PROJECT IN BUILDINGS 64 & 65
 SKG-DE57710-01

LEGEND:
 * GENERAL AREA BAG AIR SAMPLE
 O AREA MONITORING BAG AIR SAMPLE

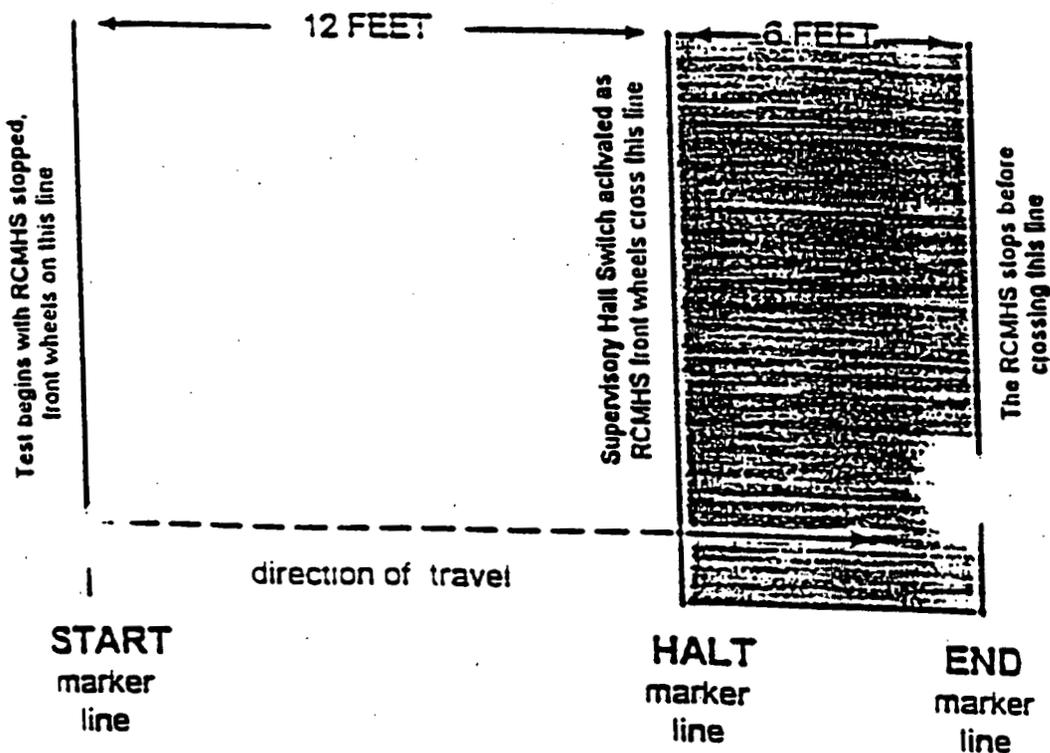
BUILDING 64/65 LAYOUT
 Figure 3

000095

RCMHS MEASURED TEST COURSE

Three designated lines marked on Annex floor.

Conduct test in accordance with RCMHS SYSTEM
FUNCTIONALITY CHECKLIST, APPENDIX A.



RCMHS MEASURED TEST COURSE
Figure 4

000096

RCMHS SYSTEM FUNCTIONAL CHECKLIST

(See Back Page for Instructions)

DATE: _____ SHIFT: _____

1. Reason for Completing Checklist (check One):

- Routine Startup (Start of Shift)
 Startup after Maintenance
 Startup after Emergency Shutdown
 Directed by Supervisor
 Other (Specify) _____

CAUTION

Before entering the Annex Area to perform the following physical inspections, ensure that the following has been completed:

1. Both (2) CAMs are operable, operating at least 2 hours and not alarming,
2. RCMHS must be secured or shutdown, both Supervisor and Operator Keys in the Off Position,
3. Entry into the Annex has been authorized by the Supervisor.

2. Ensure that Video Systems are operating at the ROS

_____ A. Turn ON Power to the VMS and Stationary Video Systems at the ROS.

3. Physical/Visual Inspection of RCBU (Completed prior to Functional Checks)

RCBU Number _____ Hour Meter Reading _____

INSPECTION ITEM	STATUS		COMMENT
	OK	PROBLEM	
Engine Oil Level			
LP Cylinder Fuel Level			
LP Cylinder standard size (33 ½ lbs.) (SAR Requirement)			
Tire Condition			
Hydraulic Hoses and Connections			
Obvious Damage or Leaks			
VMS Camera and Flood Lights			
Current Maintenance PM Sticker			

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RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

4. Prepare RCBU for Remote Operations

CHECK	INSPECTION/ACTION STEP
	Ensure that the RCBU Key Operated Power Switch is turned to ON.
	Ensure that RCBU Halt Switch is ON (in the UP position).
	Ensure that RCBU LPG cylinder fuel line is connected.
	Ensure that RCBU LPG cylinder valve is in the OPEN Position.
	Ensure that Tether Cable Retraction System moves freely.
	Ensure that proper attachment tool is on RCBU.
	Ensure that Stationary Cameras are positioned properly.
	Ensure that the RCBU front wheels are at the Halt Switch Start Line

5. Prepare the ROC (Remote Operating Console) for startup.

A. Ensure that All ROC Switches are in proper position.

CHECK	SWITCH	POSITION
	Base Unit Motion	NEUTRAL (Centered)
	Base Unit Mode	TRAVEL
	Parking Brake	ON
	Self-Cen	NEUTRAL (Centered)
	Lift and Tilt	NEUTRAL (Centered)
	Sideshift	NEUTRAL (Centered)
	Support Plate	NEUTRAL (Centered)
	Support Plate Release	OFF
	Gripper	NEUTRAL (Centered)
	Gripper Rotate	VERTICAL
	Gripper Extend	NEUTRAL (Centered)
	Gripper Pressure	LOW

B. Insert and turn the Supervisor and Operator Keys to the ON position.

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

C. Verify that warning lights illuminate while pushing Lamp Test button.

CHECK	WARNING LIGHT	CHECK	WARNING LIGHT
	Low Engine Oil Pressure		Low Engine Coolant Level
	Air Cleaner Plugging		High Engine Water Temperature
	Alternator Charge Low		High Engine Oil Temperature
	Low Hydraulic Oil Level		High Hydraulic Oil Temperature
	Low Brake Fluid Level		

D. Verify that the video systems, VMS and Stationary Cameras functioning

RCMHS VMS CAMERA			STATIONARY CAMERA		
CHECK		POSITION	CHECK		POSITION
LEFT	RIGHT		EAST	WEST	
		Pan Left/Right			Pan Left/Right
		Tilt Up/Down			Tilt Up/Down
		Zoom In/Out			Zoom In/Out
		Focus Near/Far			Focus Near/Far
		Monitor Clarity			Monitor Clarity
		Camera Lights			Camera Lights

_____ E. Check Warning Light on the RCBU using a Stationary Camera.

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

6. Startup and Functional Checking of Halt Switches.

WARNING
Two Operators must be at the ROC at all times during remote operation of the RCMHS. The Support Operator must watch the video monitor for unexpected motion of the RCBU during start-up and shutdown the RCBU by depressing the SUPERVISORY HALT Switch.

- A. Push the Engine Start button, starting the RCBU.
- B. Push the RCMHS Halt Switch. (Test OK, engine stops)
- C. Push the Engine Start button, restarting the RCBU.
- D. Check all ROC warning lights. (No lights illuminated)
- E. Release Parking Brake and put Base Unit Mode switch on Travel.
- F. SUPERVISORY HALT Switch Test (Technical Safety Requirement, LCO 1)

Description: RCBU must stop in a safe configuration within six feet of travel after activating the Halt Switch. This test satisfies requirements for independent verification of the SUPERVISORY HALT Switch.

1. Ensure that the RCBU front wheels are positioned on the START line of the SUPERVISORY HALT Switch Test Area. (See Figure 4 in Procedure 64-C-102)
2. Remote Operator drive the RCBU full FORWARD.
3. Support Operator push the SUPERVISORY HALT Switch when the front wheels reach the HALT line.
4. Verify RCBU does not travel six feet before stopping by making sure the front wheels do not cross the END line.
5. RCBU passes SUPERVISORY HALT Switch Test (proceed with checklist)

6. RCBU fails SUPERVISORY HALT Switch Test:	
(Discontinue Checklist, RCBU Shutdown)	
Remote Operator Signature: _____	Date: _____

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

- ___ G. Position Stationary Cameras to monitor the operation of the tether retraction system. (Cable retracts; OK)
 - ___ H. Drive RCBU forward and release the Joystick. (Brakes on; OK)
 - ___ I. Drive RCBU backward and release the Joystick. (Brakes on; OK)
 - ___ J. Steer RCBU backward, steering Left and Right. (Steering OK)
 - ___ K. Steer RCBU forward, steering Left and Right. (Steering OK)
7. RCMHS Tool Attachment Functional Checking (only for current tool attached)
- ___ A. Push the Engine Start button, starting the RCBU.
 - ___ B. Check the operation of the Tool attached to the RCBU.

Tool Attachment Component Check	Standard Forks		Loose Material Tool		Drum/Plywood Handler (DPH)	
	Check		Check		Check	
Mast Lift		X		X		X
Mast Lower		X		X		X
Tilt Forward		X		X		X
Tilt Backwards		X		X		X
Side Shift Left		X		X		X
Side Shift Right		X		X		X
Gripper Extended				X		X
Gripper Retracted				X		X
Clamp Close Low						X
Clamp Open Low						X
Clamp Close Medium						X
Clamp Open Medium						X
Clamp Close High						X
Clamp Open High						X
Support Plate Lift				X		X
Support Plate Lower				X		X
S.Plate Release ON				X		
S.Plate Release OFF				X		
Rotate Left						X
Rotate Right						X

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

___ C. Push the RCMHS or SUPERVISORY HALT Switch, turning off RCMHS.

___ D. Turn the Supervisor and Operator Keys to the OFF Position.

8. Comments: _____

9. Signatures:

Visual Checker (2 and 3):	_____	Badge No.: _____
Remote Control Operator (4,5,6,7)	_____	Badge No.: _____
ROC Support Operator:	_____	Badge No.: _____
Reviewing Supervisor:	_____	Badge No.: _____

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

INSTRUCTIONS FOR COMPLETING CHECKLIST

NOTE 1: The RCMHS Support Operator shall check off as completed. During manned inspection of the RCBU, the inspecting operator(s) will communicate completion of an item to the Support Operator, in the ROS, using a radio. The Support Operator will mark the inspection sheet and communicate to the inspecting operator of any items missed prior to departing Annex.

NOTE 2: Ensure that requirements stated in the Caution statement in Section 1 are completed prior to entering the Annex.

1. **Reason for Completing Checklist** - Check the reason that best explains the cause for the checklist to be completed. Normally this checklist will be completed at the beginning of each shift.
2. **Video Monitoring System Operation** - Turn on the power to the video cameras and Monitors so that ROC Operators, who are filling out the checklist, are in contact with operators performing Physical/Visual Inspections.
3. **Physical/Visual Inspection** - Taken from the daily checklist for Forklifts, this inspection needs to be performed thoroughly. The restrictions on LP gas cylinders for use in Building 65 and the Annex are based on the standard size rather than the weight of the tank. Operators should ensure that only cylinders stamped with the standard size markings (33 ½ lbs) are used.
4. **Prepare RCBU for Remote Operation** - Following the physical inspection, the operator shall check the positioning of switches and equipment on the RCBU. If the switch is not in the required position, the inspecting operator shall reposition the switch, as required.
5. **Prepare ROC for Startup** - This is an inspection of the controllers and the video monitoring system (both the VMS and Stationary Cameras).
6. **Startup and Functional Checking of Halt Switches** - The SUPERVISORY HALT Switch is a key safety device on the RCMHS. The TSR requires that this switch be checked at the beginning of each shift of operation. If the RCBU fails this test, the checklist shall be discontinued.

Also important in this section is the checking the RCMHS Halt Switch, Steering and Brakes. The steering and brakes will be inspected as the RCBU is being moved into place to perform the SUPERVISORY HALT Switch testing.

7. **RCMHS Tool Attachment Functional Checking** - Only the tool that is currently attached to the RCBU is to be checked. Mark at the top of the table which tool is attached to the vehicle, then check those items marked in the column for that tool.

RCMHS SYSTEM FUNCTIONAL CHECKLIST (cont.)

INSTRUCTIONS FOR COMPLETING CHECKLIST (cont.)

8. **Comments** - If during the inspection a minor problem, such as a small propane leak or loose bulkhead connector, is discovered and corrected immediately, note this action in this section and proceed with the checklist. If major problems are discovered, note them in this section and return the uncompleted checklist to the supervisor. If the inspection is being performed because of anything but routine startup, use this area to give details on maintenance work or corrective actions performed prior to initiating this inspection.
9. **Signature** - Upon completion of the inspection sheet, sign in the area designated for the task performed.

THORIUM OVERPACKING PROJECT THORIUM OVERPACK WORK SHEET

1a. Thorium Overpack Container (TOC) Inventory Number: _____ (Assigned after TOC is Lidded)

1b. Thorium Overpack Container (TOC) Serial Number: _____

2. TOC Preparation Visual Checks: (also recorded on Video Tape)

CHECK	INSPECTION ITEM	WEIGHT
	Verify that Absorbent Pad installed on TOC Bottom	
	Verify that Plywood installed on top of Absorbent Pad (if No Insert)	
	Verify that TOC Insert installed on top of Absorbent Pad	
	Verify TOC Base in Good Condition to receive Drums/Debris.	

3. TOC Content Visual Inventory Information: (also recorded on Video Tape)

DRUM INFORMATION

DRUM MARKINGS			WEIGHTS (lbs.)				DRUM SIZE			DRUM CONDITION			COMMENTS
OX	HY	Lot, Other or No Markings	N/A	Gross	Tare	Net	35	55	Other	Good	Bottom Failure	Total Failure	

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THORIUM OVERPACKING PROJECT THORIUM OVERPACK WORK SHEET (cont.)

DEBRIS/FAILED DRUM INFORMATION (TOC Insert Used)

DRUM MARKINGS			ESTIMATED QUANTITY (gallons/scoops)	DRUM SIZE (gal.)			COMMENTS
OX	HY	Lot, Other or No Markings		35	55	Other	

4. TOC Overpacking Signatures:

ROC Support Operator: _____ Badge No.: _____ Date: _____

Reviewing Supervisor: _____ Badge No.: _____ Date: _____

5. Full TOC Visual Checks:

CHECK	INSPECTION ITEM
	All bolts installed and tightened/flange metal-to-metal.
	All container labels attached and correct.
	Condition of Paint and Structure of TOC Lid/Base.
	TOC Lid Lifting Straps Disabled using Metal Shears.

THORIUM OVERPACKING PROJECT THORIUM OVERPACK WORK SHEET (cont.)

6. Full TOC Information

TOC Inventory Number	
TOC Serial Number	
TOC Lot Number	0000-716-T-090-_____
TOC Container Number	

Gross Weight	
TOC Tare Weight	
TOC Mat. Prep. Weight	
Net Weight	

7. TOC Storage Location

ROW NUMBER									STACK						LEVEL		
1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	B	M	T

8. TOC Overpacking Signatures:

TOC Prep. Operator: _____ Badge No.: _____ Date: _____

Reviewing Supervisor: _____ Badge No.: _____ Date: _____

RCMHS SHUTDOWN CHECKLIST

DATE: _____ SHIFT: _____

1. Reason for Completing Checklist (check one):
- _____ Routine Shutdown (End of Shift)
 - _____ Prepare for Maintenance
 - _____ Complete after Emergency Shutdown
 - _____ Directed by Supervisor
 - _____ Other (Specify) _____

2. Ensure that the RCBU tools and ROC Switches are in proper position.

CHECK	SWITCH	RCBU POSITION	SWITCH POSITION
	Base Unit Motion	At START line	NEUTRAL (Centered)
	Base Unit Mode	N/A	TRAVEL
	Parking Brake	N/A	ON
	Self-Cen	Centered	NEUTRAL (Centered)
	Lift and Tilt	Lowered/Vertical	NEUTRAL (Centered)
	Sideshift	Centered	NEUTRAL (Centered)
	Support Plate	Down	NEUTRAL (Centered)
	Support Plate Release	N/A	OFF
	Gripper	Closed	NEUTRAL (Centered)
	Gripper Rotate	Centered	VERTICAL
	Gripper Extend	Fully Retracted	NEUTRAL (Centered)
	Gripper Pressure	N/A	LOW

3. Turn off the RCMHS as follows

CHECK	INSPECTION/ACTION STEP
	Ensure that the RCBU front wheels are at the Halt Switch Start Line
	Depress the RCMHS or SUPERVISORY HALT Switch, turning off RCBU.
	Turn the Supervisor and Operator Keys to the OFF position.
	Remove the Supervisor and Operator Keys, Store in Facility Lock Box

4. Turn off the RCBU as follows

CHECK	INSPECTION/ACTION STEP
	Verify that RCBU Cameras and Flood Lights are OFF
	Depress the RCBU Halt Switch. (in the Down position)
	Turn the RCBU Key Operated Power Switch is in the OFF position.
	Remove the RCBU Key for Storage in Facility Lock Box
	Close the RCBU LPG cylinder valve.
	Visually verify quick disconnects are connected and not leaking.

5. Turn OFF the CCTV Stationary Cameras, Flood Lights and VCRs.

6. Signatures: Remote Control Operator _____ Badge No.: _____
 Reviewing Supervisor: _____ Badge No.: _____

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RECORD OF ISSUE/REVISIONS

<u>DATE</u>	<u>REV. NO.</u>	<u>DESCRIPTION AND AUTHORITY</u>
10-09-95	0	Procedure requirement for Startup and Operation (<u>REMOTE</u>) Building 65 Thorium Overpacking Project per Request No. P95-0244, initiated by L. Wigley.
01-17-96	0	Procedure reissued to comply with current program requirements for Startup and Operation (<u>REMOTE</u>) Building 65 Thorium Overpacking Project per Request No. P95-0406, initiated by M. Slaughter.
03-05-96	1	Procedure revised to update to current program requirements per Request No. P96-0090, initiated by T. Huey.
03-26-96	2	Procedure revised to update to current program requirements per Request No. P96-0125, initiated by T. Huey.

Fernald Environmental Management Project Fernald Environmental Restoration Management Corp. REMIEDIATION SUPPORT OPERATIONS DOCUMENT SYSTEM		Page 1 of 43 Revision No. 2 Revision Date: 03-25-96
THORIUM OVERPACKING PROJECT PROCEDURE	Thorium Overpacking Project Troubleshooting Response Procedure	64-C-103 TECHNICAL PROCEDURE
(Signature on File) Authorization: T.N. Huey, TOP Operations Manager	Supersedes: Rev. 1	Issue Date: 11-22-95

UNCONTROLLED

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1.0 PURPOSE

1.1 This procedure provides instruction to Thorium Overpacking Project (TOP) Personnel at the Fernald Environmental Management Project (FEMP) for response actions to be taken in the event that equipment is not operating as designed.

2.0 SCOPE

2.1 The requirements contained in this document apply only to those steps that can be taken by TOP Operations Personnel in response to problems associated with equipment used for the Thorium Overpacking Operation.

2.2 This procedure does not apply to equipment used for Thorium Overpacking that is covered by specific equipment procedures, such as fork trucks and vacuums. This procedure also does not cover actions to be taken by Maintenance to diagnose a problem.

3.0 APPLICABLE DOCUMENTS

3.1 Source Documents

3.1.1 D10-00-020, "Remediation Support Operations Division Document System"

3.2 Reference Documents

3.2.1 64-C-100, "Thorium Overpacking Project Recovery Events Procedure"

3.2.2 65X-5500-X00034, Rev. 0, "RCBU Recovery" Engineering Drawing

3.2.3 64-C-102, "Startup and Operation (Remote) Building 65 Thorium Overpacking Project"

3.2.4 M-136, "Operation Manager's Standing Orders for Thorium Overpacking Project (TOP) System"

3.2.5 64-C-101, "Thorium Overpacking Project Manned Operations Procedure"

3.2.6 TOP-ACCIP-001, "Airborne Contamination Control Implementation Plan"

3.2.7 TOP-HPP-001, "Health Physics Plan for the Thorium Overpacking Project"

3.2.18 JSA 367, "Thorium Overpacking Project Job safety Analysis"

3.2.19 JSA 404, "Manual Retrieval of the RCBU"

3.2.20 RM-0021, "Safety Performance Requirements Manual"

3.2.21 DPT-ED-0001, "Engineering Differential Pressure Checks for Building 65"

4.0 DEFINITIONS

4.1 Airlock - The primary means of entry into Building 65 and the Annex from Building 64. Its purpose is to control the air leakage from Building 65.

4.0 DEFINITIONS (cont.)

- 4.2 Close Circuit Television (CCTV) - The stationary cameras (not attached to the RCBU) that are used to assist the ROC Operator with operation of the RCMHS.
- 4.3 Continuous Air Monitor (CAM) - Alpha radiation air monitoring system with real-time measurement capabilities. CAMs on the TOP are equipped with visual and audible alarms which are set at the appropriate airborne radioactivity levels. CAMs are safety significant components as defined in the Safety Analysis Report, Section 4.
- 4.4 Drum/Plywood Handler - An RCMHS attachment tool that is capable of grabbing, holding, lifting, turning, and releasing one drum. It is also capable of lifting and holding plywood separators.
- 4.5 Fork Tine - An RCMHS attachment, typically used on fork trucks, that is capable of lifting and lowering the TOC, base and/or lid. It is also capable to move other equipment, such as TOC stands, that will be used in the operation.
- 4.6 High Efficiency Particulate Air (HEPA) Filter - A pleated fibrous medium filter that has a particulate efficiency of at minimum 99.97 percent (%) for 0.3 micrometer particulate of DOP aerosols.
- 4.7 Loose Material Cleanup Tool - An RCMHS attachment that is capable of retrieving loose material from flat surfaces using a shovel and scraper.
- 4.8 On-Board Remote Controller - Provides the functions for communications with the Remote Control Command Unit, and decoding commands for controlling the base vehicle drum handler attachments and Visual Monitoring System (VMS).
- 4.9 Powered Air Purifying Respirator (PAPR) - Protection factor = 1000.
- 4.10 RCMHS - Remote Control Material Handling System, which include the Remote Control Base Unit (RCBU) and the Remote Operation Console (ROC).
- 4.11 RCMHS Attachment Tools - Tools used for remote operation by installing them on the RCBU, including the drum/plywood handler, fork tine, and loose material cleanup tool.
- 4.12 Remote Control Base Unit (RCBU) - Remote controlled forklift truck used as part of the Remote Control Material Handling System (RCMHS). The RCBU consists of the base vehicle. On-board remote controller, and the visual monitoring system.
- 4.13 Remote Control Console - A console used by the TOP Remote Operating Console (ROC) Operator to oversee all operations of the drum retrieval procedure.
- 4.14 Remote Operating Console (ROC) - Console used by the Operator to control the functions of the RCBU.

4.0 DEFINITIONS (cont.)

- 4.15 Remote Operating Station (ROS) - The trailer that houses the Remote Operation Console (ROC) for the RCMHS and associated video equipment. Also, located in this trailer are the operations status boards, records and procedures for the Thorium Overpacking operation.
- 4.16 SUPERVISORY HALT Switch - A switch used by the Support Operator to halt operation of the RCBU in an emergency or at the end of a shift. The SUPERVISORY HALT Switch is a safety significant component as defined in the Safety Analysis Report, Section 4.
- 4.17 Troubleshoot - Actions that are to be taken to assist in the identification and/or correction of a problem.
- 4.18 Visual Monitoring System (VMS)- The VMS provides the Operator the viewing capability to remotely retrieve the drums and the plywood/pallets, and maneuver and navigate the RCBU.

5.0 RESPONSIBILITIES

5.1 Shift Supervisors are responsible for the following:

- 5.1.1 Informing the Process Engineer and/or Operations Manager of a problem and actions to be taken prior to performing troubleshooting activities.
- 5.1.2 Directing all troubleshooting activities performed by Operators.
- 5.1.3 Requesting assistance in performing troubleshooting activities.
- 5.1.4 Documenting problem and corrective actions in appropriate project logs.
- 5.1.5 Ensuring that troubleshooting and recovery activities are per operations procedures.
- 5.1.6 Ensuring that post troubleshooting and maintenance testing is performed before returning the equipment to operation status.

5.2 Operators are responsible for the following:

- 5.2.1 Informing the Shift Supervisor of a problem and recommend actions to be taken prior to performing troubleshooting activities.
- 5.2.2 Performing troubleshooting and recovery actions per this operations procedure.
- 5.2.3 Performing post corrective action testing prior to using equipment for Thorium overpacking.
- 5.2.4 Becoming familiar with the provisions of this procedure for reporting RCMHS equipment failure and operational impacts.
- 5.2.5 Transfer any information, relative the status of equipment, to oncoming Shift Operators.

6.0 GENERAL

- 6.1 Warnings, Cautions, and Notes shall precede and be on the same page as the Item, Step, Sub-Step, Section, or Sub-Section to which they apply.
- 6.2 The second Remote Control Material Handling System (RCMHS), used for simulating operations outside of Building 65, may be used to simulate troubleshooting activities or be used as a replacement for the primary unit in Building 65. Once moved into Building 65, however, this system will need to stay inside the contamination area. For this reason, approval is required from the Operations Manager prior to using this as a replacement in Building 65.
- 6.3 The SUPERVISORY HALT Switch must be functional during any remote operations utilizing the RCMHS. If not functional, any activities being performed must be stopped immediately and not resume until the function is available (SAR 5.5.1.1). Confirmation testing of the SUPERVISORY HALT Switch to stop the RCBU per operation specifications will be performed by a qualified Operator after any troubleshooting activity on the vehicle, along with other items listed on the "RCMHS System Functionality Checklist" per Procedure 64-C-102, "Startup and Operation (Remote) Building 65 Thorium Overpacking Project".
- 6.4 No personnel shall be permitted inside Building 65 or the Annex when the RCBU is being operated remotely.
- 6.5 The Continuous Air Monitor (CAM) must be operating at least two hours and not alarming prior to personnel entry into the Annex or Building 65. If either CAM is not functioning, manned activities within Building 65 and the Annex must be stopped and personnel must leave the area. Access to troubleshooting, diagnosing and correcting any problem may take place under the control of the Radiological Work Permit (RWP) for this activity (SAR 5.5.1.2). The Shift Supervisor shall confirm that the CAMs are back in operation prior to resuming manned operation in Building 65 and/or the Annex.
- 6.6 If a step cannot be performed as it is currently written in the procedure, or if a procedure does not exist for an action, the Operator shall stop the performance of the procedure, notify the Shift Supervisor, and place the system/equipment in a safe, stable condition.
- 6.7 The Remote Control Operator shall be rotated to another work station periodically. No Operator shall spend more than two continuous hours at the controls while the RCBU is being operated, including operations required to troubleshoot a problem. During troubleshooting activities, however, the Operator shall remain in the ROS to ensure that the problem has been corrected.
- 6.8 The Airlock has four access doors, two roll-up overhead doors and two personnel doors, one of each to Building 64 and the Annex. Personnel entering the Airlock from Building 64 or the Annex are responsible for ensuring that Building 64 and Annex doors are not opened at the same time.

6.0 GENERAL (cont.)

- 6.9 The "Troubleshooting Cause/Response Table" (See Table 1) at the end of this procedure identifies the possible causes for a problem and what actions shall be taken by operations personnel to resolve the problem. This procedure and tables do not identify the steps to be taken by the Process Engineer or Maintenance.
- 6.10 In the event of a problem that requires further operations assistance beyond the steps included in this procedure, a "TOP Equipment Troubleshooting Authorization" (See Attachment A) can be created by the operations staff and presented to the Operations Manager and the Process Engineer for approval.
- 6.11 Unusual events that threaten the physical integrity of Building 65 or the Annex (such as a broken window or a vehicle collision with a roll-up door) require that overpacking of thorium drums be suspended until Building 65 differential pressure is evaluated and determined to be satisfactory per reference 3.2.6 (ACCIP) and reference 3.2.21 (DPT-ED-0001).
- 6.12 The periodic surveillance of Building 65 differential pressure required by reference 3.2.6 (ACCIP) must be completed with satisfactory results before overpacking of thorium drums can commence. It is the assessor's responsibility to inform operations of any unsatisfactory result or deteriorating trend of Building 65 differential pressure surveillance.

7.0 HEALTH AND SAFETY REQUIREMENTS

- 7.1 Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to a Supervisor or to the Assistant Emergency Duty Officer (AEDO), who will immediately report the circumstances to Medical and Industrial Hygiene. The involved personnel shall be directed by the Supervisor or AEDO as to when and where to report for medical evaluation, completion of an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submitting bioassay samples (e.g. blood, urine). Employees are responsible for complying with any additional requirements as specified by S&H.
- 7.2 Any circumstance which could have resulted in an intake of radioactive materials by inhalation, ingestion, or absorption shall immediately be reported to a Supervisor. The Supervisor shall immediately report the circumstance of possible radioactive materials intake to S&H Radiological Control Department for evaluation. When the suspect isotope is uranium, the involved personnel shall report to the Urine Sampling Station at the end of their shift to complete an Incident Investigation Report (IIR) (Form No. FS-F-1458), and submit an incident urine sample. The involved personnel shall also report to the Urine Sampling Station at the start of their next shift to submit a follow up urine sample. When the suspect isotope is other than uranium, the involved personnel shall report to the Dosimetry Section of the Radiological Control Department for further determination of actions. Employees are responsible for complying with additional requirements as specified by the Radiological Control Department.

7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.3 All personnel performing work activities relative to this procedure must complete the following prior to starting work.
- 7.3.1 Understand this and other applicable procedures associated with the work to be performed.
- 7.3.2 Follow the requirements of the work permits and procedures associated with the work to be performed.
- 7.3.3 Ensure that all appropriate monitoring equipment is in place and operational as directed in SOPs, RWPs and JSAs as appropriate prior to entry into a contaminated area or starting work.
- 7.3.4 If the work to be performed is non-routine, a pre-job brief and walkthrough should be conducted by the Supervisor. This briefing should consist of reviewing the work permits and the steps of the procedure that are to be performed.
- 7.4 The chemical of concern in Building 65 and Annex is thorium. Thorium is principally an inhalation and external radiation hazard. For this reason, personnel air monitoring and respirator protection are required in airborne thorium areas.
- 7.5 The external radiation hazard is principally due to gamma radiation. Both the drums being overpacked and the full TOCs will be sources of gamma radiation. For this reason, personnel dosimeters are required to be worn at all times. In Building 65 and the annex a Self Reading Pocket Dosimeter (SRPD) will also be work to Track Personnel exposures daily.
- 7.6 When checking levels and filters on the RCBU be cautious of high temperature surfaces. Wear leather palm gloves if working close to these surfaces. Also watch contact with anti-C clothing for burn holes.
- 7.7 Be careful working around hydraulic fluid. There may be stored pressure in the hydraulic system which can be dangerous when working around hydraulically controlled parts of the RCBU. Care should be taken to make sure all hydraulic connections are made correctly and completely.
- 7.8 When bleeding air from a Liquid Propane Gas (LPG) line, be careful of generation of cold surfaces. Wear gloves when performing this process.
- 7.9 Be aware of the pinch points during tool attachment and during handling of the TOC container. Keep hands, fingers and feet out of these areas.
- 7.10 Hazards associated with the Thorium Overpacking Project in Building 64/65 are identified in appropriate JSAs and RWPs. Recommended safe job practices are summarized below.
- 7.10.1 Elevated radiation fields - Per RWPs and the Health Physics Plan (TOP-HPP-001).

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7.0 HEALTH AND SAFETY REQUIREMENTS (cont.)

- 7.10.2 Thorium contamination - Per RWPs and the Health Physics Plan (TOP-HPP-001).
- 7.10.3 Heat Stress - Physiological monitoring of workers for control of heat stress or established work/rest regimen will be implemented per JSA 367. A change/cool area will be established with a supply of drinking water. The cool area will be established at the control point/change out area in Building 64.
- 7.10.4 Cuts, scrapes and abrasions - Leather palm gloves will be worn, as required in JSAs 367 and 404, when performing RCBU recovery or while handling sharp objects.

8.0 PROCEDURE

8.1 RCMHS Alarm Response

- NOTE 1:** RCMHS vehicle alarms are classified as:
- 1) Critical/Disabling Alarms, requiring immediate action to shutdown per Procedure 64-C-100, "Thorium Overpacking Project Recovery Events Procedure", or
 - 2) Non-Critical Alarms, not requiring immediate shutdown. However, maintenance should be performed following the completion of the task being performed.

- NOTE 2:** The following RCBU base vehicle alarms, annunciated at the Remote Operating Console (ROC) are classified as critical, disabling conditions:
- 1) Low Engine Oil Pressure
 - 2) High Engine Water Temperature
 - 3) High Engine Oil Temperature
 - 4) Low Brake Fluid Level
 - 5) Low Hydraulic Oil Level.

8.1.1 Response to Critical/Disabling Alarms

- A. IF one or more critical/disabling alarm indicators are annunciated at the ROC, THEN perform immediate shutdown of the RCMHS per Procedure 64-C-100.
- B. Perform visual and operation response steps as indicated in the "Troubleshooting Cause/Response Table" (See Table 1) for the alarm activated.
- C. IF maintenance or configuration changes were made to deactivate the alarm, THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102, prior to resuming operation of the vehicle.

8.0 PROCEDURE (cont.)

8.1 RCMHS Alarm Response (cont.)

NOTE: The following RCBU base vehicle alarms, annunciated at the Remote Operating Console (ROC) are classified as non-critical conditions:

- 1) Alternator Charge Low
- 2) Low Engine Coolant Level
- 3) Air Cleaner Plugged
- 4) High Hydraulic Oil Temperature.

8.1.2 Response to Non-Critical Alarms

- A. IF one or more non-critical alarm indicators are annunciated at the ROC,
THEN complete task and perform routine shutdown of the RCMHS per Procedure 64-C-102.
- B. Perform visual and operation response steps as indicated in Table 1 for the alarm activated.
- C. IF maintenance or configuration changes were made to deactivate the alarm,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.2 RCMHS RCBU/Vehicle Failure Response

8.2.1 Engine Fails to Start or Stops During Operation

- A. IF the engine fails and the starter is operating properly,
THEN perform visual and operation response steps as indicated in Table 1 for when starter is operating.
- B. IF the engine fails and the starter does not operate properly,
THEN perform visual and operation response steps as indicated in Table 1 for when starter is not operating.

NOTE: The ALT CHARGE LOW Indicator light on the ROC will provide indication of vehicle battery failure.

- C. IF maintenance or configuration changes were made to start the engine,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

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8.0 PROCEDURE (cont.)

8.2 RCMHS RCBU/Vehicle Failure Response (cont.)

8.2.2 Loss of Hydraulic Control

NOTE: The LOW HYDRAULIC LEVEL Indicator light on the ROC will provide indication of loss of hydraulics. Operators can also determine loss of hydraulics if the steering, mast control and/or RCBU attachment fails to operate properly.

- A. IF an indication is received that the hydraulic controls are not operating properly,
THEN perform visual and operation response steps as indicated in Table 1 for loss of hydraulic control.
- B. IF maintenance or configuration changes were made to start the engine,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.2.3 Gear Failure; Stuck in Forward, Neutral, or Reverse

- A. IF the RCBU will not drive forward or reverse remotely,
THEN attempt to move the RCBU using the Pendant Control.
 - 1. IF the Pendant Control is successful in moving the RCBU in forward and/or reverse,
THEN move the RCBU to the Maintenance Area.
 - 2. IF the Pendant Control is unsuccessful in moving the RCBU,
THEN manually retrieve the RCBU per 8.15.
- B. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for gear failure.
- C. IF maintenance or configuration changes were made to repair the gear mechanism and/or control,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.2.4 Brake Failure

NOTE: The SUPERVISORY HALT Switch should be activated immediately in the event of a brake failure.

- A. IF the RCBU brakes will not operate remotely,
THEN immediately activate the SUPERVISORY HALT Switch and secure RCMHS.

8.0 PROCEDURE (cont.)

8.2 RCMHS RCBU/Vehicle Failure Response (cont.)

8.2.4 Brake Failure (cont.)

- B. Attempt to activate the brake the RCBU using the Pendant Control.
 - 1. IF the Pendant Control is successful in activating the RCBU brakes,
THEN move the RCBU to the Maintenance Area.
 - 2. IF the Pendant Control is unsuccessful in activating the RCBU brakes,
THEN manually retrieve the RCBU per 8.15.
- C. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for gear failure.
- D. IF maintenance or configuration changes were made to repair the brake mechanism and/or control,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.3 RCMHS RCBU On-Board Remote Controller Failure Response

NOTE: If the engine shuts down automatically, or as a result of a system failure, it may be necessary to turn OFF the Key Operated Power Switch on the RCBU for at least 15 seconds to allow the central command register to reset.

8.3.1 Controller Electronics and Communications Electronics Failure

- A. IF the RCBU cannot be controlled remotely,
THEN attempt to move the RCBU using the Pendant Control.
 - 1. Attempt to reset central command register by turning OFF the Key Operated Power Switch on the RCBU.
 - 2. IF the Pendant Control is successful in controlling the RCBU,
THEN move the RCBU to the Maintenance Area.
 - 3. IF the Pendant Control is unsuccessful in moving the RCBU,
THEN manually retrieve the RCBU per 8.15.
- B. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for On-Board Remote Control failure.
- C. IF maintenance or configuration changes were made to repair the On-Board Remote Controller,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.0 PROCEDURE (cont.)

8.4 RCMHS Remote Controller/ROC Failure Response

8.4.1 Controller Switch, Electronics and Communications Electronics Failure

- A. IF the RCBU cannot be controlled remotely,
THEN attempt to move the RCBU using the Pendant Control.
 - 1. IF the Pendant Control is successful in controlling the RCBU,
THEN move the RCBU to the Maintenance Area.
 - 2. IF the Pendant Control is unsuccessful in moving the RCBU,
THEN manually retrieve the RCBU per 8.15.
- B. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for Remote Control failure.
- C. IF maintenance or configuration changes were made to repair the Remote Controller,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.5 RCMHS Pendant Controller Failure Response

- 8.5.1 IF the RCBU cannot be controlled locally using the pendent,
THEN attempt to move the RCBU using the Remote Controls.
 - A. IF the Remote Control is successful in controlling the RCBU,
THEN move the RCBU to the Maintenance Area.
 - B. IF the Remote Control is unsuccessful in moving the RCBU,
THEN manually retrieve the RCBU per 8.15.
- 8.5.2 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for Pendant Control failure.
- 8.5.3 IF maintenance or configuration changes were made to repair the Pendant Control,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.6 RCMHS Attachment Tool Failure Response

- 8.6.1 Drum/Plywood Handler Fails to Operate
 - A. IF the RCBU is not in the Maintenance or Tool Changing Area,
THEN move the RCBU to the Maintenance Area.
 - B. IF the drum/plywood handler fails to operate remotely,
THEN attempt to control the drum/plywood handler using the Pendant Control.

8.0 PROCEDURE (cont.)**8.6 RCMHS Attachment Tool Failure Response (cont.)****8.6.1 Drum/Plywood Handler Fails to Operate (cont.)**

- C. IF the drum/plywood handler fails to operate using the Pendant Control,
THEN check the installation of the attachment, hydraulics and the pendent.
- D. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for drum/plywood handler failure.
- E. IF maintenance or configuration changes were made to repair the drum/plywood handler, RCBU and/or controllers,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.6.2 Fork Tine Fails to Operate

- A. IF the RCBU is not in the Maintenance or Tool Changing Area,
THEN move the RCBU to the Maintenance Area.
- B. IF the forks fail to operate remotely,
THEN attempt to control the forks using the Pendant Control.
- C. IF the forks fail to operate using the Pendant Control,
THEN check the installation of the attachment and the pendent.
- D. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for fork tine failure.
- E. IF maintenance or configuration changes were made to repair the fork tines, RCBU and/or controllers,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.6.3 Loose Material Cleanup Tool Fails to Operate

- A. IF the RCBU is not in the Maintenance or Tool Changing Area,
THEN move the RCBU to the Maintenance Area.
- B. IF the cleanup tool fails to operate remotely,
THEN attempt to control the Cleanup Tool using the Pendant Control.
- C. IF the forks fail to operate using the Pendant Control,
THEN check the installation of the attachment and the pendent.
- D. Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for loose material cleanup tool failure.

8.0 PROCEDURE (cont.)**8.6 RCMHS Attachment Tool Failure Response (cont.)****8.6.3 Loose Material Cleanup Tool Fails to Operate (cont.)**

- E. IF maintenance or configuration changes were made to repair the cleanup tool, RCBU and/or controllers,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.7 RCMHS Visual Monitoring System (VMS) Failure Response

NOTE 1: The VMS consists of cameras, lamps, and pan/tilt units mounted on the top of the RCBU.

NOTE 2: The RCBU Vehicle can be operated remotely if the problem is limited visibility, which can be assisted by the Stationary and Security Cameras.

8.7.1 IF full visual contact with the RCBU is lost,
THEN shutdown the RCMHS per 64-C-100.

8.7.2 Move the RCBU to the Maintenance Area using either remote or Pendant Control.

8.7.3 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for Visual Monitoring System failure.

8.7.4 IF maintenance or configuration changes were made to repair the VMS cameras and/or controller,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.8 RCMHS Tether Support Cable Failure Response

NOTE: The indications of a support cable break includes:

- 1) RCBU shutdown,
- 2) Loss of RCBU electronics,
- 3) Obstruction of RCBU movement,
- 4) Loss of RCBU video monitoring,
- 5) Excessive noise generated by the falling of the cable and tethered weight.

8.8.1 Visually confirm and locate the tether support cable break both remotely and physically.

NOTE: A support cable break may leave the tether control cable intact so that the RCBU can be operated remotely, however extra measures may need to be taken to ensure that the tether cable is not damaged.

8.8.2 Move the tether control cable and the tether support cable so that the RCBU can be moved to the Maintenance Area.

8.0 PROCEDURE (cont.)

8.8 RCMHS Tether Support Cable Failure Response (cont.)

- 8.8.3 Move the RCBU to the Maintenance Area using the Pendant Control.
- 8.8.4 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for tether support cable failure.
- 8.8.5 IF maintenance or configuration changes were made to repair the tether support cable,
THEN complete the "RCMHS System Functionality Checklist" per Procedure 64-C-102 prior to resuming operation of the vehicle.

8.9 SUPERVISORY HALT Switch Failure Response

NOTE: The SUPERVISORY HALT Switch must be functional during any remote operations utilizing the RCMHS. If not functional, any activities being performed must be stopped immediately and shall not be resumed until the SUPERVISORY HALT Switch is operating correctly (SAR 5.5.1.1).

- 8.9.1 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for SUPERVISORY HALT Switch failure.
- 8.9.2 IF the Pendant Control is successful in controlling the RCBU,
THEN move the RCBU to the Maintenance Area.
- 8.9.3 IF the Pendant Control is unsuccessful in moving the RCBU,
THEN manually retrieve the RCBU per 8.15.
- 8.9.4 Confirmation testing of the SUPERVISORY HALT Switch to stop the RCBU per operation specifications will be performed by a qualified operator after any troubleshooting activity on the vehicle, along with other items listed on the "RCMHS System Functionality Checklist" per Procedure 64-C-102.

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8.0 PROCEDURE (cont.)

8.10 HEPA Building Exhaust Failure Response

NOTE 1: Each of the independently operated HEPA Building Exhaust Units installed on Building 65 has a manually adjustable low and high differential pressure (d/p) alarm setpoint across each HEPA filter bank and pre-filter bank. The alarm setpoints will provide both a visual and audible annunciation at the local control panel.

NOTE 2: The ROS is equipped with an alarm panel for the HEPA exhaust units. This panel provides a visual indication that the HEPA blower is not operating when a trouble light is illuminated.

NOTE 3: The HEPA blower will be automatically shutdown if there is a low HEPA reading across the HEPA filter. This, along with mechanical or electrical problems will cause the remote HEPA Alarm Trouble Light to come on.

CAUTION

If fewer than 6 HEPA units are operating, overpacking operations must be suspended (SAR requirement).

8.10.1 Remote HEPA Alarm Activated in the Remote Operation Station (ROS)

- A. Determine the cause of the HEPA alarm/shutdown by visual inspection of the unit, local control panel and performing operation steps as indicated in Table 1 for HEPA alarm activated in the ROS.
- B. IF a backup HEPA unit is available, THEN change out the HEPA unit.
- C. Assist Maintenance in checking of the instruments prior to resuming operation of the backup HEPA unit.
- D. Evaluate HEPA flow capacity for continued overpacking operations per 3.2.21 (DPT-ED-0001).

8.10.2 HEPA Alarm Activated on Local Control Panel

NOTE: Each HEPA unit is equipped with a local control/alarm panel where both pre-filter and HEPA filter High and Low differential pressures (d/p) can be set and monitored. In the event that the d/p across the filters exceeds the high d/p setpoint or falls below the low d/p setpoint, the affected unit will alarm locally with both a visual and audible annunciation.

- A. Determine the cause of the alarm by visual inspection of the unit, local control panel, past inspection logs, and performing operation steps as indicated in Table 1 for HEPA Alarm activated on the local control panel.

8.0 PROCEDURE (cont.)

8.10 HEPA Building Exhaust Failure Response (cont.)

8.10.2 HEPA Alarm Activated on Local Control Panel (cont.)

- B. IF a backup HEPA unit is available,
THEN have Maintenance change the HEPA unit.
- C. Assist Maintenance in checking of the instruments prior to resuming operation of the backup HEPA unit.
- D. Evaluate HEPA flow capacity for continued overpacking operations per 3.2.21 (DPT-ED-0001).

8.10.3 Visible Dust Discharge from the HEPA Fan Exhaust

NOTE: Because the HEPA units are located outside it is possible that dust can settle inside the HEPA fan exhaust stack during a shutdown period of over two days.

- A. Warn other personnel in the general area and exit the area.
- B. Notify the Supervisor.
- C. Limits access to area.
- D. Don respiratory protection (PAPR minimum).
- E. Enter area and shut down leaking HEPA unit.
- F. Immediately shut down the HEPA unit upon observation of visible discharge from the HEPA stack.
- G. Investigate the possible causes for the dust by visual inspecting the unit, local control panel, past inspection logs, and performing operation steps as indicated in Table 1 for dust discharge from the fan exhaust.
- H. IF a backup HEPA unit is available,
THEN have Maintenance change the HEPA unit.
- I. Assist Maintenance in checking instruments prior to resuming operation of the backup HEPA unit.
- J. Evaluate HEPA flow capacity for continued overpacking operations per 3.2.21 (DPT-ED-0001).

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8.0 PROCEDURE (cont.)

8.11 Continuous Air Monitor (CAM) Alarm Response

NOTE 1: The Continuous Air Monitor (CAM) must have been operating at least two hours and not alarming prior to personnel entry into the Annex or Building 65. Access to troubleshoot, diagnose and correct any problem may take place under the control of the RWP for this activity (SAR 5.5.1.2).

NOTE 2: Low or no air flow through the CAM filter system indicates that either the vacuum pump has stopped operating or that the filter has become plugged with collected dust.

8.11.1 CAM Vacuum Pump Flow Failure or Inadequate

- A. The Radiological Control Technician (RCT) will investigate the vacuum pump operation and the filter paper condition.
- B. IF a backup CAM Vacuum Pump unit is available, THEN RCT will change the CAM Vacuum Pump unit.

8.11.2 CAM Detector Failure

- A. The RCT will investigate the cause for the CAM Detector to fail.
- B. IF a backup CAM Detector unit is available, THEN RCT will change the CAM Detector unit.

8.12 Security CCTV System Failure Response

NOTE: The Security CCTV System has been installed to record activities being conducted during periods of non-operations. The Security CCTV System consists of cameras, a monitor and a video recorder.

- 8.12.1 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for the Security Camera System failure.

8.13 Stationary CCTV System Failure Response

NOTE: The Stationary CCTV System consists of cameras, lamps, and pan/tilt units, remotely controlled and mounted on stands that shall be used to assist in operation of the RCMHS.

- 8.13.1 Move the stationary cameras out of Building 65 to the Maintenance Area.
- 8.13.2 Assist Maintenance in determining corrective maintenance by performing visual and operation steps as indicated in Table 1 for Stationary CCTV System failure.

8.0 PROCEDURE (cont.)

8.14 Airlock Overhead Door Failure Response

NOTE: The Airlock overhead doors are an important feature of the Building 65 ventilation system. Normal position for these two doors is closed. Only one overhead door may be open at any given time to maintain negative air pressure in Building 65 and the Annex.

8.14.1 Investigate cause of the overhead door failure by performing visual and operation steps as indicated in Table 1 for the Airlock overhead door failure.

8.14.2 IF the overhead door cannot be closed automatically,
THEN use the manual chain closing device to close the overhead door.

8.15 Manual Retrieval of the RCBU

NOTE 1: There are two methods for performing the manual retrieval of the RCBU from Building 65. The preferred method is to pull the vehicle out using a winch. This method requires that the vehicle is positioned correctly and can be maneuvered out of the area. The backup method is to pull the vehicle out using the manned forklift. This is the most common method of retrieving a forklift vehicle, however, there is a slight increase in personnel radiation exposure.

NOTE 2: Engineering Drawing Number 65X-5500-X-00034, "RCBU Recovery" depicts the design intent of the towing system, lists the minimum equipment requirements for the RCBU towing kit, and serves as an Operator Aid for towing operations.

8.15.1 Winch Retrieval of the RCBU

- A. Lift the electric winch skid with the Annex manned forklift truck.
- B. Secure the winch skid to the forklift truck.
- C. Locate the winch skid at the most optimum angle to move the RCBU into the Annex.
- D. Place the winch skid securely on the ground using the fork tines.
- E. IF the RCBU hydraulic system is intact,
AND temporary hydraulic source to remove a load or reposition steering is required,
THEN install the temporary source of hydraulic power (Enerpak).
- F. IF the RCBU is holding a load,
THEN lower and remove the load by manual operation of the hydraulic control valves.

8.0 PROCEDURE (cont.)

8.15 Manual Retrieval of the RCBU (cont.)

8.15.1 Winch Retrieval of the RCBU (cont.)

- G. IF the steering wheels need to be positioned THEN manually turn the wheels by manual operation of the hydraulic control valves.
- H. IF the RCBU is not positioned for towing, THEN move the RCBU manually per the following 8.15.2.
- I. IF the RCBU hydraulic system is inoperable, or IF the steering system is inoperable, THEN move the RCBU manually per 8.15.2.
- J. Attach RCBU hitch assemble on the back of the vehicle.
- K. Attach the tow cable from the electric winch skid to the RCBU hitch assembly.
- L. Place the brake release block on the RCBU brake line.
- M. Pull the RCBU into the Annex using the electric winch.
- N. Steer as necessary during RCBU towing using the Enerpak with manual operation of the hydraulic control valves.
- O. WHEN RCBU has been moved into the Annex, THEN remove and store the following equipment used to retrieve the RCBU:
 - 1. Electric winch skid with cable
 - 2. Enerpak.

8.15.2 Manned Forklift Truck Retrieval of the RCBU

NOTE: Authorization of manned forklift retrieval must come from the Operations Manager prior to initiating this section.

- A. Ensure that all prerequisites for entering the Annex and Building 65 are met.
- B. IF the RCBU cannot be retrieved from Building 65 using the winch, THEN attach the manned forklift hitch assemble to the back of the RCBU.
- C. Place the brake release block on the RCBU brake line.
- D. Attach the tow bar, linking the back of the RCBU with the manual forklift truck.
- E. Pull the RCBU out of Building 65.

8.0 PROCEDURE (cont.)

8.16 Thorium Overpacking Container (TOC) Out-Of-Specification Response

NOTE 1: A TOC is considered to be out-of-specification if the full container is missing the lid/base gasket or the gasket is damaged, or if the container is overweight or is overfilled.

NOTE 2: Actions taken to perform the following will require a special RWP and attention by the RCT.

NOTE 3: The TOC gasket will be installed on the TOC lid prior to moving it into the Building 65 Annex. If the gasket becomes unglued from the lid surface it may be partially or totally damaged.

8.16.1 Repairing and/or Replacing a Damaged or Missing TOC Gasket

- A. Ensure that the full TOC is located on a TOC stand inside the Annex.
- B. Using the manned forklift truck, lift the lid from the TOC base until access can be made to the gasket surface.
- C. Wipe or vacuum loose material off the gasket area and gasket material.
- D. IF the gasket material is not damaged and can be put into place, THEN stick the gasket material back into place on the TOC lid.
- E. IF the gasket material is damaged and/or missing, THEN stick a new gasket onto the TOC Base.
- F. Lower the lid back onto the TOC Base.

8.16.2 Handling an Overweight TOC Container

NOTE: A TOC is overweight when the weight of the full TOC exceeds the maximum authorized container shipping weight (8,000 pounds).

- A. Return the overweight TOC to the Airlock.
- B. Remove the bolts from the TOC in the Airlock.
- C. Using the manned forklift, move the full TOC out of the Airlock to the manned forklift truck limit line.
- D. Place an empty TOC Base adjacent to the full TOC Container.
- E. Using the manned forklift truck, lift the lid completely off the full TOC.

8.0 PROCEDURE (cont.)

8.16 Thorium Overpacking Container (TOC) Out-Of-Specification Response (cont.)

8.16.2 Handling an Overweight TOC Container (cont.)

- F. All personnel must leave the Annex/Building 65 Area for remote RCBU operation.
- G. Use the RCBU under remote control equipped with drum/plywood handler attachment to move a drum from the full TOC and place it onto the empty TOC Base.
- H. After the RCBU has been secured, reenter the Annex area.
- I. Wipe or vacuum loose material off the gasket area and gasket material.
- J. Use the manned forklift truck to lower the lid back onto the full TOC Base.

8.16.3 Handling an Overfilled TOC Container

NOTE 1: A TOC is overfilled when the lid cannot be seated on the TOC Base. This will be discovered before the full TOC is moved into Building 64.

NOTE 2: Carefully check the gasket surface area for debris prior to complete removal of the lid.

- A. Evaluate the contents in the TOC by reviewing the video tape generated while the TOC was being filled.
- B. IF the overfilling is determined during remote lidding of the TOC, THEN lift the lid off using the RCBU remotely.
- C. IF the overfilled container is not discovered until it is moved onto the TOC stand, THEN use the manned forklift to lift the lid off.
- D. Place an empty TOC Base adjacent to the full TOC Container.
- E. All personnel must leave the Annex/Building 65 Area for remote RCBU operation.
- F. Use the RCBU under remote control equipped with drum/plywood handler attachment to move a drum from the full TOC and place it onto the empty TOC Base.
- G. IF the problem was created by the drum being too tall for the container, THEN place the tall drum on its side into a TOC Base equipped with a TOC insert.

8.0 PROCEDURE (cont.)

8.16 Thorium Overpacking Container (TOC) Out-Of-Specification Response (cont.)

8.16.3 Handling an Overfilled TOC Container (cont.)

- H. AFTER the RCBU has been secured,
THEN reenter the Annex area.
- I. Wipe or vacuum loose material off the gasket area and gasket material.
- J. Use the manned forklift truck to lower the lid back onto the full TOC Base.

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TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Critical/Disabling RCMHS Alarm</u> - Low Engine Oil Pressure (8.1.1).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Oil Leak on RCBU, or 3. Failed Oil Pump	1. Leave RCBU shut down. 2. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 3. Contact the Garage to repair oil leak or other repairs. (Work Order)
	4. Low Oil Level in RCBU Engine	1. Check oil level in RCBU engine.
	<u>Critical/Disabling RCMHS Alarm</u> - High Engine Water Temperature (8.1.1).	1. RCBU Engine has stalled
2. Low Engine Coolant Level		1. Check coolant liquid level on RCBU engine.
3. Coolant Liquid Leak on RCBU		1. Leave RCBU shut down. 2. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 3. Contact the Garage to repair a coolant liquid leak. (Work Order)

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Critical/Disabling RCMHS Alarm</u> - High Engine Oil Pressure (8.1.1).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Low Oil Leak in Engine	1. Check oil level in RCBU Engine.
	3. Low Coolant Level	1. Check coolant liquid level on RCBU engine. (Caution - Engine must be cool)
	4. Coolant Liquid Leak, or	1. Leave RCBU shut down.
	5. Oil Leak on RCBU	2. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 3. Contact the Garage to repair oil leak or other repairs.
<u>Critical/Disabling RCMHS Alarm</u> - Low Brake Fluid Level (8.1.1).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Low Brake Fluid Level	1. Check brake fluid level.
	3. Brake Fluid Leak	1. Leave RCBU shut down. 2. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 3. Contact the Garage to repair fluid leak or other repairs. (Work Order)

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Critical/Disabling RCMHS Alarm</u> - Low Hydraulic Oil Level (8.1.1).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Low Hydraulic Fluid Level	1. Check hydraulic fluid level.
	3. Hydraulic Fluid Leak or,	1. Leave RCBU shut down.
	4. Failed hydraulic Pump	2. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 3. Contact the Garage to repair hydraulic fluid leak or other repairs.
<u>Non-Critical RCMHS Alarm</u> - Alternator Charge Low (8.1.2).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Battery Cables Loose, or	1. Move RCBU to the Maintenance Area.
	3. Alternator/Battery Problem	2. Contact the Garage to inspect and repair battery or perform other repairs. (Work Order)
	4. Battery Conditioner Box Left Energized	1. Change battery (Auto Charge Mode only)

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Non-Critical RCMHS Alarm</u> - Low Engine Coolant Level (8.1.2).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Low Coolant Level	1. Check coolant liquid level on RCBU engine.
	3. Coolant Liquid Leak, or	1. Move RCBU to the Maintenance area. 2. Contact the Garage to repair coolant liquid leak. (Work Order)
	4. A level sensor is bad	
<u>Non-Critical RCMHS Alarm</u> - Air Cleaner Plugged (8.1.2).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Air Filter/Cleaner is plugged, or	
	3. The sensor is bad	1. Move RCBU to the Maintenance Area. 2. Contact the Garage to inspect and/or replace the air filter. (Work Order)
<u>Non-Critical RCMHS Alarm</u> - High Hydraulic Oil Temperature (8.1.2).	1. RCBU Engine has stalled	1. Using CCTV microphones listen for engine operation. 2. <u>IF</u> the engine is not operating, <u>THEN</u> restart the engine. 3. <u>IF</u> the engine is operating, <u>THEN</u> shut down engine.
	2. Hydraulic Problem	1. Move RCBU to the Maintenance Area. 2. Contact the Garage to inspect and/or replace the air filter. (Work Order)

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>RCBU / Vehicle Failure</u> - Engine Fails to Start (Starter Working), or - Engine stops during Operation (Indicated by audio pickup) (8.1.2).	1. Empty LP Gas Cylinder 2. LP Gas Cylinder Valve Shut 3. Air in LP Gas Line 4. Low Battery/Alternator 5. Engine Problem	1. Replace the empty cylinder with a full LP gas cylinder. 1. Open LP gas cylinder valve. 1. Bleed air from LP gas line at cylinder (See 7.0, Health & Safety for Caution statement). 1. Leave RCBU shut down. 2. IF RCBU is not in the Maintenance Area, THEN retrieve RCBU per 8.15. 3. Contact the Garage to inspect battery and/or engine. (Work Order)
	6. Central Command Register not reset	1. Turn off the Key Operated Power Switch. 2. Push down the RCBU HALT Switch. 3. Turn the Key Operated Power Switch back on. 4. After 10-15 seconds, lift the RCBU HALT Switch.

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>RCBU / Vehicle Failure</u> - Engine Fails to Start (No starter) (Indicated by audio pickup) (8.2.1).</p>	<ol style="list-style-type: none"> 1. RCBU Key Operated Power Switch Off or HALT Switch Down 2. Supervisor/Operator Key Switches off, Supervisory Halt Switch Down 3. Base Unit Mode in wrong position. 4. Low Battery/Alternator Problem, or 5. Engine Problem 	<ol style="list-style-type: none"> 1. Turn on Key Operated Power Switch, pull up RCBU HALT Switch. 1. Turn on SUPERVISOR and/or OPERATOR KEY Switch. 2. Pull up Supervisory Halt Switch. 1. Move Base Unit Mode Switch to "Travel". 1. Leave RCBU shut down. 2. IF RCBU is not in the Maintenance Area, THEN retrieve RCBU per 8.15. 3. Contact the Garage to inspect Battery and/or engine. (Work Order)
<p><u>RCBU / Vehicle Failure</u> - Loss of Hydraulic Control to Steering, Mast Control (8.2.2).</p>	<ol style="list-style-type: none"> 1. Hydraulic Fluid Leak, or 2. Failed Hydraulic Pump 3. Low Hydraulic Fluid Level 	<ol style="list-style-type: none"> 1. Leave RCBU shut down. 2. IF RCBU is not in the Maintenance Area, THEN retrieve RCBU per 8.15. 3. Contact the Garage to repair hydraulic fluid leak or other repairs. (Work Order) 1. Check hydraulic fluid level.

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>RCBU / Vehicle Failure</u> - Gear Failure - Stuck in Neutral, Forward or Reverse (8.2.3).</p>	<p>1. Gear Problem 2. Controller Problem</p>	<p>1. Attempt to check gears using the Pendant Controller. 2. <u>IF</u> Pendant Controls work, <u>THEN</u> move to the Maintenance Area. 3. <u>IF</u> Pendant Controls do not work and not in Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. 4. Contact the Garage and/or Maintenance to repair the gear mechanism. (Work Order)</p>
<p><u>RCBU / Vehicle Failure</u> - Gear Failure - Stuck in Neutral, Forward or Reverse (8.2.3).</p>	<p>1. Low Brake Fluid Level 2. Brake Fluid Leak, or 3. Brake Mechanical Failure</p>	<p>1. Check brake fluid level. 2. Leave RCBU shut down. 3. <u>IF</u> RCBU is not in the Maintenance Area, <u>THEN</u> retrieve RCBU per 8.15. Contact the Garage to repair brake fluid leak or other repairs. (Work Order)</p>

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>On-Board Remote Control Failure</u> - RCBU Vehicle does not Respond to Remote Control Command (8.3).</p>	<p>1. Controller Electric Problem 2. Communications Electric Problem 3. Switch on the Vehicle in wrong position 4. Tether Cable Problem</p>	<p>1. Turn off the Key Operated Power Switch, then push down the RCBU Halt Switch, then turn on the Key Operated Power Switch. After 10-15 seconds, lift the RCBU Halt Switch. 2. Attempt operation of the RCBU using the pendant. 3. IF operated on pendant, THEN move RCBU to the Maintenance Area, THEN try to resume remote operation. 4. IF attempts to operate vehicle are unsuccessful, AND the RCBU is not in the Maintenance Area, THEN retrieve RCBU per 8.15. 5. Contact Maintenance to inspect and repair electronic problem.</p>
<p><u>Remote Control (ROC) Failure</u> - RCBU Vehicle does not Respond to Remote Control Command. RCBU will Respond to Pendant Operation (8.4).</p>	<p>1. Controller Electric Problem 2. Communications Electric Problem 3. Switch on ROC in wrong position 4. Switch on ROC broken 5. Tether Cable Problem</p>	<p>1. Attempt operation of the RCBU using the Pendant Control. 2. IF operates on Pendant Control, THEN move RCBU to the Maintenance Area, THEN try to resume remote operation. 3. IF attempts to operate vehicle are unsuccessful, THEN contact Maintenance to inspect and repair electronic problem.</p>

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>Pendent Control Failure</u> - RCBU Vehicle does not Respond to Pendant Control Command. RCBU will Respond to Remote Control Command (8.5).</p>	<ol style="list-style-type: none"> 1. Controller Electric Problem 2. Communications Electric Problem 3. Pendant Connection not made properly 4. Switch on Pendant in wrong Position 5. Switch on Pendant broken. 	<ol style="list-style-type: none"> 1. Attempt operation of the RCBU using the Remote Control. 2. IF operates by Remote Control, THEN move RCBU to the Maintenance Area. 3. Contact Maintenance to inspect and repair electronic problem with the Pendant Control.
<p><u>Attachment Tool Failure</u> - Drum/Plywood Handler Fails to operate:</p> <ol style="list-style-type: none"> 1. Sideshifter fails to move left/right, 2. Support Plate fails to raise/lower, 3. Drum Gripper fails to extend/retract, 4. Drum Gripper fails to close/open, 5. Low Grip Pressure, 6. Rotator fails to turn 7. Mask fails to go up/down, 8. Mask fails to tilt forward/backward (8.6.1). 	<ol style="list-style-type: none"> 1. Pendant not connected properly 2. Hydraulic hoses not connected properly 3. Hydraulic System Problem 4. On-Board Remote Control Problem 5. Remote Control Problem 6. Pendant Control Problem 7. Drum/Plywood Handler not Properly Attached 	<ol style="list-style-type: none"> 1. Reconnect Pendant Controls. 1. Inspect and reconnect hydraulic hoses to tool. 1. See RCBU/Vehicle failure, loss of Hydraulic Control (8.2.2). 1. See On-Board Remote Control Failure (8.3). 1. See Remote Control (ROC) Failure (8.4). 1. See Pendant Control Failure (8.5). 1. Inspect and reconnect drum/plywood handler attachment to the RCBU.

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
Attachment Tool Failure - Fork Tine Fails to operate: 1. Sideshifter fails to move left/right, 2. Mask/Forks fails to move up/down, (under load), 3. Masks/Forks fails to move up/down, (under load), 4. Mask fails to tilt forward/back (8.6.2).	1. Pendant not connected properly	1. Reconnect Pendant Controls.
	2. Hydraulic Hoses not Connected Properly	1. Inspect and reconnect hydraulic hoses to tool.
	3. Hydraulic System Problem	1. See RCBU/Vehicle Failure, Loss of Hydraulic Control (8.2.2).
	4. On-Board Remote Control Problem	1. See On-Board Remote Control Failure (8.3).
	5. Remote Control Problem	1. See Remote Control (ROC) Failure (8.4).
	6. Pendant Control Problem	1. See Pendant Control Failure (8.5).
	7. Fork Tines not properly attached	1. Inspect and reconnect fork tines to the RCBU.

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TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p>Attachment Tool Failure - Loose Material Cleanup Tool Fails to Operate: 1. Support plate fails to raise/lower, 2. Gripper fails to extend/retract, 3. Gripper fails to close/open, 4. Low grip pressure, 5. Mask fails to move up/down, 6. Sweeper plate fails to move in/out (8.6.3).</p>	<ol style="list-style-type: none"> 1. Pendant not connected properly 2. Hydraulic hoses not connected properly 3. Hydraulic System Problem 4. On-Board Remote Control Problem 5. Remote Control Problem 6. Pendant Control Problem 7. Drum/Plywood Handler not Properly Attached or Damaged 8. Loose Material Cleanup Tool not Properly Attached or Damaged 	<ol style="list-style-type: none"> 1. Reconnect Pendant Controls. 1. Inspect and reconnect hydraulic hose to tool. 1. See RCBU/Vehicle Failure, Loss of Hydraulic Control (8.2.2). 1. See On-Board Remote Control Failure (8.3). 1. See Remote Control (ROC) Failure (8.4). 1. See Pendant Control Failure (8.5). 1. Inspect and reconnect drum/plywood handler attachment to the RCBU. 1. Inspect and reconnect loose material cleanup tool to the drum/plywood handler attachment.

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Visual Monitoring System (VMS) Failure</u> 1. Lighting appears inadequate. 2. Camera does not respond to remote control operation: a) Zoom in/out b) Focus c) Pan left/right d) Tilt up/down. 3. Picture not clear on monitor (8.7).	1. Light Bulb Burned Out	1. Replace RCBU camera light bulb.
	2. Camera Electric Motor/Heater Problem	1. Contact Maintenance to inspect and repair electronic problem with the RCBU camera.
	3. Video Camera Problem	1. Contact Maintenance to repair or replace RCBU camera.
	4. Remote Controller Problem	1. Contact Maintenance to inspect and repair Remote Controller for the VMS cameras.
	5. Monitor and/or VCR Problem	1. Contact Maintenance to inspect and repair monitor, VCR, or wiring between camera and monitor.
<u>Tether Support Cable Failure</u> - Support Cable Break - Cable Weight/Support Structure Failure (8.8).	1. RCBU Tether Cable Pulling on Support Cable	1. Inspect both the RCBU tether cable and the support cable for binding. 2. Contact Maintenance to inspect and repair tether support cable or structural supports.
	2. Support Cable Breaks	1. Inspect support cable for extent of damage and configuration of cable in building 65. 2. IF area is clear to the Maintenance area, THEN move the RCBU to the Maintenance Area using the Pendant Control. 3. Contact Maintenance to inspect and repair tether support cable or structural supports.

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>Supervisory Halt Switch Failure</u> Vehicle Fails to Stop when Supervisory Halt Switch is Activated (8.9).</p>	<p>1. Supervisory Halt Control Switch Failure</p> <p>2. On-Board Remote Control Failure</p>	<p>1. Contact Maintenance to inspect and repair the RCMHS SUPERVISORY HALT Switch on the ROC.</p> <p>1. See On-Board Remote Control Failure (8.3).</p>
<p><u>HEPA Building Exhaust Failure</u> - HEPA Alarm Activated in the ROS.</p> <p>1. Unit Shut Down (Auto/Man), 2. Electric Failure, 3. Low HEPA d/p (Possible Filter Breach) (8.10.1).</p>	<p>1. Power Failure, Fan is Not Operating</p> <p>2. Low HEPA Filter d/p,</p> <p>3. Pre-filter Problem, 4. HEPA Filter Problem 5. Belt Failure</p>	<p>1. Inspect HEPA unit to determine unit operation status.</p> <p>2. Inspect Local Control Panel and alarms to determine which alarm(s) have been activated.</p> <p>3. IF blower is still operating, THEN turn of unit.</p> <p>4. IF blower is not operating, THEN investigate cause for the unit to go to Auto shutdown.</p> <p>5. IF the cause is electrical, THEN contact Maintenance to repair.</p> <p>6. IF the cause is low d/p measurement, THEN contact Maintenance to inspect, and replace, as required, the HEPA Filter or the d/p instrument.</p>

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>HEPA Building Exhaust Failure</u> - HEPA Alarm Activated on the local control panel</p> <ol style="list-style-type: none"> 1. Low HEPA Filter d/p, 2. low Pre-Filter d/p, 3. High HEPA Filter d/p, 4. High pre-Filter d/p (8.10.2). 	<ol style="list-style-type: none"> 1. HEPA Unit Shut Down 2. Hole in HEPA Filter or Pre-filter 3. Filters sealed by dust or moisture 4. Belt Failure 	<ol style="list-style-type: none"> 1. Acknowledge Alarms, Clearing Alarms. 1. IF backup HEPA unit is available, THEN disconnect HEPA unit and install backup unit. 2. IF backup HEPA unit is not available, THEN contact Maintenance to inspect and replace, as required, the pre-filter and/or HEPA filter.
<p><u>HEPA Building Exhaust Failure</u> - Dust discharge from the Fan Exhaust (8.10.3).</p>	<ol style="list-style-type: none"> 1. HEPA Filter Problem 2. Loose dust in the stack during HEPA Startup 	<ol style="list-style-type: none"> 1. Shut down HEPA Unit. 2. Inspect the unit pre-filter for dust loading. 3. Inspect the HEPA filter housing for loose material. 4. Contact Maintenance to inspect and replace HEPA filter cartridge.

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TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<p><u>CAM Alarm</u> - Flow Failure or Inadequate (8.11.1).</p>	<p>1. Power Failure</p> <p>2. Heavy Dust Loading on Filter</p> <p>3. CAM Vacuum Pump Problem</p>	<p>1. Ensure CAM vacuum pump is plugged IN.</p> <p>2. Investigate facility electric supply.</p> <p>1. Ensure that RCT replaces CAM filter.</p> <p>1. IF vacuum pump fails to operate properly, THEN RCT should replace CAM.</p>
<p><u>CAM Alarm</u> - Detector Failure (8.11.2).</p>	<p>1. CAM Instrument Problem</p>	<p>1. RCT investigate cause for failure.</p> <p>2. IF cause cannot be determined or repaired, THEN RCT should replace CAM.</p>
<p><u>CAM Alarm</u> - Contaminate Concentration Above Limit (8.11.3).</p>	<p>1. Excessive Loss Contamination in Building</p> <p>2. Dust from Drum Failure</p> <p>3. High Thoron in Area</p>	<p>1. WHEN airborne concentration drops below limit, THEN enter building, AND vacuum loose contamination.</p> <p>1. Clean up spill using RCBU loose material cleanup tool.</p> <p>1. Ensure that HEPA building exhaust units are operating.</p>

TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Security CCTV System Failure</u> 1. No Picture on the monitor, 2. Picture not clear on monitor (8.12).	1. Camera Electric Motor/Heater Problem	1. Contact Maintenance to inspect and repair electronic problem with the Security Camera.
	2. Video Camera problem	1. Contact Maintenance to repair or replace Security Camera.
	3. Monitor and/or VCR Problem	1. Contact Maintenance to inspect and repair monitor, VCR, or wiring between camera and monitor.
<u>Stationary Camera Failure</u> 1. Lighting appears inadequate, 2. Camera does not respond to remote control operation: a) Zoom in/out, b) Focus, c) Pan left/right, d) Tilt up/down, 3. Picture not clear on monitor (8.13).	1. Light Bulb Burnt Out	1. Replace stationary camera light bulb.
	2. Camera Electric Motor Problem	1. Contact Maintenance to inspect and repair electronic problem with the stationary camera.
	3. Video Camera Problem	1. Contact Maintenance to repair or replace stationary camera.
	4. Remote Controller Problem	1. Contact Maintenance to inspect and repair Remote Controller for the stationary camera.
	5. Monitor and/or VCR Problem	1. Ensure that HEPA building exhaust units are operating.

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TROUBLESHOOTING CAUSE/RESPONSE TABLE

ALARM/FAILURE	POSSIBLE CAUSE	RESPONSE
<u>Airlock Overhead Door Failure</u> - Overhead door will not open and/or close (8.14).	1. Electric Motor Problem	1. Check breaker to ensure power to door motor drive. 2. Contact Maintenance to investigate and repair electrical problem. 3. Open/Close door manually using chain drive.
	2. Open/Close Switch Problem	1. Contact Maintenance to repair switch. 2. Open/Close door manually using chain drive.
	3. Door Jamb or Out of Track	1. Inspect the door guides for pinch points and/or door out of guide tracks. 2. Contact Maintenance to repair overhead door.

TOP Equipment Troubleshooting Authorization

This form shall be completed by the Shift Supervisor, to recommend diagnostic and other troubleshooting actions for Thorium Overpacking equipment problems.

Problem: _____

Potential Cause(s): _____

- Recommended Steps:**
1. _____
 2. _____
 3. _____
 4. _____
 5. _____
 6. _____
 7. _____
 8. _____

Recommended: _____
 Shift Supervisor Date _____

Approved: _____
 Process Engineer Date _____

Concurred: _____
 Operations Manager Date _____

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RECORD OF ISSUE/REVISIONS

<u>DATE</u>	<u>REV. NO.</u>	<u>DESCRIPTION AND AUTHORITY</u>
09-27-95	0	New procedure requirement for Thorium Overpacking Project Infrequent Events Procedure, per Request No. P95-0288, initiated by F. Ito.
11-22-95	0	Procedure reissued to incorporate additional program requirements for Thorium Overpacking Project Infrequent Events Procedure, Per Request No. P95-0424, initiated by F. Ito.
02-20-96	1	Revised to update procedure to current requirements per Request No. P96-0055, initiated by T.N. Huey.
03-25-96	2	Revised to update procedure to current requirements and to incorporate TCN 0597, per Request No. P96-0128, initiated by T. Huey.

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